Platte River Recovery Implementation Program

Michael Forsberg Photo

Final Environmental Impact Statement

Volume 2

U.S. Department of the Interior
Bureau of Reclamation

U.S. Department of the Interior
U.S. Fish and Wildlife Service

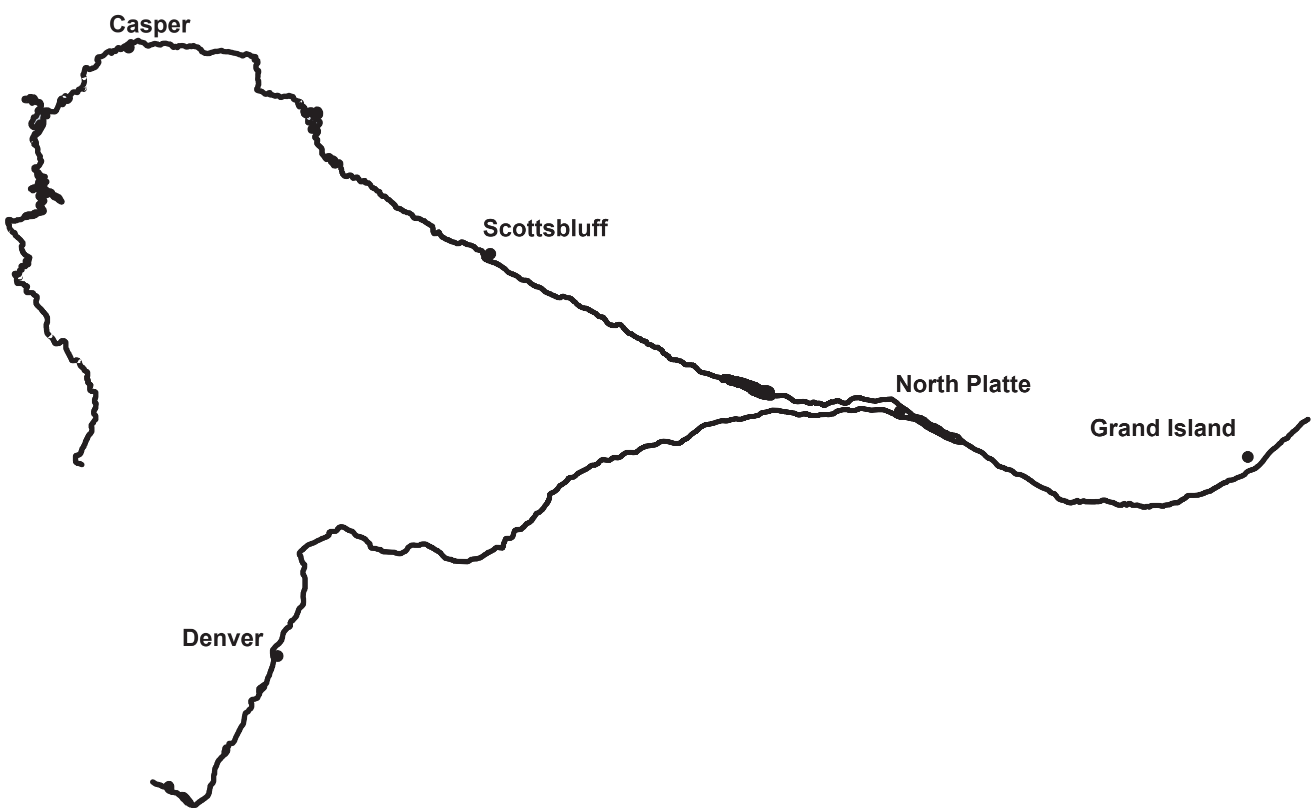
April 2006

Platte River Recovery Implementation Program Final Environmental Impact Statement

Volume 2

Assessing Alternatives for Implementation of a Basinwide, Cooperative, Endangered Species Recovery Program

April 2006



United States Department of the Interior
Bureau of Reclamation
U.S. Fish and Wildlife Service

COVER SHEET
Final Environmental Impact Statement
Platte River Recovery Implementation Program

Prepared by: Bureau of Reclamation and U.S. Fish and Wildlife Service.

National Environmental Policy Act Cooperating Agencies: U.S. Natural Resources Conservation Service, U.S. Environmental Protection Agency, Western Area Power Administration, U.S. Department of Agriculture-Forest Service, U.S. Geological Survey, U.S. Army Corps of Engineers, and Carbon County, Wyoming.

Action Area:
Nebraska Counties: Adams, Arthur, Banner, Buffalo, Cheyenne, Custer, Dawson, Deuel, Garden, Gosper, Hall, Hamilton, Kearney, Keith, Kimball, Lincoln, Merrick, McPherson, Morrill, Phelps, Scotts Bluff, and Sioux.
Colorado Counties: Adams, Arapahoe, Boulder, Clear Creek, Denver, Douglas, Elbert, Gilpin, Jackson, Jefferson, Larimer, Logan, Morgan, Park, Sedgwick, Teller, Washington, and Weld.
Wyoming Counties: Albany, Carbon, Converse, Fremont, Goshen, Laramie, Natrona, and Platte.

This Final Environmental Impact Statement (FEIS) is prepared to address requirements of the National Environmental Policy Act (NEPA). This FEIS also serves as the Biological Assessment for the Endangered Species Act (ESA) Section 7 consultation.

In 1997, the States of Nebraska, Wyoming, and Colorado and the U.S. Department of the Interior (Interior) signed a *Cooperative Agreement for Platte River Research and Other Efforts Relating to Endangered Species Habitats Along the Central Platte River, Nebraska (Cooperative Agreement*). In this document, the signatories agreed to pursue a Basinwide, cooperative approach to improve and maintain habitat for four threatened and endangered species—the whooping crane, interior least tern, piping plover, and pallid sturgeon in the Platte River.

Interior has prepared this FEIS to analyze the impacts of the first 13 years of implementation of the proposed Recovery Implementation Program (Program) (Program's First Increment) to benefit the target species and their habitat in the Platte River Basin and to provide compliance with the ESA for certain historic and future water uses in each state. The habitat objectives of the proposed Program include: improving flows in the Central Platte River through water re-regulation and conservation/ supply projects; and protecting, restoring, and maintaining at least 10,000 acres of habitat in the Central Platte River area between Lexington and Chapman, Nebraska. This FEIS analyzes the impacts of four alternatives to implement the Program. The Governance Committee Alternative is selected as Interior's preferred alternative.

The Programmatic FEIS focuses on impacts that the Program may have on hydrology, water quality, land, target species and their habitat, other species, hydropower, recreation, economics, social, and cultural resources. Subsequent NEPA and ESA documents required for implementation of specific Program actions will be tiered off of this document.

For further information regarding this FEIS, or to obtain additional copies of this FEIS, contact Joy Knipps at the Platte River EIS Office (PL-100), PO Box 25007, Denver, Colorado 80225-0007, telephone (303) 445-2096 or facsimile (303) 445-6331.

Copies of the *Platte River Recovery Implementation Program Document* may be obtained by contacting the office of the Executive Director, Governance Committee, 2003 Central Avenue, Cheyenne, Wyoming 82001, telephone (307) 634-1756 or toll-free (877) 634-1773. These documents are also available at <http://www.platteriver.org>.

ROADMAP TO THE FINAL ENVIRONMENTAL IMPACT STATEMENT

This FEIS is comprised of 3 volumes and a summary.

SUMMARY

The summary contains the basic information about the proposed Program and summarizes the alternatives, Present Condition, and potential impacts of each alternative.

FINAL ENVIRONMENTAL IMPACT STATEMENT, VOLUME 1

Chapter 1 introduces the purpose of and need for proposed Program and the approach to both National Environmental Policy Act (NEPA) and Endangered Species Act (ESA) analysis for the Program. The objectives and principles for the Program's First Increment, which guide the formulation of alternatives, are described. The chapter provides a sketch of the target species and the habitat they use in and along the Platte River in Nebraska, as well as the basic kinds of actions that would be taken to restore and protect habitat. Chapter 1 also describes briefly the significant changes that have been made in the EIS in response to public comments. The complete listing of public comments and responses from the EIS Team is in volume 2 of the FEIS (see below).

Chapter 2 gives a more detailed description of the target species and the key features of the Platte River habitat used by the species. This chapter also describes in detail the changes in the species habitat and trends in the species' population that provide the impetus and need for this Recovery Implementation Program.

Chapter 3 describes the action alternatives. A table summarizing the elements in each alternative, and a table summarizing the impacts of each alternative on the environment, is found at the end of chapter 3.

Chapter 4 describes the Present Condition for the affected resources, which serves as the baseline for comparing the action alternatives. The methods used for analysis are summarized in this chapter.

Chapter 5 analyzes impacts of the action alternatives for each indicator, as well as cumulative impacts. Chapter 5 also includes the biological assessments' determination of effects for the target species.

Chapter 6 describes the public involvement process and consultation and coordination efforts with other Federal, state, and local government agencies.

Chapter 7 is a list of environmental commitments that would be undertaken upon implementation of a Program.

Glossary
Bibliography
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Abbreviations and Acronyms
List of Preparers

FINAL ENVIRONMENTAL IMPACT STATEMENT, VOLUME 2

This volume contains documents that provide background information.

- Public Comments on the DEIS and Responses From the EIS Team
- Governance Committee Program Document Table of Contents
- The ESA Section 7 Consultation Process With and Without a Cooperative Program
- History of ESA Consultations on Platte River Target Species
- Platte River EIS Screening Report
- Lake McConaughy EA 2005 Operating Plan
- Major Water Facilities Likely to be Affected
- Service Draft Instream Flow Recommendations
- National Research Council Report on Endangered and Threatened Species for the Platte River[1]
- Fish and Wildlife Coordination Act Report: Platte River Recovery Implementation Program
- Financial Impacts to Pick-Sloan Firm Power Customers
- Volume 3 Table of Contents

FINAL ENVIRONMENTAL IMPACT STATEMENT, VOLUME 3 (ON REQUEST)

This volume is available by contacting the Platte River EIS Office <http://www.platteriver.org>. Platte River EIS Office, PL-100, PO Box 25007, Denver, Colorado 80225, USA. 303-445-2096. It contains:

A technical appendix for each resource discussed in chapters 4 and 5 to provide additional data including modeling results, methodology, and other analysis, on compact disk (CD).

Technical reports that support the data or describe methods.

[1]Reprinted with permission from the National Academies Press, Washington, D.C., Permission Number: 2248-10978.

PUBLIC COMMENTS ON THE DRAFT ENVIRONMENTAL IMPACT STATEMENT (DEIS) AND RESPONSES FROM THE EIS TEAM

INTRODUCTION

The purpose of this "Comments and Responses" section is to describe how the comments received on the Platte River Recovery Implementation Program Draft Environmental Impact Statement (DEIS) were considered and addressed in the Final Environmental Impact Statement (FEIS).

The official public comment period began January 26, 2004 and, at the request of the States, was extended twice by Federal Register notice on March 31, 2004 and May 26, 2004. Both extensions were to allow the public time to review the DEIS along with the report entitled, "Endangered and Threatened Species in the Platte River Basin," by the National Research Council of the National Academy of Sciences which was released in May, 2004. The public was invited to submit comments by email, letter, fax, or through testimony at the DEIS public hearings. The comment period concluded September 20, 2004.

The Platte River EIS Office received and addressed submissions from 17 Federal, state, local, and city agencies; 21 irrigation, power, and conservation districts, electric power organizations, and water user organizations; 9 miscellaneous local organizations in Colorado, Nebraska and Wyoming; 16 environmental and conservation groups; and 27 private citizens. In addition, nearly 7,000 postcards and letters were received through conservation groups, including the National Wildlife Federation and American Rivers. All written and oral comments are on file with the Bureau of Reclamation (Reclamation).

Changes made to the FEIS, resulting from public comments, ranged from minor editorial changes to significant changes in alternatives and analysis. The most significant changes are listed in chapter 1 of the FEIS.

ORGANIZATION OF THE COMMENTS AND REPONSES

Some submissions provided one comment while others expressed comments on multiple subjects. Members of the EIS team carefully reviewed each comment. Some issues were raised by more than one commenter or several times by the same commenter. To reduce repetition and provide one comprehensive response, repeated comments are described in a "summary comment" and addressed with a "summary response". All other comments are addressed individually. Comments included in this document were quoted directly from the submissions whenever possible. However, some lengthy comments were edited to shorten the length of this document.

Many of the responses include references to other documents. More information on most of these can be found in the "Bibliography" of the FEIS, volume 1. If the referenced document was not used in the FEIS, the additional information is provided in a footnote. Some of the referenced documents are included in volumes 2 and 3 of the FEIS. The document names are in italics. Volume 3 contains technical reports related to the FEIS. A compact disk (CD) of volume 3 is available upon request at

<http://www.platteriver.org/>. There are also references to parts of the Governance Committee Program Document. The Governance Committee Platte River Recovery Implementation Program Document (Draft), September 6, 2005, is included on a CD in volume 1 of the FEIS. This is the version used for the FEIS analysis. Final versions can be obtained on request at <http://www.platteriver.org/>.

Comments by Cooperating Agencies are addressed in the first section starting on page 3. This is followed by a listing of all summary comments, arranged by topic and responses, starting on page 21. Last, all remaining individual comments are addressed starting on page 42.

Finding Your Comments: At the end of this document is a list of all parties who commented on the DEIS. Following each name is a list of comment numbers corresponding to the comments submitted by each party. This list starts on page 180. These numbers can be used to find the comments which each party submitted and a response, either in the summary comment or individual comment sections below.

The list of all parties who commented does not include the nearly 7,000 postcards and letters that were received through conservation groups. These submissions state a position regarding the preferred alternative as summarized in Summary Comment 01. Because this kind of comment does not require a response, according to NEPA regulations, the individual names of the submitters are not listed in this document. They are available upon request from the Platte River EIS Office or the Reclamation Great Plains Regional Office.

HOW COMMENTS WERE ADDRESSED

The National Environmental Policy Act requires that the agency preparing an EIS consider and respond to all substantive comments on the DEIS. In most cases these are comments asking for more information about the alternatives or their impacts, comments indicating specific factual errors or omissions in the document, or suggestions for additional alternatives. The EIS Team has attempted to address all such comments through changes in the EIS analysis or the document.

Some types of comments received do not require an agency response, as directed by NEPA regulations. These are:

- Comments expressing a position or a preference regarding one or more of the alternatives.
- Comments asking the proponent (the Governance Committee) to make modifications to its proposal. This included a relatively small number of comments.
- Comments or information not relevant to the EIS scope. Again, a relatively small number.

All other comments received a response. The response to some comments is, “Comment noted”. These comments are usually expressions of a viewpoint about the document or a general statement about the document which has been considered by the EIS Team but which may not be associated with a specific change to the document.

RESPONSES TO COMMENTS FROM COOPERATING AGENCIES

The NEPA encourages identification and involvement of cooperating agencies in preparation of an EIS. These can be Federal, state, and local agencies with special expertise or information that is important to the issues being assessed in the EIS. For this EIS, the cooperating agencies are:

Environmental Protection Agency (EPA)
U.S. Army Corps of Engineers (Corps)
U.S. Forest Service
Western Area Power Administration (Western)
Natural Resource Conservation Service (NRCS)
U.S. Geological Survey (USGS)
Carbon County, Wyoming

The comments of these agencies are addressed below.

Environmental Protection Agency (EPA)

Comment 14083: *Based on the information provided in this document, our Agency's review has resulted in a rating of "EC-2" (Environmental Concerns-Insufficient Information). The numeric rating of "2," states that additional information and analyses should be included in the Final EIS. This rating will be published in the Federal Register.*

To improve the decision-making utility of the Final Environmental Impact Statement, EPA suggests that the Department of Interior (Interior):

I) More clearly explain the decision process that will be utilized to commit to additional Program increments beyond the initial 13-year increment.

2) Provide a more comprehensive description of the impacts and mitigation plans for those impacts to water resources addressed under Sections 404 and 303 of the Clean Water Act.

3) Clarify Governance Committee Alternative Scenarios I and 2.

Response: Item 1: Additional explanation has been added to, "Introduction and Overview", chapter 1 which explains that the initial habitat restoration objectives for the Program may be modified during or at the end of the First Increment as more knowledge is gained about the species and the most effective means to improve their habitat and aid their recovery. Therefore, it is not possible at this time to define the criteria that will be used to determine whether a second increment is necessary or what the objectives of a second increment will be. The Service retains the responsibility, both during and at the end of the second increment, to determine whether sufficient progress is being made.

Item 2: A new section has been added to both chapters 4 and 5 focusing on the potential effects of the Program alternatives on waters falling under jurisdiction of the Clean Water Act Section 404. This analysis indicates that the Program alternatives produce a significant increase in wetlands.

The sections on "Water Quality" describes the potential impact on waters falling under Section 303 jurisdiction. Significant additional information can be found in the *Water Quality Appendix*.

Item 3: Due to significant clarification in the Governance Committee's proposal for the Program, two scenarios are not needed for the FEIS to represent the alternative.

Comment 14084: *The DEIS presents the wetland impacts of all alternatives as ranging roughly between 100-400 acres). This is a potentially significant impact to wetlands, and it is not clear whether mitigation for these impacts is required or has been planned. Furthermore, it is not clear whether the U.S. Army Corps of Engineers, has been consulted. EPA recommends that DOI consult with the Corps to determine the least damaging practicable alternative, and to determine mitigation requirements for impacted wetlands.*

Response: Substantial additional analysis of wetland issues has been added to the FEIS, based upon continuing consultation with the Corps of Engineers Omaha Office.

Comment 14085: T*here are several sections of the Platte River that are currently impaired for selenium sedimentation, fecal coliform, PCB's, atrazine, dissolved oxygen, and other pollutants. EPA recommends that the DOI consult with the Nebraska Department of Environmental Quality to evaluate the utility of this information to assist the selection of a preferred alternative. Alternative choice and implementation of Program features may help toward alleviating stream segment impairments, or conversely, detrimental to achievement of the designated beneficial use.*

There did not appear to be consideration of organic pollutants bound in sediments which could be leached into surface waters. The presence (or absence) of persistent bioaccumulative toxic chemicals (PBTs) should be described.

If groundwater from the groundwater mound is used for Platte River recharge, it should be monitored for contamination on an ongoing basis. Furthermore, contingency plans should be established to monitor the recharge plan if contamination from the groundwater mound threatens water quality compliance of either the Platte River or surface streams leading to the River.

Response: Most of the Clean Water Act 303(d) impaired sections of the Platte River are in the Lower Platte Basin and downstream from the habitat reach that would be the focus of the Program's activities. These reaches should not be adversely affected and may benefit from the increase flows associated with implementation of the Program. A review of the 303(d) list was included in the *Water Quality Appendix* to the DEIS. A copy of this was provided to the appropriate EPA personnel after this review had been completed. The 303(d) aspect of the comment was addressed during follow-up consultation with EPA.

The DEIS was based on the 2002 303(d) list. The FEIS includes an updated review of the 2004 list. In addition to the more extensive analysis in the *Water Quality Appendix,* a summary is included in the FEIS.

Prior to sampling sediments, a data set including fish inorganic and organic contaminants concentrations was obtained from the Nebraska Department of Environmental Quality and another data set including inorganic and organic contaminants in terns and plover eggs was provided by the Grand Island Office of the Fish and Wildlife Service. These data sets showed no elevated concentrations of organic contaminants. On the basis of those results, we felt that there was not likely to be high concentrations of organic contaminants in the sediments. In addition, sediment samples collected during the Central Platte National Water Quality Assessment Program Study, although limited in number, also showed no elevated concentrations of organic contaminants in the sediments, but those results did show some inorganic contaminants present at concentrations that were of concern. These are addressed in the *Water Quality Appendix* to the DEIS and will be included in an updated *Water Quality Appendix* in volume 3[1] to the FEIS.

[1] Volume 3 is available upon request at <http://www.platteriver.org/>

We agree that any Program actions involving manipulation of the Central Platte groundwater mound would require additional sampling and analysis before implementation. This commitment is included in the FEIS.

Comment 14086: *It is our assumption that the GC Alternative is a base alternative, and Scenarios 1 and 2 illustrate the range of potential impacts of the GC Alternative. It is not clear how the actual implementation of the GC alternative will be undertaken, and how decisions will be made to establish a GC Alternative that may ultimately be somewhere within the range bounded by GC Alternative, Scenarios 1 and 2. If the difference between the two scenarios are due to factors outside of DOI operational control (e.g. dependent upon willing sellers of property), EPA recommends that such constraints be outlined. If DOI operational control is assured, and scenario differences (such as to clear or not clear island acreage) amounts to programmatic decisions, then EPA recommends that the basis for such decision-making be outlined in detail.*

Response: See response to Comment 14083 above.

Comment 14087: *Pursuant to the Federal Energy Regulatory Commission (FERC) licensed conditions, the environmental account in Lake McConaughy should receive 10 percent of the storable inflows up to a maximum of 100,000 acre-feet of storage. While releases from either the Pathfinder environmental account or the re-timed flows from Colorado's Tamarisk Project can be exchanged for Lake McConaughy storage, it is not clear whether these exchanges will continue to operate during sustained drought periods. We suggest that operational conditions are carefully assessed to assure that the Program objectives of increased water supply can be maintained during low-flow or drought conditions on the river.*

Response: Comment noted. The hydrologic period of record used in the analyses of the Program (1947 to 1994) contains both very wet and very dry periods, including the 1950s drought. We therefore believe that the analysis reflects Program operations and benefits under a sustained drought condition.

Comment 14088: *One method of augmenting Platte River flow in the "Water Action Plan" is to pump groundwater from the mound into the streams that drain back to the Platte. This ground water may contain selenium concentrations in excess of the aquatic life criteria. If this method of groundwater management is selected, special emphasis will be needed to meet the State of Nebraska's stream criteria for selenium which could either be based on in-stream concentrations after dilution, or anti-degradation criteria.*

Response: Agreed. For this reason, the use of the groundwater mound for direct stream augmentation is strongly discouraged. The base flow in the streams in question is currently derived from seepage from the mound. It seems likely that at least some of the streams already have high concentrations of selenium. Before any of the options that involve flow augmentation from the groundwater mound would be implemented, site-specific data on selenium (and possibly atrazine) would be required.

Comment 14089: *The Bureau of Land Management (BLM) in Rawlins, WY has received several plans for coal bed methane (CBM) producers to augment North Platte flow for ESA purposes. The BLM field office in Rawlins is currently updating plans for the Atlantic Rim and Seminoe Road CBM projects proposed by Dudley Oil and Anadarko Petroleum Company, respectively. Typically CBM wells produce for 7 to 15 years, with a rapid decline in water production after the first year. EPA suggests that this CBM water source be studied.*

Response: Comment noted.

U.S. Army Corps of Engineers (Corps)

Comment 14848: *The intent of the Program needs to be more clearly defined based on information we received from staff discussions of August 31 and September 1, 2005.*

Response: The FEIS contains additional information about the Program purpose and need, including more specific information about the Federal requirements for the Program. In short, the purpose of the action is to implement a Program that offsets impacts to target Endangered Species Act species and their critical habitat. Implementation is through land and water management actions which result in target species habitat restoration, creation, and/or enhancement. In doing, so the Program can provide ESA coverage for existing and certain new water uses in the Platte River Basin.

Comment 14849: *The DEIS should clearly identify how the proposed program approach will be more successful than what the ESA review for individual projects has not been able to do for the past 30 years.*

Response: Chapter 1 describes in more detail why a Basinwide, cooperative approach to ESA compliance will be more effective in producing habitat improvements than individual project consultation. Additional clarification has been provided for the process of ESA compliance under the Program and without such a Program.

Comment 14850: *The DEIS should make it very clear whether there is a proven need for habitat restorations in the Central Platte River, based on the historic sited water depletions and subsequent channel encroachments, that are essential for recovery of each of the four "targeted" species.*

Response: In Interior's view, the need for habitat improvement has been established through ESA consultation between various Federal agencies and the Fish and Wildlife Service, and by the resulting jeopardy opinions that have been issued for upstream water projects in the Platte River Basin.

In addition, in 2003 Interior funded the National Research Council of the National Academy of Sciences to undertake a scientific review of the Platte River issues, focusing on the importance of the Platte River habitat to the recovery of the target species. The review panel concluded (Endangered and Threatened Species of the Platte River, National Research Council, 2004 (released draft May 2004)) that the current habitat conditions in the Central Platte adversely affect the survival of the whooping crane, piping plover, and interior least tern, and that these areas are important to the recovery of these species. The panel concluded that current conditions in the Lower Platte River provide suitable habitat for the pallid sturgeon, but that the population is so low in numbers and the habitat provided by the Lower Platte River so rare that this area is pivotal in the management and recovery of the species (National Research Council, 2005).

Comment 14851: *An expanded discussion that all "reasonable alternatives" to the Governance Committee Alternative have been considered is needed. The rationale for exclusion/inclusion of alternatives and screening criteria need to be stated in terms of institutional constraints and technical feasibility.*

Response: The *Platte River EIS Screening Report*, attached to the DEIS and in volume 2 of the FEIS, describes the process for screening 42 options for addressing the purpose and need for water and land habitat improvement. Elements were eliminated based upon excessive cost compared to other elements producing similar benefits, technical feasibility, and potential harm to other endangered species habitat. A section has been added to beginning of the *Platte River EIS Screening Report* in volume 2 which describes why certain approaches which did not fit within the purpose and need were not considered.

Some additional discussion about the formulation of alternatives has been added to chapter 3.

For the DEIS, three alternatives were formulated in addition to the Governance Committee's proposal. Two scenarios were evaluated for the Governance Committee Alternative, one of which contained little active channel restoration and the other which incorporated very active channel management. These alternatives represented a wide range of approaches to habitat restoration within the general framework of a cooperative, Basinwide approach using a given contribution of funds and resources for the First Program Increment. The range of alternatives included significantly more and less water management, significantly more and less managed land, sediment augmentation and no augmentation, island leveling and no island leveling, pulse flows and no pulse flows, water leasing in Colorado and no leasing in Colorado.

For the FEIS, an alternative has been added which relies almost entirely on reduction in consumptive use of water to provide flow improvement. In Interior's view, this represents analysis of a reasonable range of alternatives suitable for a Programmatic FEIS.

Comment 14852: *Based on data from other studies referenced in the DEIS, it appears that the proposed alternatives may take a currently stable river, with narrower, but stable to increasing channel widths in most areas, and destabilize the river downstream of where mechanical intervention is being used to clear islands.*

Response: The DEIS and the FEIS contain considerable field data indicating that the Platte River in the Central Platte Habitat Area is not stable, but is continuing to degrade due primarily to the effect of substantial clear water inflows from the Johnson-2 Return, the long-term coarsening of bed material, and the associated downcutting and narrowing of the wetted channel and the encroachment of vegetation.

More of this field data, particularly sequential surveys of river transects in the Habitat Area, have been added to chapter 2 of the FEIS. Much of the proposed Program activities seek to offset this continued erosion of the channel by restoring the sediment balance, and to offset the continuing encroachment of vegetation by clearing channels of trees and shrubs and by implementing regular short duration flows near bankfull to help prevent reestablishment of vegetation in cleared areas.

Comment 14853: *The DEIS has not adequately addressed wetland impacts. There is no specific discussion on the current status and conditions of wetlands and aquatic resources in the Central Platte River and along the various rivers and tributaries or at the reservoirs where spillway heights may be increased.*

Response: A new section has been added to the FEIS addressing impacts to waters which fall under the jurisdiction of the Clean Water Act, Section 404. This section describes both the current status of wetlands in the Central Platte, as well as the likely effect of the Program alternatives on wetlands.

Most potential Program impacts to wetlands will result from site-specific Program actions the location of which cannot be determined until either willing land sellers are identified or further feasibility studies are conducted. Therefore these new sections of the FEIS provide a programmatic analysis of potential wetland impacts. Site-specific NEPA and Section 404 analysis and application for Federal, state, and local permits will occur when site-specific actions are identified. NEPA documentation through environmental assessments or supplements to the FEIS will ensure procedural and substantive compliance to applicable statutes.

Comment 14854: *The DEIS needs to provide information on what improvements could be hydrologically sustained without continued mechanical intervention or maintenance by just utilizing variations in the volume of flow.*

Response: In all cases, it is expected that mechanical means must be used to remove established vegetation (trees and shrubs) from the channel. The DEIS and FEIS analysis indicates the types of channel habitat improvements which can then be sustained through flow management. However, it is expected that mechanical intervention will be used as needed to augment flow management. The alternatives vary in the amount of water they manage and hence the amount of flow management they can accomplish. The varying magnitude of open channel maintained by each alternative reflects this variation in the volume of flow.

Comment 14855: *Critical to the use of Adaptive Management is monitoring to document actual outcomes as compared to expected results. The Integrated Monitoring Program Research (IMPR) plan needs to be described in more depth.*

Response: The Integrated Monitoring and Research Plan (IMRP) is described fully in the Adaptive Management Plan attached to the Governance Committee Program Document[2]. In addition, a 2-page summary has been included in the main FEIS document. General components of the Adaptive Management Plan are as follows:

- Overall Program objectives and adaptive management objectives for the water and land Management.
- Hypotheses to be tested through Program actions.
- Plans for monitoring Program implementation and species response.
- Research on species' needs, habitat use, ecosystem processes, and other key questions.
- Process for annually reviewing information about Program implementation, habitat changes, species response, research findings, and other relevant information to adjust as needed.
- Adaptive Management objectives and Program actions.
- Process for peer review.

Comment 14856: *An expanded discussion of water quality information is needed with reference to baseline characterization and contaminants. Our concern is that toxic elements may reside in the sediments and that flow manipulation/in-channel clearing may contribute to contaminant release. At some point in the process, impacts to human consumptive uses and target recovery species should be assessed.*

Response: The FEIS contains an analysis of the existing contaminants in the river, bank, and island sediments, and a programmatic analysis of the effects of moving island and bank sediments back into the river. Site-specific analysis of sediment augmentation on contaminants concentrations will be undertaken in the future, once Program lands are acquired, and specific channel restoration plans are being considered. As part of the IMRP, water quality monitoring will occur. Specific parameters to be monitored will be incorporated in permits associated with sections 401 and 404 of the Clean Water Act.

Comment 14857: *Most hydrological models are only accurate to within ½ to 1 foot and yet many predictions indicate changes of water heights that are often outside the range of accuracy for these models. The DEIS needs to clarify how this information is being utilized and what factors are being weighed and considered most important when assessing the significance of this data.*

Response: It is true that the Program will manage only a small fraction of the total riverflows and, hence, flow effects are relatively minor on average. However, when analyzed over a 48-year period, the flow changes, although small, create a consistent pattern. Many of the impact analyses utilize statistical methods to identify which changes are statistically reliable. Further, many of the Program management

[2] The September 6, 2005 draft version of the Governance Committee Program Document used for the FEIS analysis, is included on a CD in volume 1 of the FEIS.

actions are locally quite dramatic, e.g., modification of the channel geometry, increasing of channel sight distances, augmentation of sediment to the river, creation of short-term pulse flows. Additional model validation is part of the IMRP process.

Comment 14858: *The DEIS addresses a complex Program, yet it needs to be written so that the reader can readily follow Reclamation's thought process.*

Response: Comment noted.

U.S. Forest Service

Comment 14051: *It is important to recognize the role of the action agency along with the applicant. In chapter 1, page 1-12, we recommend rewording as "Complete Section 7 consultation without relying on Program activities. Federal agencies and their applicants would be responsible for complying with Section 7 of the ESA. (Note: Either the federal agency and or project applicant can elect to participate in the Program or not for ESA compliance purposes)." Please clarify the definitions for land-use activities (page 1-13) and Present Condition (1-18).*

Response: Comment regarding page 1-12 is noted. When consultation is on a Federal action relating to a non-Federal project, the Federal action agency is responsible for avoiding the likelihood of jeopardy. However, the Federal action agency typically requires the private parties to provide and fund the offsetting measures. Additionally, it is the project applicant's decision whether to participate in the Program or not, and not the Federal action agency's decision. Therefore, the subject text was not revised per the comment.

Regarding clarification of Land-use activities, the Governance Committee's definition of "water-related activities" (see footnote 3 of the DEIS Program Document) includes those aspects of land-use activities that may affect riverflow quantity and timing. The definition also states that the scope of "water-related activities" is limited to those subject to section 7(a)(2) of the ESA (and therefore not necessarily to each and every specific land-use activity).

Regarding clarification of the definitions for Present Condition (page 1-18), see chapter 1 of the FEIS, "National Environmental Policy Act Analysis of the Program," "Present Condition" section.

Comment 14052: *Based on reading the Governance Committee Program Documents, it appears that the state and Federal depletion management plans are still being developed. We hope that these and other aspects of the program that are not yet drafted will undergo some level of public review before the EIS is finalized. Additionally, it appears that the U.S. Forest Service Vegetation Management Plan, referred to as Appendix A of the Federal Depletion Plan, was not included in the CD-ROM of the Governance Committee proposed Program.*

Managing new depletions appears to be a critical piece of the Program, however, the draft depletions plans do not appear to use the same assumptions or definitions. A clearer approach would be to set up a boiler plate document and have each state and the Federal government develop their depletions plans using the same headings and definitions.

Response: See response to Summary Comment 03 in the "Summary Comments and Responses" section of this document.

Comment 14053: *The inclusion of state-listed and species of special concern is important but leaves us wondering as to why they are included. The biological summaries are often not related to the effects of this proposal. We recommend that there be a summarization of whether these species are affected and if so, whether beneficial or adverse. This could be completed in a table format. Would it be helpful to also include Forest Service designated sensitive species if not already included in these lists?*

Response: Including state listed species is a NEPA requirement. No U.S. Forest Service lands will be directly or indirectly affected by land and flow management, therefore we do not believe it is necessary to include species found only on those lands.

Comment 14054: *The next to last paragraph on page 4-8 states that there are "substantial variations in hydrologic conditions, including a relatively wet 6-year period...and an 11- year dry period...." The following paragraph appears to state that precipitation and runoff are the same for present condition hydrology and historic hydrology, which may be contradictory to the previous statement.*

In any case, it is important to clearly recognize the concept of a range of natural variability in precipitation and runoff cycles, and that these cycles, especially the extremes, may affect native vegetation in the river basin. For example, drought conditions tend to correlate with long term natural disturbance cycles in forest vegetation such as fire, insects and disease. These disturbances play a significant role in seral stage, density, and other vegetative characteristics that affect runoff from forested watersheds. These cycles can vary by vegetation type, but may be as long as 150 — 300 years in high elevation forests.

Response: Additional information has been added to the FEIS regarding cycles of growth and disturbance in forest vegetation in the “Habitat Features Historically used by the Target Species” section in chapter 2.

Comment 14055: *The final paragraph under the Federal section of the "Cumulative effect of future water development on Platte River Flows”, on page 5-275, is misplaced. The vegetation management issue is not an issue of "Future Water Development”. Suggest deleting this paragraph entirely, as the issues related to vegetation management are addressed elsewhere in the EIS and the draft program documents.*

Also, this language continues to perpetuate the erroneous concept that vegetation management on National Forest System lands in the Platte River basin constitutes a depletion to the system. If this paragraph is retained in this section, we suggest revising it to eliminate the use of the word "depletion” in relation to the vegetation management issue. This could be done with the following substitute language: "A related question for the Governance Committee concerns the management plans for National Forests in the headwaters of the Platte River, and whether harvesting of trees might be reduced in the future, possibly reducing average runoff to the Platte River. The Forest Service has indicated that: (1) any amendments or revisions of Land and Resource Management Plans will be developed through the NEPA process and with appropriate consultation under the ESA; and (2) although project implementation is dependent on many factors current trends are that rates of vegetation removal are likely to remain steady or increase during the first increment of the program, leading to no change or a minimal positive change in water yield to the Platte River as a result of these activities during this time period.”

Response: The FEIS sections which address these issues, forest management in chapter 2 and the Federal depletion management plan in chapter 3, have been revised.

Comment 14056: *We are concerned by the ambiguous treatment of several non-target species that potentially leaves hundreds of Forest Service (and state and private) activities in limbo. Statements are made that stream depletions may adversely affect the Ute's ladies tresses orchid, Preble's meadow jumping mouse and Colorado butterfly plant. The document further states "Therefore, while we believe there may be project impacts, we do not have enough information to conclude that these impacts will adversely affect [these species]."*

To a reader, it would appear that the best available information so far supports an adverse effect determination, one that has already been made by the FWS over a several year period for more than one of these species. By failing to address the "presumed" impacts already mentioned in either previous FWS opinions or by statements made above, the failure to remedy this potentially leaves many projects hanging in legal limbo. It might be inferred that projects involving stream depletions adversely affect these species but with no recourse or Section 7 or 9 coverage. This could have the effect of opening up existing historic and future consultations on hundreds if not thousands of activities. We recommend that either offsetting measures are addressed through this biological opinion or that the FWS remove reference to "adverse affect" determinations in light of the ambiguity. It is possible that possible adverse effects from depletions to these species might be offset by the beneficial effect of changing water delivery and flow in a manner more consistent with historical patterns through this Program. Please note the reference on page 5-153 that flow management activities are not likely to adversely affect the Ute ladies' tresses orchid in Wyoming though we understand the different context from above.

Additionally, it is important to reiterate the limited nature of Forest Plans as documents that establish a framework for project planning. The Supreme Court has said that forest plans "do not command anyone to do anything or to refrain from doing anything; they do not grant, withhold, or modify any formal legal license, power, or authority; they do not subject anyone to any civil or criminal liability; they create no legal rights or obligations."

Response: "Adverse effect" determinations should not be confused with a "likely to jeopardize" determination, nor being unable to develop a Reasonable and Prudent Alternative as part of a biological opinion. The text commented upon (DEIS, page Attachment-25) is a summary of Platte River ESA consultations since 1978, and was part of a previous biological opinion addressing the effects of numerous minor (less than 25 acre-feet) depletions and their effects to the target species in the Central and Lower Platte River. Without knowing which particular water depletive activity is under consultation, it is not possible to state the effects of such depletions to other listed species (such as Preble's mouse, etc.) that may be in a particular project area. The text simply explains that the scope of the "1996 minor water depletions biological opinion" focused on effects to downstream Platte River target species, and any impacts of minor water depletions on other listed species were not included in that 1996 biological opinion. Effects of the Federal action on other listed species would be addressed, as applicable, during ESA consultation on a particular project or activity, and Reasonable and Prudent Alternatives developed as necessary. It is incorrect to infer "that projects involving stream depletions adversely affect these species but with no recourse or section 7 or 9 coverage."

Comment 14058: *It is suggested that Preble's critical habitat descriptions for Colorado be included in the FEIS.*

Response: Impacts to the South Platte River habitats are below (downstream) Greeley, Colorado. No critical habitat for Preble's occurs below Greeley.

Comment 14059: *South Platte basin section; 'Flows' statement (2nd paragraph) - this is inconsistent with the concept that water leasing and land management is expected above Greeley, which accordingly would probably change water flows too. The point is that water leasing and land management are stated* *as key reasons to expect effects to upstream species from Greeley. However, possible changes to upstream flows due to leasing is neither acknowledged, nor explained as to why flow changes would not occur.*

Response: The FEIS has clarified that it is not expected that any of the alternatives would involve actions or elements in the South Platte Basin above Greeley.

Comment 14060: *Indicators section; reference to Table 4-38 should be Table 4-40.*

Response: This has been corrected in the FEIS.

Comment 14062: *Greenback cutthroat trout and boreal toad are dependent on open water, yet are on the no effect list. However Preble's mouse and black-tailed prairie dog do not depend on open water, but are on the may effect list. Clear reasoning is lacking as to how these definitive determinations can be made.*

Response: Chapter 5 of the FEIS has been revised to include an expanded discussion of effects determinations for other federally listed and state listed species and species of special concern. Also see response to Comments 14245 and 14432.

Comment 14064: *Figure 5-46 does not have y-axis labeled. Add y-axis values if values are missing but intended.*

Response: The figure shows the range of impacts to gross agricultural revenues by alternative, and is not intended to have a y axis. In the FEIS, this figure has been modified for clarity.

Comment 14065: *Page 5-153 states that impacts to Spiranthes diluvialis in Wyoming for water flow management are NLAA yet Table 5-58 on page 5-158 cites impacts as "Undetermined" for Wyoming. Please clarify the conclusion. Is it undetermined based on other water uses, e.g., water leasing, associated with project?*

Response: The effects determinations have been revised in the FEIS. See revised text and table under the "Summary of Effects Determinations For All Listed Species" section.

Comment 14640: *Differences in effects by alternative and 'present condition' are not presented for the non-target species and habitats discussed in these sections. It is understandable that similar types of impacts are generally common in all alternatives; however there should be some relative differences by alternative that can be estimated and disclosed. A solution would be to show relative differences in effects by alternative and 'present condition' along with rationale. For example, since water leasing in Colorado applies to only 2 alternatives, the habitats and species found upstream of Greeley would not be affected by the other alternatives, thereby differentiating impacts by location and amount amongst alternatives.*

Response: These sections have been revised to make impacts of alternatives more clear.

Comment 14641: *Page 5-153 does not discuss impacts to Colorado populations of Spiranthes diluvialis. Table 5-58 on page 5-158 cites impacts as "undetermined." Why are Colorado populations not discussed?*

Response: See response to Comment 14058 in the "Individual Comments and Responses" section of this document.

Comment 14642: *Table 5-58 on page 5-158 cites impacts to Colorado butterfly plant in Colorado and Wyoming as "undetermined," but rationale could not be found.*

Response: Chapter 5 of the FEIS has been revised to included expanded discussion of impacts to other federally listed species.

Comment 14643: *On Page 1-7, a bullet states a purpose is to "help prevent the need to list more species." This statement does not seem supported in the rest of the document. Which species? How? A solution would be to clarify if there are specific species related to this statement and how the project would be anticipated to help prevent the need to list them.*

Response: No specific species have been identified. However, monitoring of Program activities will focus on state listed species and species of special concern identified by each state.

Western Area Power Administration (Western)

Comment 14038: *All of the action alternatives impact energy available from Pick-Sloan Missouri Basin Program (PSMBP) facilities in the North Platte basin and, as such, will financially impact the PSMBP power customers. The DEIS analysis shows that the Governance Committee and Water Leasing alternatives increase annual North Platte generation and that the Wet Meadow and the Water Emphasis alternatives decrease annual generation. The timing of monthly energy generation is also altered by all of the alternatives. If generation is shifted from months of higher energy prices to months of lower energy prices, the financial impact may be negative even if the annual energy generation is greater than under the present condition. The projected cost impact of the action alternatives is very dependant upon the assumptions used to calculate future monthly energy prices. The financial impact of the action alternatives may be reduced, in Program implementation, by moving more water from upstream storage to downstream storage in the winter months than was modeled in the DEIS.*

Response: The hydropower analysis in the DEIS accounts for monthly shifts in generation and the value of this generation. In the analysis, monthly generation for the Present Condition and all of the alternatives, were evaluated using monthly avoided costs. This process captures the differential economic value of generation across each month during the year. Relative to the Present Condition, the change in economic value of generation is appropriately characterized in the DEIS.

As suggested by the reviewer, adverse hydropower impacts described in the DEIS have been reduced somewhat by altering the timing of water movement from upstream to downstream storage in the North Platte Basin.

Comment 14039: *Western's analysis of the action alternatives shows that each action alternative represents a cost to PSMBP customers. The changes to the PSMBP generation and dependable capacity caused by the alternatives will be a cost borne by the PSMBP customers. The customers could also bear a portion of the primary Program costs unless all Program costs assigned to the Federal Government are deemed to be non-reimbursable.*

Alternatives' Energy Impacts: The Program EIS shows that the PSMBP monthly generation is changed by all of the action alternatives. Western has assumed that, to accommodate the Program changes, it must purchase energy on the open market for months of reduced generation, and will sell energy in months of increased generation. To place a value on the potential impact, Western estimated the lost generation (in Gigawatt Hours) by month. We then computed the lost generation's dollar value based on the average monthly energy sale and purchase prices. The following table summarizes the potential financial impact of the generation changes:

Summary Table: Annual Costs to PSMBP Firm Power Customers Based on Actual Monthly Prices (FYs 2002, 2003 and 2004, and 3-Year Average)

	Variance From Present Condition (GWh)	***Cost Based on Actual***			***Cost Based on 3-Year Avg Actual Prices ($)***
		FY 2002 Prices ($)	***FY 2003 Prices ($)***	***FY 2004 Prices ($)***	
Proposed Program	*3.131*	*119,582*	*34,899*	*6,274*	*53,585*
Water Emphasis	*-6.850*	*503,601*	*532,543*	*405,646*	*480,597*
Water Leasing	*1.039*	*158,025*	*97,986*	*93,008*	*116,340*
Wet Meadow	*-4.850*	*480,104*	*462,130*	*388,243*	*443,491*

Response: In the DEIS and the associated appendices, a Present Condition as well as five action alternatives are described. The estimated generation, capacity and economic effects are illustrated for each of these cases. This allows for the computation and display of generation, capacity and monetary effects on a percentage basis (relative to the base case) thereby providing the reader with some perspective on the magnitude of these estimated effects. The financial analysis provided in this comment does not conform to this framework. As a result, it is difficult to discern the relative magnitude of the impacts described. The Western Area Power Administration has revised and resubmitted an analysis of financial impacts (see *Financial Impacts to Pick-Sloan Firm Power Customers* in volume 2 on the FEIS). Based on our knowledge of this subject and the most recent version of the financial analysis submitted, we expect these financial impacts to be quite small, relative to the base case.

Unfortunately, the financial analysis submitted by the reviewer does not contain an assessment of the potential rate impacts, if any. This is unfortunate. In our view, the greatest value Western could add to the EIS would be an analysis of the effects of the proposed alternatives on customer rates.

Comment 14798: *The DEIS states the Federal Government will pay 50 percent of the Program costs and the States will pay the other fifty percent. The DEIS assumes any action alternative will be fully funded but does not address the source of funding of the Federal Government's share. Western assumes funding will be considered non-reimbursable and, as such, will not be considered a multipurpose cost of any PSMBP facility. The cost of implementing many of the alternatives is significant, with some in excess of $100 million. Such costs, if shared by Western's ratepayers, could be in the tens of millions of dollars. Western requests a confirmation from the Governance Committee that none of the Program costs will be classified as reimbursable by the power function.*

Response: The July 1997 Platte River Cooperative Agreement among the three States and the Department of the Interior anticipated that the Federal contribution for the Program's First Increment would be funded through Department of the Interior appropriations as a non-reimbursable cost.

Comment 14799: *Under the water leasing element of the action alternatives, it would be possible that water districts or individuals would be compensated at market rates for irrigation water, which is paid for by PSMBP power customers. Legislation authorizing PSMBP projects requires that reimbursable irrigation costs above the irrigators' ability to pay be assigned instead to power repayment. This shifting of repayment responsibility from irrigators to power customers is called irrigation assistance. It is Western's position that, if water leased to the Program is PSMBP irrigation assistance water the compensation to the lessor/irrigator should be reduced to reflect the value of irrigation assistance being borne by the power customers.*

Response: Comment noted.

Comment 14800: *Western has compared the financial impacts of the action alternatives to the present condition and will provide the results of that analysis to the Governance Committee by way of the Platte River EIS office. Western realizes that the no action alternative may have a greater financial impact to the power customers than any of the action alternatives; however, Western remains concerned that the potential impact of joint action may still be substantial.*

Response: As suggested by the reviewer, there may well be financial impacts on project beneficiaries in the Central, South and North Platte River Basins. However, it is expected that the aggregate cost of environmental mitigation to all affected parties will be lower with the Program than it would be without the Program. Based upon the analysis submitted by Western (see *Financial Impacts to Pick-Sloan Firm Power Customers* in volume 2), it appears that this impact will be quite small.

Comment 14801: *All of the action alternatives also reduce the PSMBP dependable capacity. The specific capacities reduced are those of the Seminoe and Fremont Canyon power plants. There will be less water stored in the Seminoe and Pathfinder reservoirs under the action alternatives and, therefore, less generating head available at the hydroelectric plants that generate energy by releases from those reservoirs. The Seminoe and Fremont Canyon plants are considered load following plants because each has a regulating afterbay and can be remotely operated to follow electric loads in real time. The value of the lost capacity is the cost of replacing it with a higher priced natural gas fueled combustion turbine.*

Response: We concur.

Natural Resource Conservation Service (NRCS)

Comment 14066: *On page 7, paragraph (C) states, "The First Increment using a flexible and incremental approach that is based on an "adaptive management process." This statement does not clearly say what adaptive management is.*

Response: See response to Summary Comment 02 in the following section "Summary Comments and Responses" section of this document.

Comment 14067: *On page 13, paragraph (d), the statement reads as follows, "FWS believes that water related activities at times have reduced the quantity or rate of flow in the Lower Platte River during the months of February through July, that new water related activities may at times cause further reductions, and that such reductions may adversely affect the pallid sturgeon."*

The reader did not find data in the document to substantiate the belief of FWS or justification by FWS for the findings that demonstrate the cause of low flows that is said to affect the pallid sturgeon. Some factual data should be presented based on scientific fact or proof to support the belief, since so much is at stake with this hypothesis.

Response: Comment noted. Chapter 2 provides extensive analysis of the cause of reduced flows from the Platte Basin above Chapman, Nebraska.

Comment 14068: *NRCS recommends that prior to the finalization of the EIS and subsequent ROD, additional public input be sought once the Federal and State Depletion Management Plans have been developed.*

Response: Comment noted.

Comment 14069: *Recent discussions with the Platte River EIS office have clarified, for us, the scope of what activities are and are not covered by the program and by the associated Federal depletion management plan. We suggest that this document be written to more clearly explain to the public points such as:*
• The July 1, 1997 cut off date for covered activities
• The distinction between activities that are National versus local in scope and how and by whom such activities will be addressed
• The role and status of State depletion management plans
• Maintenance of existing water related structures
• How and by whom, costs of depletions from various examples of activities will be covered.

Response: The Governance Committee Program Documents and *The ESA Section 7 Consultation Process With and Without a Cooperative Program* (in volume 2 of the FEIS) distinguishes between "existing" and "new" water related activities using July 1, 1997 as the point in time between the two. See table "Summary of Differences Between Providing ESA Compliance by Separate ESA Consultation (No Action Alternative) and Providing ESA Compliance by Implementing a Program (Proposed Federal Action)" of *The ESA Section 7 Consultation Process With and Without a Cooperative Program* in volume 2.

1. As recommended, the Federal depletion management plan was revised to more clearly discuss activities that are National in scope. See sections 3 through 6 of the Federal Depletions Plan.
2. Comment noted, the role and status of the Federal and state depletion management plans are included in the FEIS.
3. We believe that "The ESA Section 7 Consultation Process With and Without a Cooperative Program" in volume 2 of the FEIS explains the ESA obligations of Federal agencies. Concerning maintenance of existing water related structures, if the Federal agency determines the Federal action may affect listed species, they must consult with the Service. If the particular Federal action involves a water depletive effect that existed prior to July 1, 1997, the Program can provide the needed offsetting measures for effects to the target species (if the applicant elects to participate in the Program). If the particular Federal action involves a *new* water depletive effect, then that activity may be covered by a state or Federal depletion management plan. If the activity is not able to be addressed via a depletion management plan, the Federal agency still must complete Section 7 consultation (i.e., separately from the Platte Program).
4. Each depletion plan identifies the mechanisms and depletion replacement obligations for new water related activities. See the Program Document, Water Plan for details. Also, the depletion management plans are summarized in "Management of New Depletions" in the "Governance Committee Alternative" section in chapter 3 of the FEIS.

Comment 14070: *We have a large number of specific concerns about the technical impacts of water leasing and water conservation activities. As a result of leasing, some individual irrigators will be affected by receiving less water. This will cause changes in the types of crops grown and in an individual's profits and ability to maintain an economically viable farming operation. It will almost certainly result in losses of irrigation and seepage induced, artificial wetlands. We suggest that site specific economic, hydrologic, biological (beyond T&E species) assessments will need to be conducted to determine actual impacts and mitigation needs.*

Response: The Programmatic FEIS assesses the consequences of water leasing in a general way, focusing on the effects on the mainstem reservoirs and riverflows. This is necessary because the exact location of water leasing depends upon voluntary participation. Therefore, the specific effects of elements like water leasing must be assessed in later NEPA analyses that will tier off of this EIS.

Comment 14071: *As discussed with you, we recommend you contact the Farm Service Agency (FSA) to determine how producers' crop acreage bases may be impacted by leasing their irrigation water to the Program.*

Response: We contacted the Colorado State FSA office concerning how agricultural producers leasing irrigation water to the Program might affect their crop base acreage. Our understanding is that as long as the change in land use is temporary, no change to an individual's base acres will occur.

Comment 14072: *As discussed with your office on 8/26/04 the benefits of the Program over a "no action alternative" relative to small federal nexus projects through reduction of "time, expense, and other costs of completing separate project-by-project consultations" appear to nonexistent or at least overstated.*

Response: Table 3-4 of *The ESA Section 7 Consultation Process With and Without a Cooperative Program* in volume 2 of the FEIS provides an illustrative example of future numerous small Federal nexus projects that would likely participate in the Program via a state or Federal depletion management plan in order to complete Section 7 consultation. Along with the referenced table, the FEIS section "Endangered Species Act Section 7 Consultation Process Within the Program" in chapter 1 was revised to more clearly describe future streamlined consultations that tier from the programmatic biological opinion.

Comment 14073: *As discussed, we suggest clarifying the role of the Service in water allocation relative to the role of State Engineers.*

Response: Comment noted.

Comment 14074: *Page 4-104, Table 4-40 lists the threatened and endangered species found in the Platte River basin. The States for the Colorado Butterfly Plant should include Nebraska.*

Response: The FEIS has been revised to include the Colorado Butterfly Plant in Nebraska.

Comment 14075: *We estimate that Program impacts to wetlands will be much greater than those discussed in the DEIS. Reduction in use of irrigation water will cause many areas of irrigation induced, artificial wetland to disappear or to become drier.*

Response: The FEIS includes an additional section analyzing the potential effect on wetlands.

Comment 14076: *As we discussed, although the federal activities listed on page 5-274 of the DEIS are anticipated to have no adverse effect on peak flows, there may be effects on base flows. We agree with you that some clarification about the effects on base flows is appropriate.*

Response: Comment noted. See the "Impacts to Peak Flows" section of the Federal Depletions Plan. The Governance Committee Alternative includes a small effect to baseflows (1,050 acre-feet) as part of the Federal Depletions Plan.

Comment 14077: *The Wetland Reserve Program, Wildlife Habitat Incentives Program, and other Farm Bill conservation programs administered by NRCS may serve to meet section 7(a)2 responsibilities. They have been used to improve habitat conditions for whooping crane and other species in the Central Platte habitat area. We would appreciate having these efforts acknowledged in the section which describes habitat improvement activities outside the Program.*

Response: The "Analysis of Cumulative Effects" section of the FEIS, chapter 5 was revised accordingly.

Comment 14078: *In Glossary-3, we recommend changing the definition of "deep percolation" to: "Water that goes below the plant root zone and may supply water to shallow aquifers, deep aquifers, irrigation induced wetlands, phreatophytic vegetation, or return flows to surface water."*

Response: The recommended change was added to the Glossary.

Comment 14079: *Attachment-7. "Background on Endangered Species Act, Sections 7 & 9" NRCS understands that the purpose of this attachment, at least in part, is to convey an understanding of the breadth of activities to which ESA consultation applies, and how the consultation and resulting reasonable and prudent alternatives could affect those activities. A reader should be able to understand how this breadth would be narrowed by adoption of the proposed action, and why this would increase the level of "assurance" concerning water-related activities that could occur. That being the case, NRCS recommends including examples of activities that would require Section 7 consultation if "no action" were taken, but which would not require such consultation if the proposed action were adopted. In addition, if your intent is to demonstrate that one result of adopting the proposed action would be to provide certainty, perhaps you could include examples of reasonable and prudent alternatives that might result from consultations should the no action alternative be selected.*

Response: Examples of activities and Federal programs where consultation may be required (if the agency determines they may affect listed species) are provided in table 3-3 of *The ESA Section 7 Consultation Process With and Without a Cooperative Program* in volume 2 of the FEIS. Adoption of the proposed Program would not negate the requirement for Federal agencies to consult with the Service for effects to listed species, but in many cases provides the "solution" for addressing effects to the target species. Therefore, there are no examples of activities that would not require consultation if the proposed Program was implemented.

Comment 14080: *Attachment-7. Background on Endangered Species Act, Sections 7 & 9 NRCS does not believe the lawsuits currently referenced in Attachment 7 create any incentive for the public to support the proposed action, nor do they add value to the comparison between the alternatives, primarily because the activities involved in both cases will not be covered by either the Federal or state depletion plans. Any obligation to consult on these types of activities will remain the same regardless of whether the proposed action or the no action alternative is adopted. NRCS believes the discussions of these cases, as currently written, serve primarily to highlight unrelated situations which occurred in the past in two states outside the Platte River basin. Consequently, the agency is requesting that you remove the example of the South Dakota litigation. NRCS requests major modifications to the discussion of the Edwards Aquifer lawsuit. NRCS understands the significance of Sierra Club v. Glickman, but believe it should be cited in a broader context. We recommend replacing the current discussion with the following:*

"ESA, Section 7(a)(1)
The ESA directs all federal agencies, in consultation with the FWS, to use their existing authorities to further the purposes of the Act by carrying out programs for the conservation of listed species. Therefore, a specific triggering action is not necessary in order for federal agencies to review their activities vis-à-vis Section 7(a)(1), and use their authorities in a way that benefits protected species. This responsibility was affirmed in Sierra Club v. Glickman, 156 F. 3d 606 (5th CIR. 1998)."

Response: Recommended changes in the FEIS have been made.

Comment 14793: *In Glossary-5, we recommend changing the definition of "fallow" to: "Cropland idled with the vegetation controlled by a combination of tillage and/or chemicals."*

Response: The recommended change was added to the Glossary.

Comment 14794: *Attachment-7. Background on Endangered Species Act, Sections 7 & 9. NRCS requests removal of all references to National Wildlife Federation v. Fisher in the fourth paragraph of this attachment. The fact that NRCS agreed in a settlement to undertake Section 7 consultation with FWS on the wetland mapping policy NRCS established in South Dakota does not constitute an admission that NRCS was obligated to do so. There was no ruling by the court that such consultation is required by Section 7(a)(2).*

Response: *The ESA Section 7 Consultation Process With and Without a Cooperative Program* in volume 2 of the FEIS was revised to reflect the comments.

Comment 14795: *On Attachment-13 and Attachment-14, we recommend the Note in the table entitled "Known Examples of Federal Water Projects Actions Requiring Consultation Under ESA." be worded to clarify that consultation is required only if the Federal action agency determines the project may affect a listed species. Within the table, we recommend the "Natural Resources Conservation Service" section be rewritten as recommended in our letter.*

Response: Recommended changes have been made in the FEIS.

Comment 14796: *Attachment-25, paragraph starting with "The result of all section 7…" Current verbiage suggests that the section 7 consultation completed on July 12, 2001 with the NRCS in Nebraska contributes to the Service adopting a jeopardy standard. We request that language be added here to clarify that neither the Program nor the alternatives affect the validity of Nebraska's standing section 7 consultations.*

Response: Comment noted. The subject paragraph was extracted from a biological opinion previously written, and therefore that text was not revised in preparing the FEIS.

Comment 14797: *Attachment-7. "Background on Endangered Species Act, Sections 7 & 9" We recommend that the first sentence in the third paragraph be reworded as: "Water related projects which need a federal permit, license, funding, approval, or are carried out by a federal agency...require consultation with the Service under ESA if the action agency determine the project may affect a listed species."*

Response: The text was revised per the comment.

U.S. Geological Survey (USGS)

USGS has reviewed the subject DEIS and has no comments to offer.

Carbon County, Wyoming

Comment 14421: *I disagree that there will be minimal effects on the upper Platte basin from the alternatives, including an additional demand of the basin as embodied in the Pathfinder Modification Project concept of 54,000 acre feet (including the environmental need of 34,000 acre feet) that somehow is going to be derived from an overappropriated basin. In that respect, the analysis is flawed.*

We as a county are very alarmed, I served as a liaison for Carbon County to the EIS team, to find that by this analysis, and the others by the way, that we might be seeing with the growing modification and the Pathfinder modification as much as 71,000 acre foot average annual completion for consumptive uses *and/or other uses in this segment of the basin. And, in fact, with the Pathfinder modification alone, it would be approximately 42,000 acre feet. Approximately 88 percent of that burden would accrue to the detriment of irrigators above Pathfinder and the tributaries of the North Platte on the North Platte.*

Further in the comments submitted by Carbon County as a cooperative agency, there was extensive analysis of the economic effect consequent to the hydrologic analysis that I just referred to, and those effects range in the area of $5.3 million on an annual basis to water users in this basin, not to mention the long-term consequences to the property values that might be realized up here. And, again, with just the Pathfinder modification alone, it's about a little over $3 million annual negative economic impact to this basin.

The US position has been, and as far as I can determine still, is that we are not entitled under Wyoming water law any protections after May 1st, and all of the contemplated effects through our analysis are greatly aggravated by the possibility or the threat or the sector of having regulation to the 1904 water right of Pathfinder Reservoir continue until that full -- which will ultimately be under the proposed alternatives, 1,070,000 feet a year, and that's just a reality. If that regulation occurs on past May 1 into the irrigating season, the harm is ever more substantially evident.

There will be some injury associated with the change in use of that reservoir that is federally authorized by our congress for irrigation use and permitted under the laws of the State of Wyoming for irrigation use. And when that use changes to those that are contemplated in this statement, that injury can be devastating, and it goes forward, it in fact would not be complying with Wyoming water law. It might be complying with somebody else's water law.

And just finally, again, NEPA does map a study of those economic consequences, and because I don't see it thoroughly addressed in the draft environmental statement, I assert that it is flawed and possibly terminally so.

Response: See response to Summary Comment 12 in the "Summary Comments and Responses" section of this document.

SUMMARY COMMENTS AND RESPONSES

This section lists summary comments and summary responses, that is, comments developed to summarize a number of similar comments or the same comment from multiple parties. The summary comments and responses are organized by topic area.

Platte River Recovery Implementation Program

Summary Comment 01: *The Platte River EIS Office received nearly 7,000 postcards and letters through conservation groups. Their basic message follows.*

The best alternative is Governance Committee Scenario 2 in the DEIS. A Program is needed that will use funds to provide habitat as a high priority, supports addition of sediment in the Platte River, acquires land through permanent means, supports the Water Action Plan and encourages water leasing, supports state depletion management plans able to meet the states' commitments to protect current river flow, restores the water flow capacity at the North Platte choke point and supports a sufficient research and monitoring plan to track the impacts of changes on the habitat and relationship to the species.

Summary Response: Comment noted.

Summary Comment 02: *More detail should be provided regarding the Adaptive Management Plan and the Integrated Monitoring and Research Plan.*

Summary Response: The September 6, 2005, draft Program Document that was used for FEIS analysis, including the Adaptive Management Plan and Integrated Monitoring and Research Plan, is included on a CD in volume 1 of the FEIS. The final version is available upon request at <http://www.platteriver.org/>. A brief sketch of both is provided in the EIS. These plans are not analyzed in the EIS because they do not cause environmental impacts.

Summary Comment 03: *More detail should be provided regarding the Future Depletion management Plans.*

Summary Response: More details on the depletion management plans have been added. The entire text of the plans can be found in the Governance Committee Program Document,[3] Water Plan attachment.

Summary Comment 04: *The DEIS does not reflect the Program's payments to the Districts for the Power Interference element of the Water Action Plan.*

Summary Response: The FEIS and the Governance Committee Program Document have been updated to reflect the latest Program costs for Power Interference.

EIS Alternatives

Summary Comment 05: *The Governance Committee Alternative Scenarios 1 and 2 are not endorsed by the Governance Committee or misrepresent the Governance Committee's proposal for the Program.*

[3] The September 6, 2005 draft version of the Governance Committee Program Document used for the FEIS analysis is included on a CD in volume 1 of the FEIS.

Summary Response: The EIS is required to project and analyze the environmental consequences of the alternatives. The Governance Committee's draft proposal for the Program, upon which the DEIS analysis was based, was not clear about some aspects of how water and land would be managed. These areas of uncertainty are detailed in the DEIS. In order to complete a programmatic analysis of environmental consequences, the EIS Team had to make assumptions about how the Governance Committee Alternative would be implemented, assumptions that would cover the range of likely approaches and thereby define the largest likely range of environmental consequences.

To accomplish this, two implementation scenarios were developed which variously represented the smallest scope and scale of actions and the largest, and hence the smallest and largest environmental consequences.

The Governance Committee has since developed substantially more detail about how their proposal would be implemented during the Program's First Increment. This additional detail about objectives, methods, and scale, has made it possible to project with greater certainty the likely environmental consequences at a programmatic level.

Summary Comment 06: *The EIS should not assume that a cooperative, Basinwide approach would be agreed to for any of the alternatives except the Governance Committee's proposal.*

Summary Response: The Governance Committee's proposal for a Basinwide, cooperative approach to providing ESA compliance for the target species is based on years of negotiations. However, NEPA requires that alternatives be seriously and carefully evaluated which achieve the same purpose and need. As described in the FEIS, the purpose and need for restoring riverflows and species habitat in the Central and Lower Platte requires a cooperative, Basinwide approach to be effective. Therefore, in order for the alternatives to be comparable, a Basinwide and cooperative approach must be assumed. The DEIS and FEIS clearly state that adoption by members of the Governance Committee of any alternative other than the Governance Committee Alternative should not be presumed.

Summary Comment 07: *The description of a "No Action Alternative" does not adequately frame the impacts that would result if a Platte River Recovery Implementation Program is not adopted, and that estimates of the volume of water that the DOI believes would be required for target species recovery on a state-by-state basis (or project specific) if a recovery program is not implemented are needed. Such quantification would enable parties to make decisions based on ESA compliance in a world with a Program and ESA compliance in a world absent a Program.*

Summary Response: Comment noted. See the response to Summary Comment 08 (in this section) concerning the NEPA baseline and environmental effects during a First Increment. In regards to estimating ultimate ESA obligations for all projects at this point in time, whether state-by-state or individually, as explained in *The ESA Section 7 Consultation Process With and Without a Cooperative Program* in volume 2:

> This would require estimating, at a minimum, Basinwide riverflows and reservoir levels and associated agricultural and economic conditions resulting from ESA consultations on every existing and future Federal action relating to water and associated land activities in the Basin which may affect the target species or designated critical habitat during the next 13 years. Such estimates would be too highly speculative.
>
> While it may be possible to judge the aggregate water and land contributions that might be obtained from all projects, allocating those contributions to individual projects prior to actual ESA consultation is not possible. Further, predicting the ultimate environmental effect of

individual offsetting measures absent cooperation among the states and water management entities is highly speculative.

It is not possible to accurately estimate individual project requirements across the entire Basin. However, given the incremental and adaptive management approach of the Program compared to completing individual ESA consultations in one step, the costs (time, expense, dollars) to individual water users and projects is significantly less with a Program than without.

Summary Comment 08: *By not comparing the No-Action Alternative against all other alternatives and the present condition, the DEIS loses sight of the high cost in efficiency, time, public support and litigation expense of proceeding piecemeal against Basin water users. The method used by the DEIS to address the no-action alternative does not allow for a true comparison of conditions with and without a program. The document describes that the 'Present Condition' is replacing ("in lieu of") the No Action Alternative. Based on the Council on Environmental Quality regulations, it is our understanding that a true "No Action Alternative" must be presented. We strongly recommend a "No Action Alternative" be included and fully presented in the FEIS.*

Summary Response: The Present Condition that exists in the Basin is used as the quantitative NEPA baseline for comparing alternatives. This baseline is used because these are the conditions that currently exist for the target species and upon which have been based the jeopardy opinions issued by the Service. As such, these conditions will serve as the baseline for measuring improvements in species habitat. Also, given the historic complexity and contentiousness of past Section 7 consultations related to these species, and the length of time required to develop and implement reasonable and prudent alternatives or offsetting measures as required under the ESA, it seems most likely that habitat conditions over the next decade will remain largely unchanged unless a Basinwide, Cooperative Program is implemented. Thus, for the purpose of this NEPA analysis, the Present Condition is the quantification of the No Action Alternative.

Summary Comment 09: *The DEIS doesn't make clear why increased timber harvest in the North Platte headwaters was not considered further in the analysis of alternatives.*

Summary Response: A technical study was funded by the EIS Team to examine the effect of increased timber harvest on runoff from the North Platte Headwaters. An additional reference has been incorporated into the text of the FEIS referring to the *Platte River EIS Screening Report* in volume 2 which describes why this potential approach was screened out and also refers the reader to the "*Estimating additional water yield from changes in management of national forests in the North Platte Basin*" (Troendle and Nankervis, 2000) technical report with the details of the analysis. As the technical report and the screening analysis explain, significantly increased timber cutting in the headwaters of the North Platte River Basin can create some additional runoff, at substantial cost to the managing agency, but by the time this additional water is routed downstream through the system of reservoirs and diversions and is subject to claim by existing water right holders, the improvement in flows at the Central Platte Habitat Area is small and not cost effective compared to other approaches considered. Also, see chapter 2 of the FEIS for additional material regarding the effect of Forest Management on Platte River flows. Also, see chapter 2 of the FEIS for additional material regarding the effect of Forest Management on Platte River flows. Discussion of cumulative effects in the DEIS has been clarified in the FEIS.

Summary Comment 10: *The scenario in the DEIS for water leasing in Wyoming under the Governance Committee alternative is unlikely.*

Summary Response: Based upon further discussions with the EIS Team, the Chairman of the Wyoming Water Development Commission has concluded that the Wyoming water leasing scenario for the Governance Committee Alternative is appropriate for analysis in the FEIS.

Summary Comment 11: *The description of the Colorado Tamarack plan(s) should be updated.*

Summary Response: The description of the Tamarack Project(s) has been updated based on the latest Program Documents.

EIS Analysis of Effects of Alternatives

Summary Comment 12: *The DEIS does not provide sufficient analysis of the potential effects of the alternatives on water use above Seminoe Reservoir.*

Summary Response: Additional analysis has been added to the FEIS on the effect of the alternatives on the likelihood of state administration of the North Platte River above Seminoe Reservoir and resulting effect on water diversion and use in this area. See the subsection "Effects of the Program on Water Use Above Pathfinder Reservoir" under "Water Resources," "North Platte River Basin", "Present Condition" in chapters 4 and 5.

Summary Comment 13: *Drawdowns of Seminole and Pathfinder Reservoirs appear to be lower than that recommended by the Wyoming Game and Fish. If the drawdowns cause storage to fall below identified flag values, it can negatively impact the fish population in these reservoirs and downstream fisheries including poor water quality (high turbidity, warmer temperature, and low dissolved oxygen). Flows below 500 cfs could cause poor water quality and loss of aquatic insects and invertebrates. These impacts could affect fisheries habitat through out the entire North Platte system in Wyoming including Alcova Reservoir.*

Summary Response: In coordination with the Wyoming Game and Fish Department, the EIS Team has conducted additional studies and further assessment of impacts on the North Platte reservoirs, impoundments and fisheries and revised the FEIS accordingly. With their help, it was determined that none of the alternatives would cause a significant impact to stream fisheries, but that fisheries at Seminoe and Pathfinder Reservoirs, under a prolonged drought, could be substantially eliminated. Substantial additional analysis of the impacts of the alternatives on the North Platte has been added in the sections "North Platte River Basin Fisheries," chapters 4 and 5. Fishery impacts with flows less than 500 cfs are analyzed in the FEIS, chapter 5. The effects of the alternatives on the occurrence of these flows are very small. Also see *North Platte River Basin Fisheries Appendix* in volume 3[4].

Summary Comment 14: *"Moderate" adverse impacts to the reservoir fisheries are offered for both Seminoe and Pathfinder reservoirs in the PRDEIS. We disagree with referring to these as moderate, and are concerned there are no mitigation measures identified, nor a process to develop and implement mitigation measures in the future. Our first goal must be to adequately identify and portray the potential impacts and describe actions to avoid aquatic impacts associated with the Program. If adverse impacts cannot be avoided, mitigation measures will be requested to cancel or moderate the unavoidable wildlife impact. The Wyoming Game and Fish Commission Mitigation Policy has established Mitigation Categories based on species, habitats and or management programs. If the additional site-specific NEPA analyses "tier" off the PRDEIS and only address local impacts of construction, we are uncertain how and when mitigation measures will be developed and evaluated.*

Summary Response: As described in chapter 5 in the FEIS, the Wyoming Water Development Commission has entered into an agreement to fund certain activities to mitigate for impacts the Program may have to lake fisheries along the North Platte in Wyoming.

[4] Volume 3 is available upon request at <http://www.platteriver.org/>

Summary Comment 15: *The analysis of impacts to Wyoming reservoir and stream fisheries are incomplete and underestimate the potential impacts to the fisheries. Because of this, the estimated impacts on Wyoming fishing-related recreation visitation and expenditures are understated.*

Summary Response: A significantly expanded analysis of Wyoming fisheries is now included in the FEIS. With the help of Wyoming Game and Fish (WG&F), it was determined that none of the alternatives would cause a significant detriment to stream fisheries, but that reservoir fisheries, under a worst-case scenario could experience substantial losses in angler visitation. Visitation figures for anglers as well as those for general reservoir recreation were updated with the help of WG&F and Wyoming Division of State Parks and Historic Sites.

Visitor expenditures for recreational activities in Wyoming are taken from the 2001 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation by the Service. The economic value of an angler visit in Wyoming was also taken from this study.

Summary Comment 16: *The PRDEIS does not adequately address impacts to waterfowl resources or waterfowl hunting recreation, especially in drought years, in the North Platte River drainage of Wyoming and region above Lake McConaughy. When compared to Present Condition, flows in the North Platte River would be less in the winter (October-March). Lower flows in the North Platte River during the fall and winter will reduce migratory and wintering habitat for waterfowl. Lower flows potentially will increase ice formation in the river, further reducing available habitat. The largest differences would be in the flows below Guernsey Reservoir, projected to be 12 percent less in winter for two of the alternatives.*

Summary Response: The DEIS showed a 12 percent decrease in average winter flows below Guernsey Reservoir in Wyoming (down to Lake McConaughy). More explanation has been added to the FEIS that, currently, releases are not made to the river below Guernsey Dam in the wintertime. The projected change in "average" winter flows over the 48-year period of record is a result of reductions in the volume of spills (uncontrolled releases) that occurred in two very wet years. In the other 46 years of the hydrologic record used for the analysis, there is no effect of the alternatives – the pattern of no releases in wintertime is unchanged. Because of this, no impact on waterfowl using this part of the river in the winter months is expected.

Summary Comment 17: *The DEIS must provide more analysis of the effects of the alternatives on the streams, lakes, wetlands, groundwater, fisheries and wildlife in the Nebraska Panhandle near Scottsbluff that might be affected by water leasing or reduced irrigation deliveries.*

Summary Response: The DEIS described the effects of the alternatives on riverflows below Guernsey Dam to Lake McConaughy. More description and analysis has been added to the FEIS about possible effects of the alternatives on the Inland Lakes and on the cold water streams that are found mostly north of the river in the Scottsbluff area in Nebraska.

Effects in this area are most likely to occur if substantial amounts of water leasing occur from the North Platte Projects which have irrigated lands in this area. This does not appear likely under the preferred alternative. Specific locations of water leasing cannot be known with certainty until a Program is implemented and water users offer to lease water to the Program. At that time, site specific effects of water leasing will be analyzed in a subsequent NEPA document.

Summary Comment 18: *The potential benefits from increased birdwatching in the Central Platte River area are overstated, compared to other recreation benefits. The estimates of Lake McConaughy recreation expenditures are understated. The method used to establish a recreation value at Lake McConaughy is flawed.*

Summary Response: The economic analysis estimates two types of impacts related to recreation: impacts to the value of recreation, and impacts to the regional economies resulting from changes in expenditures for recreation.

Changes in the economic value of recreation are measured by assessing the "consumer surplus" associated with each recreation opportunity, which is the difference between what a visitor would spend for the opportunity and what the visitor did spend. The greater the difference, the greater the economic value of the recreation experience. Assessing consumer surplus requires special surveys of recreationists at each site. This type of data does not exist for Lake McConaughy, so economic values were taken from surveys of recreators from similar lakes. This approach to estimating the economic value of a recreation visit is typical where no current data otherwise exists. Once again, the $23 economic value for a recreation visit at Lake McConaughy should not be confused with expenditures by visitors.

Expenditures for recreation are incorporated into the regional economic analysis. Estimates of expenditures for various recreation activities are taken from the 2002 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation by the Service. For example, trip-related expenditures for a Wyoming boating trip are:

Expenditure	Avg exp per trip/person
Food-groceries	$7.86
Food-restaurant	$6.43
Lodging	$4.94
Gasoline and oil	$8.06
Automobile repair	$6.86
Privileges and fees	$1.29
Boating costs	$25.18
Bait	$1.31
Ice	$0.67
Heating and cooking fuel	$0.39
Total	**$62.99**

Economic value and expenditures for birdwatching in the Central Platte are no longer estimated in the FEIS. In their final proposal, the Governance Committee did not propose or budget for any development of additional birding or hunting blinds along the Central Platte. Therefore, economic benefits from these types of facilities are not estimated for the FEIS.

Summary Comment 19: *The DEIS did not address the issue of loss of riparian habitat and impacts to species of special concern (red headed woodpecker, yellow billed cuckoo, bell's vireo, other neotropical migrants and songbirds) through clearing and leveling of vegetated islands.*

Summary Response: Chapter 5 of the FEIS has been revised to include expanded discussion of impacts of vegetation clearing and leveling. In addition, please see the *Fish and Wildlife Coordination Act Report* in volume 2 for further discussion of this subject.

The preferred alternative reduces acres of woodland in the Central Platte Habitat Area from roughly 34,000 to 32,000 acres. As stated in the DEIS and the FEIS, impacts to species, other than target species, will be localized and wildlife travel corridors and adjacent habitats are not expected to be significantly interrupted.

Nebraska Game and Parks Commission (NGPC) has recently finalized their conservation planning report titled, The Nebraska Natural Legacy Project. NGPC has divided species of concern into two classes. Tier I species are those that are globally or nationally most at-risk of extinction and which occur in Nebraska and meet 1 of 6 categories. Tier II species include those that did not meet the Tier I criteria but were ranked by the Nebraska Natural Heritage Program as either State Critically Imperiled (S1), State Imperiled (S2) or State Vulnerable (S3) (NGPC, 2006).

The red-headed woodpecker is neither a Tier I - II species nor is it identified by the Natural Heritage Program's technical committee as a species of special concern. The red-headed woodpecker occurs in fairly open forest, woodlots, urban parks, and wooded housing areas (NGPC, 2006).

The Technical Committee established by the Cooperative Agreement has recognized both the Bell's vireo and the yellow-billed cuckoo as species of concern. The Legacy Project identifies the Bell's vireo is a Tier I species known to use all shrubland types except buckbrush, and grasslands with shrubs. This species is dependant on shrubs not riparian woodlands. The Central Platte River is not listed as a key Habitat Area for the Bell's vireo conservation. The yellow-billed cuckoo is recognized as a Tier II species. Its habitat is moderately dense thickets preferably near water, second-growth woodlands, abandoned farmsteads that are overgrown with shrubs and bushes, and brushy orchards. These birds tend to avoid extremely dense woods (NGPC, 2006).

Summary Comment 20: *The EIS should evaluate the effects of the proposed Program and its alternatives commensurate with the duration of the Federal action under review which is the proposed First Increment of 13 years, and not over decades following the First Increment.*

Summary Response: The DEIS contained an analysis of the long-term stability of the river channel after initial implementation of the alternatives during the Program's 13-year First Increment. This analysis has been removed for the FEIS because it was judged to be of limited value.

SEDVEG Model Used for EIS Analysis

Summary Comment 21: *The SEDVEG code and model has not been calibrated, tested, or reviewed.*

Summary Response: <u>Calibration and Sensitivity Testing.</u> A series of calibrations for the first version of the code (SEDVEG Gen1) and Platte River Model were reported and made available in the draft of the report, Platte River Sediment Transport and Riparian Vegetation Model (Murphy and Randle, 2001). An initial set of sensitivity tests were carried out during the same period. Parsons (2003[5]) reported in the B2 memorandum on the initial calibration of SEDVEG Gen1, "Unfortunately, there is no way around the issue of the sparseness of historic data. Given this situation, the overall initial calibration and verification approach appears to be reasonable; however it could be improved by a more detailed effort in order to focus calibration on shorter periods of time involving more adequate data." A first revision of the SEDVEG code (SEDVEG Gen2) and Platte River Model were used for the DEIS analysis, and a second series of calibrations were carried out at that time that focused on shorter periods with more available data. The two calibration test series and the sensitivity test series were summarized in the DEIS River Geomorphology Appendix. The SEDVEG code (SEDVEG Gen3) and Platte River Model were revised a second time for the FEIS. A third set of calibration tests and a second series of sensitivity tests were conducted for this version. Summaries of the three sets of calibration testing and two sets of sensitivity testing are reported in *Platte River Sediment Transport and Riparian Vegetation Model* (Murphy et al.,

[5] Parsons (2003). "Platte River Channel Dynamics Investigation," prepared for States of Wyoming, Colorado and Nebraska.

2006) in volume 3. Data used for calibration of the Platte River SEDVEG Model are presented in Murphy et al. (2004) and Holburn et al. (2006) in volume 3 of the FEIS.

<u>Outside Reviews.</u> The first review by an outside party addressed code structure of SEDVEG Gen1. This review was both informal and undocumented due to Dr. Murphy's demise in 2003. Dr. Cannelli of Simons and Associates, as a subcontractor to Parsons, also provided a review of the SEDVEG Gen1 code and Platte River Model. Dr. Cannelli's comments are reported in the B2-Independent Assessment of "Sed" Concepts in SEDVEG Model, a section of the Parsons Report (2003). The third outside review by Dr. H. W. Shen of the University of California, Berkely, was also informal and undocumented, but occurred in conjunction with the National Academies of Sciences Investigation. This review focused on theoretical concepts of the SEDVEG Gen1 code. General comments reported in Endangered and Threatened Species of the Platte River (NRC 2005), included in volume 2 of the FEIS, do not reflect topics of discussion from Dr. Shen's review.

<u>Internal Reviews.</u> Internal peer reviews of numerical models at Reclamation focus on the written documentation for the code. The 2001 draft version of *Platte River Sediment Transport and Riparian Vegetation Model* by Murphy and Randle, was peer reviewed by Dr. Mohammed Samad. The final version of *Platte River Sediment Transport and Riparian Vegetation Model* (Murphy et al., 2006) was reviewed by Dr. Victor Huang. Simons and Associates have provided the vegetation subroutines and a calibration of their program subroutines. Over the five years of development, four code writers at Reclamation have contributed to the SEDVEG Gen3 code: Dr. Peter Murphy, Tim Randle, Dr. Victor Huang, and Dr. Young Lai. Dr. Lisa Fotherby, and Elaina Holburn contributed to construction and modification of the Platte River SEDVEG Model. Each modeler implemented improvements based on review of the SEDVEG code and/or Platte River Model.

Summary Comment 22: *General concerns with the SEDVEG code and model.*

Summary Response: These comments on the SEDVEG code and Platte River Model in most cases originate from the model review presented in the Parsons Report (2003). Dr. Cannelli of Simons and Associates, as a subcontractor to Parsons, reviewed a May 2001 version of SEDVEG code and Platte River Model. His comments are presented in the B2 Technical Memorandum –Independent Assessment of "SED" Concepts in SEDVEG Model. Dr. Cannelli's comments can be divided into three categories:

- Technical or conceptual concerns that have been addressed through code and model revisions. Examples include increased number of cross sections and inclusion of tributary sediment inputs in the model.

- Technical or conceptual concerns that were incorrect or are now addressed. Examples include assumptions that the model had not been calibrated or tested, assumptions that hardwired algorithms fix maximum scour depth, and the concern that predictive capabilities of the 2001 version of the model were poor based on an analysis which evaluated the 2-D aspects of this 1-D model.

- Suggestions that are not critical but would improve 1-D modeling capabilities. Items in this category have been added to a list of proposed improvements for the next major revision of the SEDVEG code and Platte River Model. Examples include replacing the existing normal depth algorithms with step-backwater computations, adding a mechanism that eliminates vegetation based on a minimum depth of burial by sediment, and a second calibration of the vegetation removal by ice mechanism.

The model output should not be indiscriminately applied. Interpretation of the model should be restricted to the capabilities within the realm of a 1-D model, and in some cases the model may only identify locations where more in-depth analysis is required. However, within these limitations, SEDVEG Gen3 is the best available tool for analyzing Platte River alternatives, and the application of a 1-D model for this level of assessment is recommended by the industry (ASCE Task Committee on Hydraulics, Bank Mechanics and Modeling of River Width Adjustment, 1998[6]). The National Research Council (2005) whose comments are based on early versions of SEDVEG, 2001 and 2002, also urge continued use of the model. "Current DOI model developments, including the emerging SEDVEG Model, are likely to be helpful and useful in both understanding and managing the Platte River". For additional general comments on the model, see response to Summary Comment 23.

Summary Comment 23: *EIS analysis should use methods other than SEDVEG, or in addition to SEDVEG to assess existing conditions and to assess the alternatives.*

Summary Response: The geomorphic study of the critical Habitat Area is based on available data and the application of generally accepted theoretical concepts. Our understanding of past and current trends in Platte River geomorphology is based on: USGS flow measurements and statistical analysis of these values; surveyed cross sections and sediment sampling; and plan form studies of historical maps and aerial photos. The "River Geomorphology" sections in chapters 2 and 4 have been revised to focus on available data and theoretical concepts. The analysis of sediment transport in chapter 4 includes an estimate based on sediment rating curves and repeat cross section surveys, and a 1 dimensional (1-D) numerical model is used to compute a second, more detailed, estimate.

The power of a one dimensional numerical model is its capacity to compute and track multiple elements of complex processes, over long distances (90 miles of the Platte River), and over long periods of time (50 years or more). This 1-D computation tool: helps extend our understanding of the base concepts; tracks the complex interactions of processes; provides more detail on the system; provides quantitative values for a relative comparison of approaches; and serves as a screening tool for options to be tested in the field. The use of a numerical model is cost efficient, effective and timely. Over 200 different scenarios were considered for the Central Platte River using SEDVEG Gen3, in the 6 months previous to the FEIS.

Numerical models apply, but do not generate, geomorphic concepts. If model results do not support base concepts, the program code and input data are re-examined for potential errors. The manner in which data is input accounts for the vast majority of irregularities in output. Irregularities occur because input data must represent a 3-dimensional world in a 1-dimensional format. The 1-D model is a very useful tool when the limitations of the model are understood. For additional general comments on the model, see responses to Summary Comment 22 in this section on general concerns with the early SEDVEG Gen1 code and model, and Summary Comment 21 on the calibration and testing of SEDVEG Gen3.

The "River Geomorphology" sections of chapters 2 and 4 are based on analysis of data and geomorphic concepts; however, the sediment budget from SEDVEG Gen3 for Present Condition is introduced in chapter 4. In chapter 5, model results from the 1-D SEDVEG Gen3 are used, in addition to data and theoretical concepts, for comparative analysis of the alternatives. Under this Programmatic FEIS, results from existing data, theoretical concepts, and 1-D modeling are used to evaluate differences between broadly outlined alternatives.

Implementation of the preferred alternative is anticipated to require greater definition of theoretical concepts and greater definition of the action plans. This extended investigation should proceed with the aid of: the IMRP to provide more detailed field and laboratory data; an expanded 1-D numerical model

[6]ASCE Task Committee on Hydraulics, Bank Mechanics and Modeling of River Width Adjustment (1998). "River width adjustment. II: Modeling," Journal of Hydraulic Engineering, ASCE, v. 124, n. 9, pp. 903-917.

and site specific 2-D modeling studies based on new IMRP data; and an implementation test program of water, sediment and mechanical action plans under the adaptive management plan. Expansion of theoretical concepts, data collection, and numerical modeling all provide screening tools and support for implementation of adaptive management in the field. The adaptive management plan is founded on an approach of small-scale testing advancing, by small steps based on successful implementation, towards full-scale implementation.

Summary Comment 24: *Sediment input at the upstream end of the reach was incorrectly modeled at capacity in SEDVEG-Gen1 and SEDVEG-Gen2, and there were no tributary inputs of sediment which predisposed the model towards degradation.*

Summary Response: Transport at capacity at the upstream model boundary is a common approach when better data are not available and when there is a significant distance with intermediate cross sections between the boundary and main study reach. This was the case for the original SEDVEG Gen1 Model.

However, one of the improvements to SEDVEG Gen3 is increased options for sediment inputs. The upstream end of the modeled reach now begins at the Johnson-2 Return in the FEIS Platte River Model (see Murphy et al., 2006, in volume 3 of the FEIS). In the current model, sediment input at the first section is assigned by a rating curve. Sediment input from the North Channel at Jeffrey Island is specified from a SEDVEG Gen2 sediment transport file. Sediment at seven tributary locations is input as daily volumes during the six higher flow months of the year. In addition, sand is augmented at one location for the alternatives, bringing the total to ten locations where sand is input to the river.

Summary Comment 25: *The SEDVEG-Gen1 and SEDVEG-Gen2 Platte River Models used an insufficient number of cross sections and did not adequately represent the study reach.*

Summary Response: The first SEDVEG (SEDVEG Gen1) and Platte River Model, the version reviewed in the Parsons report, had 17 cross sections for 143 miles from North Platte, Nebraska, to Chapman, Nebraska. The current SEDVEG Gen3 Platte River Model begins at the Johnson-2 Return in the South Channel of Jeffrey Island (RM 247), and continues to Chapman, Nebraska, (RM 157.2), a distance of approximately 90 miles. The model uses 62 cross sections, of which 16 are shifted or synthetic. Shifted and synthetic cross sections are used when there are no available surveyed sections to represent a reach. The depth data of synthetic cross sections are not as reliable as the width data, but these sections are occasionally useful to smooth sediment transport across abrupt changes in adjacent but disparate surveyed sections. See the report *Platte River Sediment Transport and Riparian Vegetation Model* (Murphy et al., 2006) in volume 3 for more detail on model cross sections.

Because every available Reclamation cross section not influenced by a bridge has been incorporated into the model, the spacing in the current Platte River SEDVEG Model is one cross section per 1.45 miles. As the Program moves into implementation studies under the AMP, it is hoped that the IMRP will supply additional surveys that allow selective incorporation of cross sections into the 1-D numerical model.

Summary Comment 26: *Why are relative values from SEDVEG output used rather than absolute values with defined accuracy and precision?*

Summary Response: The degree of accuracy and precision for each indicator is not listed since absolute values are generally not used. The model predictions are consistent with accepted geomorphology theory and concepts so relative values are used for the alternatives comparison in chapter 5 of the EIS analysis. Any errors associated with the model input and assumptions are applied equally among alternatives compared. This conservative approach generally uses only relative comparisons based on percent change from Present Condition. Sediment transport values are one exception where absolute values are used to analyze the sand augmentation plan, with values compared in chapter 4 to available sediment transport data for an estimate of accuracy.

There is also no focus on single cross sections and the analysis instead considers trends by reach. Average values for a reach represent multiple cross sections. With respect to temporal certainty, the analysis is based on average values from a 48-year period of hydrologic record to reduce the biases from wet and dry periods and from high flow years.

Geomorphology

Summary Comment 27: *Throughout the DEIS, the Platte River is portrayed as a degrading river and the DEIS assumes that the channels of the Platte River have not come into a dynamic equilibrium with current water management. However, fifteen years of data systematically collected by Dr. Johnson, Parsons (2003), and fieldwork conducted by NPPD verify the fact that channel width has changed very little since the narrowing which occurred during the 1950s drought. The EIS team should have acknowledged all theories, data sets, and the conclusions reached by other scientists and why the team has settled on the one they did.*

Summary Response: Dr. Johnson’s studies have been taken into consideration; however, dynamic equilibrium is not defined singly by changes in vegetation expansion. Although spatial measures of vegetation are recognized as an indicator of changes in channel width, the definition of dynamic equilibrium is based on sediment transport. A reach of river is defined as being stable (in dynamic equilibrium) when the volume of sediment entering the upstream reach equals the volume of sediment leaving the downstream end of the reach, a definition attributed to Mackin (1947). Sediment transport studies presented in the “River Geomorphology” section of chapter 4 indicate the Platte River is degrading from Jeffrey Island (RM 147) downstream to approximately Elm Creek. More sediment is leaving than is entering this reach. The river appears to be aggrading between Gibbon and Wood River. Between Wood River and Chapman sediment transport is currently stable, or in dynamic equilibrium, but the analysis shows gradual degradation over time due to upstream changes. Repeat cross section surveys and development and refinement of sediment transport budgets help to determine degrading or agrading reaches of channel, while measurements of vegetation expansion provide feedback on the width dimension of the channel and the dominant hydrologic regime in the channel. See Holburn et al. (2006) in volume 3 of the FEIS for data on repeat survey measurements.

The DEIS describes and the FEIS adds more detail and data about the forces currently affecting the river channel habitat, documenting the fact that the Central Platte River is not in equilibrium. This analysis is also reported in Murphy et al., (2004), and has been reviewed by the National Research Council (2004) at the request of the Governance Committee.

Summary Comment 28: *The current morphologic condition of the Central Platte River is also due to climate and not fully attributable to the reduction in peak flows resulting from water resources development.*

Summary Response: As presented in the FEIS, large water diversion systems have impact on flow and the supply of sediment downstream, and climate patterns appear to have lesser impact on both flow and sediment (Murphy et al., 2004).

From page 152 of the National Resource Council publication (2005) “Regardless of climate change, water-resources development will continue to affect Platte River flows as long as there is a net irrigation water consumption and reservoir evaporation. The human controls on flow are the most important controls on a daily, monthly, or annual basis, but the longer term effects of climate change are a background control worthy of further investigation."

Flow Characterization Report

Summary Comment 29: Several reviewers commented on a technical report developed by the EIS Office, referred to as the Flow Characterization Report. Additional documentation was requested. The time periods used for summarizing flow changes were questioned. More information on precipitation was requested. The accuracy of very early flow gauge data was questioned.

Summary Response: The Flow Characterization Report was prepared to provide a comprehensive listing of available flow data for the Platte River. The report played no role in the analysis of EIS alternatives. It is cited once in the DEIS, and not at all in the FEIS. Therefore, most of the comments received about this report are not addressing aspects of the FEIS. This report has been extensively modified since it was last published and can be found on volume 3, *Flow characterizations for the Platte River Basin in Colorado, Wyoming, and Nebraska*. These modifications are described in the following paragraphs.

The sources of the data for the flow characterization report have been included in Appendix A of the *Flow characterizations for the Platte River Basin in Colorado, Wyoming, and Nebraska* and scanned images of the data have been included in Appendices B, C, and D of the Report. USGS peak annual flows have also been added to the report to reduce any misunderstandings that may arise by using the available data, which are not the mean daily flow prior to 1930 due to changes in gauging methodology. The precedent for using data prior to 1930 has been set by Shaffer (1976)[7], Williams (1978), Bentall (1982)[8], and Kircher and Karlinger (1983)[9].

The report has been modified to include precipitation data from several locations in the Platte River basin. The report also includes Palmer Hydrologic Drought Index data for additional locations.

In each of the sections of Appendix A of the *Flow characterizations for the Platte River Basin in Colorado, Wyoming, and Nebraska*, there is a section that talks about USGS peak annual flows. In those sections, we point out that the USGS peak annual flow is usually equal to the Maximum Annual Mean Daily flow prior to 1930.

Sandbars

Summary Comment 30: *No data is presented describing historic versus current trends in the frequency, distribution, size, and elevation of sandbars. In addition, there is no quantitative discussion of the required river stage change, the number of days needed to create sandbars, how that information is accounted for in the model, or whether it historically occurred.*

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[7] Schaffer, F. B. 1976. "History of Irrigation and Characteristics of Streamflow in Nebraska Part of the North and South Platte River Basins, USGS Open File Report 76-167.
[8] Bentall, R. 1982. "Nebraska's Platte River: A Graphic Analysis of Flows", Nebraska Water Survey Paper 53.
[9] Kircher, J. E., and M. A. Karlinger. 1983. "Effects of Water Development on Surface-Water Hydrology, Platte River Basin in Colorado, Wyoming, and Nebraska Upstream from Duncan, Nebraska", United States Geological Survey (USGS) Professional Paper 1277-B.

Summary Response: See discussion in "River Geomorphology" sections of chapters 4 and 5 on differences in water surface elevations and sandbar height potential for Present Condition and alternatives. See discussion in "River Geomorphology," sections of chapters 4 and 5 and "Central Platte River Channel" in chapter 2 on the relation between plan form and the frequency and distribution of mid-channel sandbars. The actions proposed in the FEIS and AMP focus more on flow peaks than duration of flows because sandbar-building potential in theory and in literature are more directly dependent on the peak flow.

Groundwater

Summary Comment 31: *How can groundwater pumping deplete the river, but high flows in the river have little if any effect on groundwater levels near the river?*

Summary Response: The processes by which groundwater pumping depletes the Platte River (or any river) have been well described by Patterson and Bleed (2004).

Basically, rivers are the drains for groundwater in most river Basins, that is, groundwater moves toward the river as the lowpoint in the Basin, and emerges from the ground as gains to the riverflow. Pumping from groundwater wells can intercept groundwater flowing toward the river. Generally, the closer the well is to the river, the more likely that some of the water pumped from the well is water that would have contributed to the river's flow. This process is quantified by the Nebraska COHYST Study.

High riverflows can raise groundwater levels near the river if those riverflows remain high for several days. The effect is slow because it depends upon the rate at which water can move through the ground. The effect is limited to areas near the river because high riverflows can only "back up" the groundwater flowing toward the river to a limited degree, i.e., water cannot flow up hill. The analysis of the relationship between Platte River flows, rainfall, and groundwater levels reported in the DEIS (see technical report *Groundwater and Riverflows Analysis*, 2001, at www.platteriver.org), based upon realtime monitoring of each, shows that increases in groundwater levels more than a short distance from the river are associated with rainfall events which can quickly increase groundwater levels, rather than with increases in river stage.

FEIS Definitions of Lower and Central Platte River

Summary Comment 32: *There seems to be numerous definitions of the lower and Central Platte River in the DEIS. The change from conventional terminology, particularly for the Central Platte appears to change and broaden the goals of the Program, changes the meanings of studies, and the reason for this definitional change appears to be to make sweeping statements about the "central Platte River" data and trends that are more appropriate descriptions of reaches of the river not generally considered part of the central Platte. This makes conditions in those reaches appear relevant to the associated habitats in the true Central Platte River area, which experience substantially different flow conditions. Using the longer reach of river also serves to minimize the benefits of the action alternatives. For example, citing land management percentages over a longer reach masks the much higher percentages of river bank managed for endangered species between Lexington and Chapman, making them appear less significant.*

Summary Response: All EIS geographic descriptions of the Basin have been made consistent with the definitions in chapter 1. The figure in chapter 1, section "Study Area" has been edited and text has been clarified for consistency. In the EIS, the Central Platte River is defined as starting at Lake McConaughy and proceeding to Chapman, Nebraska, because this geographic area encompasses the water projects and water operations most relevant to the Central Platte Valley and Habitat Area. This approach is taken rather than dividing the description of facilities and the analysis of alternatives into the North Platte River through Lake McConaughy and part of the Nebraska districts facilities, and then the Central Platte River from the confluence to Chapman which divides facilities and even canal reaches into two parts. All descriptions of land management percentages related to the Central Platte Habitat Area are based upon the area between Lexington to Chapman and not based on any other river reach.

Target Species

Summary Comment 33: *Figure 1-2 on page 1-5 of the DEIS is inaccurate.*

Summary Response: "The four target species listed as endangered or threatened in the Platte River Basin under the Endangered Species Act" figure in chapter 1 is included to provide historical context of why the target species were initially listed as threatened or endangered. The more specific impacts of water and land development in the Platte River Basin are described in detail in chapter 2. Also, the figure has been edited to more closely reflect the contents of the Federal Register notices cited.

Summary Comment 34: *The DEIS conveys the impression that little is currently being done on the river to provide and improve habitat conditions. This is incorrect given that nongovernmental organizations, Interior, districts and state agencies currently manage thousands of acres of habitat for the target species. Page 4-6, Table 4-1 is incomplete according to the geographic database map produced by the DOI in May 2001, for example, Nature Conservancy and Whooping Crane Trust lands in the Alda to Wood River reach, and Central's land in the last two bridge segments.*

Summary Response: Information has been added to "Affected Environment and the Present Condition (No Action Alternative)," chapter 4 to describe the extent of conservation lands in the Habitat Area and the habitat restoration activities underway. However, the FEIS focuses on the improvements to habitat created by the alternatives, as required by NEPA. Table 4-1 is a listing of "Geographic Markers for the Central Platte River", provided to assist readers in orienting themselves to the features referenced in the EIS analyses. The table provides a selection of prominent gauge locations, bridges, cities, and properties. It is not a listing of all protected lands. To avoid any further confusion, this set of geographic markers has been removed.

Least Tern and Piping Plover

Summary Comment 35: *There are no historic or documented least tern or piping plover nesting records on the Central Platte River*.

Summary Response: "History of Habitat Use and Habitat Trends for Target Species," chapter 2 has been modified for the FEIS. It now states that:

There are no known historic records of channel nesting plovers and terns from the Central Platte River prior to 1941. The section also states that the Service believes that riverine conditions occurring further west and in the lower river (i.e., both upstream and downstream) were likely similar to riverine conditions in the Central Platte.

The Service believes that conditions existed within the Central Platte River channel that would have supported nesting plovers and terns, and that those conditions can be restored or created, depending upon your historic perspective.

As noted by the National Research Council in their review:

> "The Central Platte subpopulation of least terns declined from 1991 to 2001. The number of terns using the Platte River is about two-thirds of the number needed to reach the interior least tern recovery goal for the Platte. The interior tern is nesting in substantial numbers on the adjacent Lower Platte River but numbers continue to decline on the Central Platte, reflecting declining habitat conditions here. The decline in the tern population on the Central Platte River has been coincidental with the loss of numerous bare sandbars and beaches along the river. Control of flows and diversion of water from the channel are the causes of these geomorphic changes." (National Research Council, 2005, page 10).

The Council also stated:

> "The decline in the river's [piping] plover population has been coincidental with the loss of its preferred habitat, especially in the Central Platte River, where suppressed variability in flow has led to reductions in sandbars and beaches and indirectly to increased woodland and reduced open sandy areas…. Breeding along the Central Platte River is mostly in artificially created habitats that are not sustainable on a multidecade basis. Recovery requires a reversal of present trends by rejuvenation of a more natural regime of riverflows, sediment processes, vegetation, and channel morphology" (National Research Council, 2005, page 223).

Summary Comment 36: *Please provide the data or a reference that shows terns and plovers nested in the central Platte River before 1940 so that a degree of "habitat degradation" can be evaluated.*

Summary Response: The "habitat degradation" referenced in the above comments refers to changes in the Platte River that have occurred during the last 100 plus years, and documented with references in the DEIS. Physical attributes of the river channel such as average annual flow, annual peak flow, sediment transport, and channel width interact to create and support conditions that provide various habitat components whose abundance or quality define a site's suitability for species of interest such as plovers and terns. For example, average annual flows at Overton have decreased from 2.65 maf during the period 1985 to 1909 to 1.4 maf between 1970 to 1998. Annual peak flows—those flows that restructure the channel by eroding and re-depositing sediment (i.e., building sandbars)—have been reduced from a median annual peak flow of more than 15,000 cfs in 1895 to 1909, to roughly 3,000 cfs in recent years. Sediment transport (sediment needed to build sandbars) has been reduced from 1,675,000 tons annually at Grand Island (1895 to 1909) to 826,000 tons at Grand Island (1970 to 1999). Finally, channel width at Overton has decreased from an average 5,300 feet in 1899 to 740 feet in 1998.

The information above, and additional information described in the DEIS and FEIS indicates that the Central Platte River was once a wide and sediment rich system probably similar to the Lower Platte River today below its confluence with the Loup River. Because of the changes in the Central Platte River—the reduction in physical attributes that support conditions that provide various habitat components (components still present and used in the lower river)—the Service concludes habitat components have been reduced or "degraded." This view is supported by the National Research Council (2005); see quotes from the National Research Council report in the response to Summary Comment 35.

Summary Comment 37: *Mr Lingle's data (Lingle 2004) identify a simple, but very important point—you can't find birds where you don't look for them. The data suggest that there continues to be substantial use of sandpit habitat, particularly at managed sites, and that the sharp decline postulated by the EIS team is likely related to a period of reduced monitoring rather that reduced availability of riverine habitat. Because only a few years of data have been collected under a broader sandpit monitoring program, it is not clear whether the overall decrease in numbers between the 1989-1990 and 2001-2004 is significant. In recent years, however, sand and gravel operators have made changes in how they typically leave a site, preparing it for housing or other development instead of leaving spoils piles that were often used for nesting.*

Summary Response: Comment noted. Also, see response to Summary Comment 35.

Note to readers: the data referred to (Lingle 2004) is reproduced in part in a table in the FEIS, chapter 4, titled, "Piping plover and least tern nest data from selected sites in central Nebraska, 1992-2004" under the "Central Platte Islands" and "Central Platte Pits" columns for years 1992-2004. In Lingle (2004), data are presented beginning in 1978, and represent an excellent attempt to document existing data. However, plover and tern data collection within the Platte River Basin has historically been undertaken by a variety of entities, using varying methods, with variable funding, and varying interests. A standardized monitoring approach and cooperative database are needed for successful management of plover and tern populations within the Platte River Basin.

Summary Comment 38: *Does the EIS team have data on successful nesting by least terns and piping plovers on natural sandbars?*

Summary Response: Successful nesting (i.e., fledged young) on naturally occurring and naturally maintained sandbars currently occurs in the lower river. Habitat metrics for these birds are provided by Ziewitz et al. (1992) and Kirsch (1996). Lingle (1993 [nest] and [site]) has reported information for plovers and terns successfully using sandbars in the Central Platte River. Plovers and terns have recently successfully nested on managed islands in the Central Platte River (see FEIS chapter 4, "Piping plover and least tern nest data from selected sites in central Nebraska, 1992-2004" table). The last recorded nesting on naturally formed and maintained sandbars in the Central Platte River occurred in 1989 (least terns) and 1990 (piping plovers) (Lingle 2004).

Summary Comment 39: *The DEIS does not clearly identify how even if birds do start successfully nesting on sandbars on the Platte they will be better off than where they nest today.*

Summary Response: Interior believes that a diversity of nesting locations, including Lake McConaughy, channel sites in the Lower and Central Platte River, and sandpits (in the short term) is an acceptable management strategy for Platte River Basin tern and plover populations.

Terns and plovers can successfully produce young on managed sandpits and such management may provide short-term benefit by supplementing production at Lake McConaughy and the Lower Platte River. However, the National Research Council (2005, page 198) concluded that artificial habitats, including sandpits, ". . .cannot provide the full complement of essential habitat requirements for piping plovers over the long term and therefore cannot substitute for riverine habitat. . . ." Therefore, restoration of riverine habitats in the Central Platte River is necessary for the long-term recovery of these species.

Summary Comment 40: *What is the logic of the DOI's perceived benefit to the least tern and piping plover from "allow(ing) earlier nest initiation by 1-14 days"? The analysis appears faulty as it only results in a 1-3 day increase in fledging duration. Also, the DEIS notes tern nesting in May and early June but the analysis purports a benefit to the species by providing annual peak flows in May or June.*

Summary Response: The referenced section has been modified in the FEIS. Timing of nest initiation is no longer treated as an impact indicator. Timing is addressed indirectly in the analysis of fledging days. Please see the response to Comment 13729, and the "Piping Plovers and Interior Least Terns", Impact Indicators and Methods" section in the FEIS chapter 4.

Summary Comment 41: *Use of SEDVEG Model in tern and plover analysis is inappropriate, water surface height shows flows do not produce safe nesting habitat, all sediment in basin would not produce islands high enough to be safe from flooding, and it is impossible to model sandbar formation and degradation.*

Summary Response: Habitat studies for the tern and plover analysis are dependent on understanding current and future river channel form. Sediment transport models track physical processes associated with flow and sediment that alter river channel form. SEDVEG Gen3 is used because it has vegetation algorithms not found in most sediment transport models, which improve estimates of bank resistance for sediment transport and also provide estimates of vegetation free channel.

The Sandbar (Nest) Elevation Potential indicator used in the DEIS was found to be structured incorrectly and provided misrepresentative results. This indicator has been replaced in the FEIS by Sandbar Height Potential found in the "River Geomorphology," sections of chapters 4 and 5. The results of this and other tern and plover indicators show that the alternatives in most instances produce improvements for the nesting birds.

The combined importance of the flow regime (high spring peaks), plan form of the river (braided), and availability of sediment for desirable nest conditions are discussed in the "River Geomorphology," sections of chapters 4 and 5.

Sandbar formation and degradation are better addressed with 2- and 3-dimensional sediment transport models; however, sandbar height and prevalence information can be obtained from 1-dimensional models and plan form studies. Two and/or 3-dimensional models cannot feasibly be applied throughout the Central Critical Habitat Area, but are recommended for specific sites under the Implementation phase of the Program (Adaptive Management Plan). Under this Programmatic FEIS, the 1-D model, SEDVEG Gen3 provides basic essential information over the entire critical habitat reach on sandbar height potential through water surface elevations, and plan form data through the width-to-depth ratio indicator.

Summary Comment 42: *Clarify impacts to least tern and piping plovers above Lake McConaughy.*

Summary Response: The Platte River Recovery Implementation Program is focused on habitat restoration in the Central Platte Habitat Area. No restoration or decrease in habitat for terns and plovers is anticipated above Lake McConaughy.

Summary Comment 43: *Provide data to support forage is limiting to piping plovers.*

Summary Response: The section in the DEIS chapter 4 dealing with plovers and terns has been modified. Invertebrate food supply is no longer used as an impact indicator for piping plovers in the FEIS.

Pallid Sturgeon

Summary Comment 44: *Clarify the description of habitat for pallid sturgeon in the Lower Platte. The Present Description does not describe the Lower Platte. Also, there is no evidence to support the habitat requirements of the pallid sturgeon, or that the lower Platte is documented habitat for the pallid sturgeon.*

Summary Response: Description of pallid sturgeon habitat use and references to studies documenting habitat use can be found in the description of habitat indicators in chapter 4 of the FEIS.

Summary Comment 45: *There is no evidence of spawning historically or today. The Missouri River should be discussed separately from the Platte River as it leads the reader to confuse where pallid sturgeon occur and where they do not.*

Summary Response: While conclusive evidence of current pallid sturgeon spawning in the Lower Platte River is not available, considerable evidence exists that suggests spawning or attempts at spawning in the Lower Platte River do occur. These include timing, frequency, and distribution of known Lower Platte

River use by pallids and prevailing river conditions under times of use. In addition, several *Scaphirhynchus* larvae have been collected by researchers in the Lower Platte River and positively identified pallid sturgeon larvae have been collected by researchers at ages that indicate potential sites of origin that include the Platte River.

Summary Comment 46: *There is no evidence that suggests that increased sediment transport in the lower Platte is needed for pallid sturgeon. This was confirmed by the NRC report.*

Summary Response: Studies have documented significant morphological changes in the Lower Platte River (particularly, Rodekohr and Engelbrecht, 1988), and island and bank morphological changes detected in the Platte River bounding the Papio-Missouri Natural Resources District from 1949 through 1988 (Center for Advanced Land Management and Information Technologies, University of Nebraska, Lincoln). The Rodekohr and Engelbrecht study found that the Lower Platte River had become more constricted and erosive over time. Based upon this finding, the effects of hydrology and sediment supply on the Lower Platte River have been evaluated.

Summary Comment 47: *No data were presented to confirm conclusions regarding spring flow needs for pallid sturgeons for spawning. The NRC report concluded that current conditions in the lower Platte do not adversely affect survival or recovery of the pallid sturgeon.*

Summary Response: Conditions associated with pallid sturgeon spawning including references can be found in the description of indicators in chapter 4 of the FEIS. Also see the Missouri River Biological Opinions for a detailed discussion of the role of and need for a spring rise for pallid sturgeon (Service, 2000; Service 2003, Missouri BO).

Whooping Crane

Summary Comment 48: *The rationale of Platte River habitat impacts affecting whooping crane populations or whooping crane conservation is questionable due to a whooping crane population increase, increased detection of whooping cranes on the Platte, and the "quasi-equilibrium" Platte River habitat conditions (Johnson 1994, 1997) during a long-term period of water projects operations.*

Summary Response: Observed whooping crane use of the Platte has become concentrated in specific locales--small portions of the former range on the Platte, often to unique or managed locations. Thus, crane use may have increased at these sites even as the vast majority of the Platte has deteriorated beyond levels usable by cranes. Depending on the assumptions used however, the observation data can be interpreted as increased use, an increase in use that is disproportional to an overall population increase, or simply increased detection of whooping cranes using the Platte. Also, some parties claim that narrowed channels receive undetected crane use. Hence, the Program's "Need and Purpose" for adaptive management and a rigorous monitoring component that is described in chapter 1.

Moreover, a survey of Platte River channel maintenance science and technical reports indicates that the remaining unique and managed habitats are threatened by the same processes that have contributed to broad-scale channel habitat deterioration. The discussion in the EIS (in particular the geomorphic discussion) contain important additional information on channel maintenance investigations (e.g., Currier, 1997[10]; Johnson, 1997; Murphy et al., 2004; Simons and Associates, 2000; and Kinzel et al., 2000) beyond the scope of Johnson (1994), or with results contrary to those of Johnson (1994).

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[10] Currier, P. 1997. Woody vegetation expansion and continuing declines in open channel habitat on the Platte River, Nebraska. North Am. Crane Workshop 7:141-152.

The whooping crane population increase has been achieved through a wide array of conservation activities (see Meine and Archibald, 1996; and FWS, 1994)[11] which include: international treaties, habitat conservation, education, law enforcement and take prohibitions. Research has been undertaken on virtually all aspects of its biology, life history, and ecology. Initial research carried out under the Cooperative Whooping Crane Project (Allen, 1952; Allen, 1956)[12], has been followed by wide-ranging studies of demographics, genetics, reproductive biology, migration, food habits, habitat ecology and restoration, captive propagation, diseases and health management, and reintroduction. Notwithstanding the importance of these conservation activities, the long-term goal of the ESA and the Platte River Recovery Program is the species recovery; in other words, removing threats to the species so that intensive protective measures provided a listed species under the Act are no longer required. For recovery to be achieved, habitat must be sufficient to support an expanded population and provide resources for the species resilience, enabling it to function as a natural member of the biological community and withstand cumulative habitat impacts in its range, potential stochastic and catastrophic events (e.g., disease or storm events), and genetic and demographic constraints and a variety of environmental pressures. Based on whooping crane life history characteristics, the existence of a single wild population, and limited ability of the species to pioneer or expand into geographic areas, the Platte River is one habitat area that, along with other high-use areas of the Aransas-Wood Buffalo population, would most effectively support a larger recovered population.

Summary Comment 49: *Whooping crane use of Platte River wet meadow habitat is questionable. Observational data show few recorded uses have occurred in meadows. Cornfields are important for whooping crane feeding.*

Summary Response: The whooping crane's life history and wetland foraging habits on wintering, breeding, and migrational use-sites (including Nebraska) is widely reported in scientific literature (Austin and Richert, 2001). Historic accounts also report whooping crane feeding in Platte River wet meadows. Consideration of these factors for whooping cranes, and recognition of the ecological importance of wetland conservation along the Platte led the interagency Biology Workgroup of the Platte River Management Joint Study to specify riparian wet meadow conservation as a component of the Program land management objectives. Wetland habitats supporting aquatic and semi-aquatic food organisms are also a component to the critical habitat designation for the Platte and other migrational high-use areas designated as critical habitat. The status of meadows and potential effects of the Program on wet meadows is therefore addressed in the EIS.

Like much of the available historic information on rare whooping cranes, the Service Platte River site evaluation database (i.e., "data since 1942") is based on some chance observations. This is the same database that some Cooperative Agreement participants consider inadequate for information on whooping crane activity. As such it can indicate only--by the affirmative observation of the cranes in meadows--that cranes do use Platte River meadows. In recognition of this, the Cooperative Agreement has identified long term and rigorous systematic monitoring of whooping crane use of feeding habitat as a Program objective (FEIS chapter 2). The Service also indicated information in the database does not involve intensive daytime tracking. If it were determined through additional information gathered from

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[11] Meine, Curt D. and George W. Archibald (Eds). 1996. The cranes: - Status survey and conservation action plan. IUCN, Gland, Switzerland, and Cambridge, U.K. 294pp. Northern Prairie Wildlife Research Center Online. <http://www.npwrc.usgs.gov/resource/distr/birds/cranes/cranes.htm> (Version 02MAR98 accessed January 2006).
U.S. Fish and Wildlife Service. 1994. Whooping crane recovery plan. U.S. Fish and Wildlife Service, Albuquerque New Mexico.

[12] Allen, R.P. 1952. The whooping crane. Natl. Audubon Soc. Resource Rept. 3. 246pp.
Allen, R.P. 1956. A report on the whooping cranes' northern breeding grounds. Natl Audubon Soc. Supplemental Resource Rept. 3. 60pp.

monitoring that whooping cranes do not use wet meadows for feeding or other uses, the Service could through adaptive management, consider removing wet meadow and wetland protection from its recovery goals and objectives.

The discussion of whooping crane feeding habits in grain fields is expanded in the FEIS.

In the FEIS, citations are provided for scientific investigations of seasonal/temporal relationships of meadow invertebrates; however, we could locate no description of "soil temperature regimes and invertebrate activity" in the DEIS cited by two commenters.

Summary Comment 50: *The historic data from crane roost sites presented on page 2-8 (figure 2-2) of the DEIS is misleading and inaccurate compared to recent data collected under the Cooperative Agreement. The wording used to describe crane roost selection is not accurate.*

Summary Response: The text in the FEIS is updated with some preliminary results from Cooperative Agreement pilot study investigation (WEST Inc., 2005). While crane use of channel and availability of channel width can be analyzed and illustrated in somewhat different ways (e.g., USGS, 2000, figure 2, page 25; WEST Inc., 2005), these results, including the recent Cooperative Agreement data, all present the same basic concept represented in the figure (chapter 2, "Habitat Features Historically Used by the Target Species", "Open Channel Habitat" section), i.e., observation of whooping crane use increases with channel width and is disproportionally concentrated in the widest channels of the Platte.

Summary Comment 51: *We have concerns regarding the PHABSIM roost habitat modeling analysis. It is suggested that recommendations of an USGS review of the model be used; a whooping crane roost habitat model be modified to use the same variables used in the DEIS sandhill crane analysis; and simple relationships for individual habitat variables should be presented. Sediment augmentation planned under the Program could invalidate PHABSIM projections.*

Summary Response: The PHABSIM analysis presented in the FEIS incorporates modifications. First, several changes to the model mechanics recommended by the USGS (2000) were incorporated. These include analysis of individually gauged reaches prior to aggregation for each alterative; updating (albeit limited) the hydraulic datasets due to changed channel conditions; and employing the USGS curve aggregation technique in lieu of Reclamation's former "spline."

The design of the PHABSIM analysis was modified and simplified to more clearly illustrate and focus more on relationships for individual variable of the channel habitat. This modification also is more directly related to the channel habitat restoration objectives of the Program – i.e., to provide wider channels and greater distribution of wide-channel habitats.

The specific variables used for PHABSIM of sandhill cranes were not used for whooping cranes because the relevance of the particular habitat variables used are unsubstantiated as a viable interpretation of whooping crane habitat use. These variables have received unfavorable peer review by all or nearly all crane biologists that have examined this approach for whooping crane habitat modeling.

In regard to the effect of sand augmentation on PHABSIM applications: the purpose of sand augmentation coupled with channel monitoring is to maintain channels in quasi-equilibrium conditions; in other words, avoid channel degradation and narrowing. Thus, we believe sand augmentation would reduce the errors of long-term projections made from existing profiles, not increase the error. Other limitations of PHABSIM analysis are recognized in the text in chapters 4 and 5.

INDIVIDUAL COMMENTS AND RESPONSES

The following are individual comments received on the DEIS. They are taken from the submitted letters or transcribed testimony from public hearings. The comments are listed in numerical order.

Comment 13652[13]: *The driving assumption behind the entire focus of the DEIS is the view of the EIS Team that the development of water storage projects in the basin has produced the vegetation, channel widths, and other conditions found today in the Platte River below North Platte and that conditions in the late 1860s were better for the species. There is little or no data to support the view that the species were common or even present in the time period surrounding the 1860s that the EIS Team claims had desirable habitat conditions or that conditions at the time were even representative of historic conditions on the river. For reasons noted by Drs. Lewis and Johnson and Mr. Becker, the impact of climate changes, periodic droughts, and increased use of resources by settlers traveling along the Platte River would clearly have had a significant influence on the historical river and the wildlife habitat associated with it (Lewis at 11-12, and 15; Johnson at 5; and Becker at 4-5). The distorted, one-sided view of the historic Platte River needs to be corrected addressing all variables that have affected the Platte River over time must be addressed.*

Response: We recognize that various parties involved in the Platte River conflicts have different positions about causes of habitat loss. The EIS analysis of the river habitat attempts to integrate information about the most significant factors affecting habitat trends. At the request of the Governance Committee, this analysis (see Platte River Channel: History and Restoration, Murphy et al., 2003) was reviewed by the National Research Council and found to be a sound basis for decisionmaking by the Department of the Interior (National Research Council, 2005). Also, see responses to Comments 14646 and 14256.

Comment 13654: *The SEDVEG model assumes that sediment uniformly aggrades or degrades throughout each reach. But as Dr. Lewis points out, other sediment transport studies of the Platte River, including one by the USGS, have demonstrated that the primary mode of sediment transport in the Platte River is in the form of large macroforms (Lewis at 4). The DEIS should have been drafted, and references to the SEDVEG model qualified, to reflect the fact that the model has not been tested, validated, or properly peer reviewed and that all output from the model are speculative at best.*

Response: See responses to Comment 14681 and Summary Comment 21.

Comment 13656: *The assumptions of the EIS Team reflected in the DEIS on the process by which vegetation and tree growth comes to be established on islands and sandbars is both intuitively incorrect and contrary to the conclusions of experts who have studied the Platte (Johnson at 4-5; Lewis at 14).*

Response: See response to Comment 13865.

Comment 13659: *Based on the historic dry period experienced over the past 5 years, the hydrologic baseline used in the DEIS is inaccurate. The baseline should be re-evaluated and updated with the last 5-years of data.*

Response: The hydrologic period of 1947-1994 is considered adequate for evaluating the effects and benefits of the Program, as it includes both wet periods and extreme drought periods.

Comment 13660: *References and figures regarding the development of NPPD's Cottonwood Ranch property are incorrect (DEIS at 3-49 and 4-205) and should not be included. The Cottonwood Ranch*

[13] Comments start at number 13652.

plan was drafted to take advantage of existing features of the property and may or may not be applicable to other parcels of ground that are brought into a Program.

Response: The depiction of NPPD's Cottonwood Ranch property is intended as an illustration of types of restoration that could take place on Program lands during the Program and is consistent with the Program's Adaptive Management Plan.

Comment 13662: *Similar to what occurred in the relicensing proceeding, certain operational or release assumptions are inherent in the OPSTUDY runs. A quick review of the figures presented in the Hydropower Technical appendix reflects increased generation in April, May, and October and decreases in July and August, relative to the current baseline. It appears that these generation figures are based partially on the assumption that EA releases are made to meet the stated priorities of the FWS to provide water to the central Platte River for whooping crane migration. However, to date these assumptions have not held true. EA releases have focused on running water during the summer months, a time when NPPD has limited canal capacity available to utilize the EA releases for hydropower generation. Thus, the hydropower impacts as modeled may not reflect reality, and this must be corrected.*

Response: A limited Environmental Account (EA) was created in Lake McConaughy as part of the provisions in the license granted to the Nebraska Districts by the Federal Energy Regulatory Commission in 1998. Since 1998, the Service has managed the releases from the EA to improve habitat for the target species. The pattern and priorities for these releases do not reflect how releases will be managed by the Service under a Program, when the Lake McConaughy EA will be substantially larger. The EIS analysis was based upon the priorities for release under the full Program EA.

Comment 13665: *The EIS Team did not in the DEIS address the potential negative impacts of sediment augmentation activities and pulse flows, such as increased encroachment of undesirable vegetation including exotic and noxious weeds and channel dewatering, both of which upset the present equilibrium of the Platte River. The EIS Team cannot assume only positive outcomes from implementing these measures.*

Response: See the "Land Use Types", "Invasive Plant Species" section of chapter 5 in the FEIS.

Comment 13667: *NPPD has never agreed to operate procedures or priorities other than those included in the Environmental Account Document. NPPD wants to clarify that the "operations" described at Attachment-41 and also on page 3-41 are not operating procedures, operating priorities, operating rules or operating criteria, that NPPD would committed to and therefore they should not be considered as part of the proposed Program or any other alternative.*

Response: This language has been modified for the FEIS. The Governance Committee's final proposed Program indicates that these operating assumptions are reasonable to use for estimating the benefits of the Program for the FEIS and the biological opinion (BO), and will be tracked during Program implementation. See Governance Committee Program Documents, Water Plan, Section 11 Water Plan Reference Materials[14].

Comment 13669: *Stream gauge data from Nebraska prior to the 1930s is "non-continuous and/or estimated" leading to significant, but unquantifiable, error when compared with post 1930's data.*

[14] The September 6, 2005 draft version of the Governance Committee Program Document used for the FEIS analysis is included on a CD in volume 1 of the FEIS.

Response: It is true that early stream gauges did not use continuous recorders and that this leads to unquantifiable error. The data prior to the 1930s are scarce and impossible to replace, thus the EIS is forced to use what is available, which are the data published by the State of Nebraska. The FEIS provides a more complete description of that data.

Comment 13670: *The DEIS team, at times, chose the highest data value from among the Lexington, Elm Creek and Overton to represent the flow at Overton. Making convoluted changes in this manner distorts the DEIS team's analysis.*

Response: The Lexington gauge overlaps with the Overton gauge from 1918 through 1923. The protocol was to use data from the Platte River at Overton gauge if it was available since it has the longest period of record. The Lexington and Elm Creek gauges overlap in 1917 and the Elm Creek gauge was selected for this year because it had 24 more days of data than Lexington.

Comment 13672: *Despite the importance of the OPSTUDY model to the EIS team in reaching conclusions about the impacts of the action alternatives, there is very little information in the DEIS or technical reports cited in the DEIS that explain how the OPSTUDY was modified or the input parameters adjusted from common usage. The result is the erroneous addition of approximately 2,274,200 acre-feet of gain between North Platte and Overton, an overstatement of 56,750 acre-feet per year.*

Response: Adjustments to input parameters are discussed in the *Water Resources Appendix* in volume 3[15] of the FEIS. Also see response to Comment 14698.

Comment 13674: *A great deal of emphasis is placed on daily flow frequency comparisons but no documentation of the methodology used in the Central Platte OPSTUDY to transform monthly output data to daily flow data has been prepared.*

Response: See the "Central Platte River Model (OPSTUDY8) Technical Documentation and Users Guide" (Section 3.11.2) in the *Water Resources Appendix*, in volume 3.

Comment 13675: *The DEIS team has used the OPSTUDY results in ways that are inconsistent with a comparative model. Known errors need to be corrected and uncertainties understood and acknowledged. Most importantly given the weight placed on OPSTUDY results in the DEIS, the model, code changes and modeling assumptions need to be documented, supported, and made available for public review.*

Response: Adjustments to input parameters are discussed in the *Water Resources Appendix* volume 3 of the FEIS. More complete documentation for the Central Platte River OPSTUDY Model has been prepared for the FEIS.

Comment 13676: *Once the Program as defined by the GC is finalized, the budget figures found in Tables 5-104 (and associated tables) and other issues identified in these comments and attached reports should be addressed in a supplement to this DEIS so that the public will have a clear understanding of the cost of the Program and allow the public an opportunity to comment.*

Response: Comment noted. The September 2005 draft version of the Governance Committee's budget estimate for their Program proposal is included on a CD in volume 1 of the FEIS as part of their Program Document.

Comment 13677: *The 2003 Biological Assessment for the Missouri River Master Manual concluded that measures being proposed for the Missouri River similar to those was being touted for the Platte would not be successful. The assessment concluded that a change in the dominant discharge of the river will be*

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[15] Volume 3 is available upon request at <http://www.platteriver.org/>

required to change the alluvial process in order to create and wash away sandbar suitable for nesting terns and plovers; a message the Parson's report has stated time and again. This fact was further supported by the FWS's 2003 Missouri River BiOp, which concluded that the 2000 RPA would not accomplish the intended habitat objectives and that the flow previously stated by the FWS would cause further erosion of the riverbed.

Response: The Platte River and Missouri River are not equivalent systems; however the Missouri River analysis highlights the fact that managing flow without managing sediment can lead to problems, such as those that exist in the Central Platte River today. Having a sediment management plan in conjunction with a flow plan is a key element of the proposed Platte River Alternatives.

Comment 13678: *Although the Program does not require additional transmountain diversions to meet its needs, it is evident that the Program will influence the choices that water providers on the Front Range make with regard to use and development of existing and future water supplies. Indeed the Program's proposed alternatives rely on water from transmountain sources to meet at least a portion of the water objectives during the first increment. We are concerned that the decision to categorize reuse of transmountain water as a depletion will discourage or prevent reuse, even though the right to reuse foreign water is guaranteed, and sometimes, required by state law.*

The River District is sensitive to the process and negotiations that have brought the Platte River Program to this point We believe the upcoming decisions that will be based on the DEIS would benefit from a more thorough explanation of transmountain issues. As you suggested in our meeting, it maybe appropriate to expand the explanation under the No Action Alternative or perhaps acid a technical memorandum to include with the DEIS.

The River District is still concerned about the "baseline" for the hydrologic studies conducted under the DEIS. The July 1, 1997 baseline was selected as the point from which "to track and offset the effects of new and expanded water-related activities that would cause depletions to species and annual pulse flow targets" (DEIS Executive Summary page E-36). So, prior to the cut-off, a significant portion of the reusable return flows from transmountain sources would be tracked, in essence, as native South Platte River flows, and after the cut-off date, any development of reusable supplies would be considered a depletion and need to be offset by Colorado's Plan for Future depletions. Any baseline that includes transmountain return flows works against the efficient development and reuse of reuseable transmountain supplies, thereby putting more pressure on the Front Range to develop new water supply projects from the Colorado River Basin to the detriment of the West Slope as a whole and the Colorado River Endangered Species.

Response: As discussed in the response to Comment 14265, the Colorado depletion management plan is sized in anticipation of future changes in Front Range water use that will create a change in timing of flows in the South Platte at Julesburg of a certain magnitude. Current projections of trends in Front Range water use indicate that these changes in water use will add significantly to the total volume of Platte River flows. If the assumed mixture of sources of water supply for Front Range municipal use shifts during the course of the Program's First Increment, it is possible that the Colorado depletion management plan would need to be operated differently to provide the necessary retiming of flows. The "depletions" referred to in the comment are, in this case, changes in timing and not reductions in flow volume that must be made up from other supply sources, such as transbasin diversions.

Comment 13696: *The "choke point problem" is presented as an issue for both summer and pulse flows, but concerns about summer appear to be misplaced. At page 5-46, the EIS team indicates there are a number of years in which the river cannot accommodate an 800 cfs summer Environmental Account release in addition to irrigation releases. The DEIS does not show, however, that in each of those years* *capacity conflicts occur only when irrigation demand is at its peak on all canals, or that lower environmental flows are frequently possible on those days. Because of the very high losses between Lake McConaughy and the habitat areas under drought conditions, the environmental account manager elected not to make any summer releases in recent years even when delivery was available. After the proposed Program implements its water conservation/supply projects, if the environmental account manager chooses to make summer releases, any "choke point" issues can be addressed through other Program water projects including leasing of irrigation water without changing the carrying capacity at North Platte at all.*

Response: See response to Comment 13864.

Comment 13701: *The DEIS at 4-79 to -80 and 5-102 displays the miles of riverbank managed for crane use under Present Conditions and under the action alternatives by percentages as well as river miles, diluting the impression of available habitat by doubling the length of the typical "central Platte River" reach from 90 to 180 miles, the reach from Hershey on the North Platte River to Chapman instead of Lexington to Chapman. These figures are also deflated by omitting 6.0 river miles of lands managed by Central between Overton and the J-2 Return (Jeffrey Island habitat area), and by doubling the river miles by separately counting each bank of the river. The percentages are also calculated without taking into account the mile buffer around each bridge which the EIS team considers unsuitable for management as habitat. Under Present Conditions, 30.6 miles of river are now managed on one or both banks for crane habitat, or 39% of the 78 miles in the Lexington to Chapman reach that are at least ½ mile from a bridge. This contrasts with the 10% and 19% figures cited in the DEIS at 5-102.*

Response: The accuracy of these tables in chapter 4, "Whooping Crane" section, were rechecked for the FEIS, and the effect of managing one or both banks is clarified in the EIS discussion. The full length of river within the whooping crane migrational path, and lying within the project affected area, is provided as one parameter for impact assessment.

The rationale for discriminating a difference in the biological impacts when a single riverbank is controlled versus both riverbanks controlled is discussed in chapter 4. Control of a single bank limits, and entirely impairs, channel management when channel shifts in dynamic alluvial channel reaches, or the current shifts to other channels in anabranched reaches (i.e., shifting to the opposing owner's side the channel). Human development or anthropomorphic encroachment on the opposing bank also impairs habitat management when only a single bank is controlled. Control of a single bank can also prevent monitoring and research activity. Each of these represent situations actually encountered by river habitat managers.

Comment 13704: *The DEIS suggests that small differences in river stage predicted by SEDVEG for the action alternatives are significant in the processes of wet meadow creation and maintenance. This hypothesis is stated briefly at pages 2-9 to -10, with reference to Figure 2-3, which the EIS team states "illustrates the typical position of wet meadows along the landscape of the Platte River" and "shows the hydrologic relationship of these meadows to the river and adjacent groundwater." The EIS team is mistaken in both of these statements.*

Response: The referenced figure, which was a conceptual illustration of a wet meadow, has been replaced with an actual cross section of the river and wet complex at Mormon Island in the "Bottomland Grasslands and Wet Meadows" section of chapter 2 in the FEIS.

Comment 13705: *All of the action alternatives except GC-1 assume that it is possible to augment sediment so that the appropriate quantity and quality of sediment will be freely available as flows enter the area of interest. The EIS team anticipates that GC-2 would add to the river approximately 300,000 cubic yards of sediment on average per year of the Program, but the DEIS does not indicate how that would be accomplished. The DEIS provides no guidance on how sediment augmentation might be* *implemented, no indication of the rate or frequency for adding sediment or whether attempts will be made to match sediment augmentation with flows or sediment deficits. The FEIS needs to look at the practical problems with providing sediment.*

Response: Sediment augmentation through bank cutting, island lowering or from activities such as wet meadow development is described broadly in chapter 5 for this Programmatic FEIS, and also outlined in the Adaptive Management Plan (AMP). Repeat surveyed cross sections, sediment transport measurements and numerical modeling provide preliminary estimates of the average volume of sediment needed. However implementation of a specific sediment augmentation program will also depend on the lands acquired from willing sellers, the flow regime that occurs during implementation from both managed and climatic effects, and the results of continuous monitoring under the IMRP both upstream and downstream of the managed sight. The AMP allows for modification of Program actions on a site-specific basis. An additional resource is consultation with administrators of other ongoing augmentation projects nationwide, such as the Trinity River in California, for input on successful techniques and shortcomings.

Comment 13706: *Any procedure developed will need to take into account the potential for large quantities of sediment added to the river to cause a localized deposition, channel splits or flooding. For example, page 3-47 and Figure 3-10 show how a cross-section of NPPD's Cottonwood Ranch habitat area is to be modified by clearing a high wooded island, lowering it closer to the average water surface elevation, and pushing the scraped sediment into the river. At Cottonwood Ranch, most islands are wider than the channels. Carrying out the suggested cross-section modifications would remove enough material from the top of the islands to completely fill the channel. Thus, it is unlikely that the channel has the capability to accept all the sediment as portrayed in a short period of time without adverse impacts. The FEIS needs to make realistic assessments of the potential for augmentation measures to impact riparian landowners or adversely impact downstream habitat or structures due to miscalculation or simply the impracticality of augmentation operations that closely match flows and sediment deficits.*

Response: Existing aggradation in the Central Platte River is described in chapters 2, 4, and 5. The technique of consolidating flow is valuable for preventing river narrowing resulting from deposition in anastomosed channels. Monitoring to prevent unacceptable impacts from sand augmentation is also an integral part of the proposed management actions. Also see response to Comment 13705.

Comment 13707: *The SEDVEG model and DEIS comparisons of the action alternatives assume a river with no man-made structures or actions to interfere with the shaping of channels. In reality, numerous bridges cross the central Platte River, and Interstate-80 established a new north bank for almost the entire reach from Lexington to Grand Island, cutting off much of what was once active river channel. In addition, over the past century, landowners have installed tens of thousands of "hard points" to stabilize their property. The EIS team dismisses these structures as insignificant, but viewed collectively these man-made structures stabilize the channel on a significant percentage of the river.*

Response: Banks with riprap that restrict the width of the historic flood plain can, in some instances, aid in promoting a braided plan form. The hardened bank, like bridge foundations, could be beneficial if it prevents the main channel flows from splitting into side channels that meander independently in a wide river corridor. Each riprap location must be assessed independently to determine if the effect is beneficial or detrimental. As demonstrated in chapter 4, a desirable river corridor width is less than 3,000 feet wide and the ideal flood plain width (river corridor) may be closer to 2,000 feet. The estimate of length of protected banks has been removed in the FEIS since it is no longer identified as having solely a detrimental impact. See response to Comment 14231 for bridge impacts.

Comment 13708: *The EIS team discusses the influence of bridges at page 2-39. Because of the EIS team's unusual extended definition of the central Platte River, it identifies a total of 22 bridges spread over 153 miles, for an average of 7 river miles per bridge crossing. Nine of the bridges are dismissed without explanation as having no ability to significant constrict river channels, so the DEIS extends the effective spacing of bridges to 13 river miles. The remaining 13 bridges, the EIS team acknowledges, have a "localized" influence on channel morphology for a half mile in either direction, or 8.5% per 13 river miles. As is clear from the five to six mile lengths of the "bridge segments" in the Program's Land Plan, bridges are closer together downstream in the associated habitats. Interstate-80 crosses the Platte River or one of its channels six times in the Grand Island area alone. In these areas, bridges stabilize 20% or more of the river.*

Response: See response to Comment 14231.

Comment 13709: *At page 2-41, the DEIS discusses riverbank stabilization, citing a survey by the U.S. Army Corps of Engineers that found roughly 10% of the riverbank between North Platte and Columbus has been protected from erosion, with an additional 10% anticipated by 2020. Stabilization by Interstate-80 makes this number much higher in the Lexington to Grand Island reach. In addition to this identified hardening of the river banks during the Program's first increment, the DEIS acknowledges in a footnote that it is "likely that a substantial number of unpermitted actions may also have been undertaken." Indeed, it is Central's experience in developing the Jeffrey Island habitat area that the Platte has many imbedded "hard points" that pre-date the Corps' permitting processes or that were installed without permits, and are not accounted for by the Corps.*

Response: See response to Comment 13707.

Comment 13710: *Roads, bridges, channel stabilization structures and accretion recovery collectively stabilize a substantial percentage of the riverbanks in the central Platte River. It seems imprudent, and contrary to the interests of the species and habitat, simply to assume that their impacts are insignificant. The SEDVEG model's inability to take this extensive channel stabilization into account is a further reason that the Program should investigate sediment augmentation measures with caution, as described in the proposed Program.*

Response: SEDVEG Gen3 has the capability to represent hardened (riprap or otherwise reinforced) riverbank, but it has not been applied to date. The model does account for earth dykes but the dykes were not represented as hardened in the model due to the spacing of cross sections. The stabilization measures should extend over a majority of the distance represented by a cross section, to be represented in the model. The original spacing in the SEDVEG Gen1 model was 6.8 miles, the current spacing in the SEDVEG Gen3 version of the Central Platte River Model is now an average 1.45 miles. This capability of SEDVEG Gen3 should be utilized in the future as more cross section data becomes available to further reduce spacing, and as this spacing better represents distances of hardened bank. Also see response to Comment 13707.

Comment 13711: *The EIS team frequently suggests that the "choke point" problem is part of a "trend toward reduced capacity" that is symptomatic of what the team views as the broader sediment transport issue in the central Platte River region. This has been demonstrated not to be the case. Parsons' "Preliminary Evaluation of Channel Capacity in the North Platte River at North Platte, Nebraska" shows the North Platte area flooding problems actually result from building on the flood plain, closing of drains, blocking of a side channel due to highway work on the riverbank, and the rapid growth of phragmites (a bamboo-like invasive weed that in the past 15 years has covered the river banks and bars for several miles above and below North Platte). The Parsons study also finds that dredging and flow management are unlikely to open and maintain a higher capacity channel since these measures are unrelated to the causes of reduced capacity.*

Response: The Governance Committee has recently contracted with an independent engineering firm, JF Sato and Associates, to assess the factors leading to the reduced channel capacity in the North Platte River at North Platte, Nebraska. The consultants issued their report (JF Sato and Associates, 2005, page 2), which concluded that, ". . .The decrease in channel conveyance is due to aggradation".

Comment 13712: *Even assuming that 3,000 cfs in environmental flows can be provided at North Platte, it is unlikely such a pulse would result in a 3,000 cfs increase in flows in the associated habitats, though that appears to be one of the EIS team's assumptions.*

Response: The EIS analysis is based on the assumption that the Program will fulfill its commitment to evaluate the feasibility of delivering during the First Increment 5,000 cfs of Program water to the upper end of the habitat reach for 3 days when other demands on water are low, and to implement a solution to achieve this objective by year 5 of the Program, unless the feasibility study and the adaptive management process find that these deliveries are infeasible or unnecessary and the Governance Committee concurs. Thus, the EIS assumes for analysis of the Governance Committee Alternative that the Program has or creates the capability to move 5,000 cfs of Program water to the habitat reach. For the FEIS evaluation, a simplified modeling approach was adopted in which pulse flows were routed downstream from Lake McConaughy without modeling reach-specific attenuation and conveyance losses, as it is unknown at this time how the 5,000-cfs objective described above ultimately will be addressed. However, the FEIS analysis does not specifically assume that a 3,000-cfs increase in environmental flows at North Platte, Nebraska, must result in a corresponding 3,000 cfs increase in flows in the associated habitats in order to achieve this objective.

Comment 13713: *USBR applied the full dynamic wave "unsteady flow" model, written by the National Weather Service (D.L. Fread, 1971, 1975, 1978, 1988), to the North Platte and Platte Rivers, with input parameters calibrated until the simulated results matched the measured discharge hydrographs for a 1984 flood along the Platte River. When calibrated from this single event, the model suggested that a pulse would propagate through the system with no attenuation. The 1984 peak flow used by DOI in its calibration, however, is not representative of peak flows that might be supplemented with environmental account water. This peak came at the end of a long term and extensive flooding event (only a few days earlier measured flows were higher than the peak used by USBR in its model), in the wettest cycle of the last 50 years, when average annual flow rates exceeded 6,000 cfs. In light of the saturated condition of lands adjacent to the river, the EIS team's assumption that the river gained only 5 cfs per mile seems highly unlikely. In addition, precipitation records indicate that rainfall tracked with this peak flow the length of the central Platte River valley, not merely at Grand Island as suggested by USBR, so that the entire reach likely experienced increasing precipitation run-off far in excess of 5 cfs per mile, sustaining and adding to the pulse as it propagated downstream.*

Central believes that calibration of the wave propagation model with data from more characteristic peak flow events would be prudent, particularly since Central's sixty years of experience managing releases and Dr. Lewis' report both suggest that as peaks propagate downstream, they attenuate. In discussions with FWS regarding using releases to create or supplement a pulse in the current dry conditions, the Districts have indicated that they anticipate attenuation of a peak in excess of 50% between North Platte and Overton. Dr. Lewis aptly observes that larger flows are more likely to be attainable through using alternative means of increasing flow deliveries, located closer to the habitat, than increasing the carrying capacity at North Platte. The proposed Program includes investigations of both peak flow propagation and alternative measures, and the FEIS should be written broadly to accommodate whatever proves to be a practical option.

Response: In agreement with this comment, Reclamation switched from the previous National Weather Service unsteady flow model to a HECRAS unsteady flow model with a groundwater subroutine to address the large losses to groundwater after dry periods, which need to be accounted for. Initially, releases with multiple peaks were considered as a way to produce a short duration near-bankfull flow event of approximately 5,000 to 6,000 cfs at Grand Island during very dry conditions. Based upon HECRAS modeling, if conditions are very dry, the first flow peak may be eliminated through temporary bank storage prior to reaching Grand Island, and the second peak may also experience substantial attenuation. Because of these findings, additional release patterns continue to be evaluated for very dry conditions.

Comment 13717: *The DEIS at 5-98 states that under all alternatives the riparian grasslands would increase, but observes that the Land Plan does not explicitly require Program wet meadows to have "developed organic soil horizons" and that wet meadows established on mineral soils would support lower biodiversity and thus the "quality of food reserves" would be relatively low. There is little support, however, for this suggestion that whooping cranes have explicitly known needs that must be met and which may not be met under the proposed Program as written.*

Response: The actual items whooping cranes ingest on the Platte are not possible to determine, but it can be reasonably inferred from several sources. It is prudent that the scientific literature addressing the natural history and habitat types where whooping crane feed be addressed. Thus, scientific investigations of fauna and flora of native Platte meadows available and potentially used by whooping cranes and the physical characteristics of the habitat they are known to occupy are cited in the FEIS. Information on sandhill cranes, which often feed along-side whooping cranes on the Platte and whose diets are reasonably understood, and unless or until better information is obtained, we believe that the diet of sandhill crane serves as a reasonable surrogate and provides the reasonable best available information for the diet of whooping cranes.

Comment 13719: *There are no studies showing that the existing quantity of wet meadow is insufficient for whooping crane use. Nevertheless, the Program intends to manage substantial acreage of wet meadows as crane habitat. Third, there are no studies to show what the "quality of food reserves" in various types of lowland grassland might be or that some lowland grassland would "possibly not be useable for crane feeding" because of soil type. Fourth, elsewhere the DEIS favors "restoration" over "protection." A long-established wet meadow needing only protection likely will have the organic soil the EIS team consider desirable; according to the DEIS, "restored" habitat may not.*

Response: A number of studies of Platte River meadow soil and soil-surface organisms found in various types of lowland grassland, and the associated lowland grassland characteristics, are cited in the FEIS. The FEIS illustrates that the Wyoming Water Development Commission property near Kearney following woodland clearing and grass seeding found that sandhill cranes avoided feeding on cleared islands, yet fed in established grasslands and wetlands property outside the channel and immediately adjacent to the site. The EIS does not disagree with the comment that native meadows will likely have desirable organic soil, or that—without judicious selection, close oversight, and development and application of rigorous evaluation standards—so-called "restored" areas may not.

Comment 13721: *The ability of each action alternative to prevent or avoid disturbances to whooping cranes is based on comparisons of acreage and perimeters. This comparison is artificial, since it is based on the hypothetical selection of specific hand-picked land parcels that may not be available in the market. The action alternatives, like the Program itself, can only acquire whatever land is available in the market. The selection will be the same for each alternative. Just as when potential wet meadow lands are considered by the Program, the Program's Governance Committee must be relied upon to make reasonable choices.*

Response: It is correct that the DEIS analysis is based upon illustrative scenarios of land acquisition and management. As stated in the DEIS, except for Cottonwood Ranch and the Wyoming property, it is not possible to know at this time what lands the Governance Committee will ultimately be able to acquire an interest in and manage for habitat. The EIS Team attempted to develop land scenarios that matched the objectives described in the Governance Committee's Program Document. When doing so, the Team consciously tried not to "optimize" selection of habitat in the recognition that the Program will not be able to pick exactly the land that it might want.

Comment 13726: *On pages 4-84 to -85, the DEIS makes several unsupported assertions implying that sandpits are unsuitable nesting habitat. Although the DEIS states that "studies have demonstrated that the fish community in sandpit lakes is not conducive to…foraging," it does not identify any studies and a review of those listed in the DEIS bibliography finds no support for the statement. In sandpit lakes along the Platte River, fish populations vary from lake to lake, as some are subject to flooding and some are not. Central's biologists and other researchers have observed terns and plovers successfully nest, hatch, and fledge young at sandpits without any apparent food shortage.*

Response: The referenced section has been modified in the FEIS. Forage fish in the "Piping Plovers and Interior Least Terns" sections of the FEIS, chapter 4, receive a limited treatment as "channel resources." Forage fish are treated in detail in the FEIS, chapters 4 and 5, "Central Platte River Fisheries" sections.

Comment 13728: *The discussions in sections 4 and 5 of the DEIS regarding piping plovers and least terns rely heavily on the results of a "Tern and Plover Model." The graphics at pages 5-114 to -119 and 5-125 to -130 suggest that this is a highly detailed, complex and robust model analyzing the interplay of operations, sediment transport and sandbar formation, historic weather patterns and species biology. The "model" , however, is nothing more that a spreadsheet used by the DEIS team to compare certain OPSTUDY and SEDVEG results with EIS team theories of sandbar formation and degradation and assumptions regarding when and where nesting is theoretically possible at any given time.*

Response: The referenced sections have been modified in the FEIS, and reference to a "Tern and Plover Model" removed. The referenced exceedance graphics have been replaced with relevant tabular data comparing median values for each alternative. Impact assessment for plovers and terns in the FEIS uses output from both the Central Platte River OPSTUDY Model and SEDVEG Gen3.

Comment 13729: *Apparently the EIS team postulates a "virtual nest" is initiated each day during the nesting season in each reach of river, and the number of nests that are successful (i.e., not inundated) are counted. A number of uncertainties are introduced by this approach. First, the earlier presence of bare sand is not a nesting opportunity unless birds are present. The EIS team creates a "virtual nest" every day beginning with the earliest day a tern or plover might nest even though data show that there is some variability in dates of arrival and nest initiation. In many instances, there could be days or weeks of "virtual nests" that are counted as "successful" that could never be nests in real life because birds had not yet arrived or experienced a stimulus to nest. Clearly some portion of the longer nesting window described as a benefit of the action alternatives could not be used by birds, and the benefit is overstated.*

Response: The referenced section has been modified in the FEIS. The analysis is of habitat available to support successful nesting. It is not a prediction of nesting numbers, which depends on the species population in the area. The analysis deals with a count of days that a nest could be safe from inundation following initiation. For purposes of analysis, the count begins on May 1 for piping plovers and May 20 for least terns. These dates are among the earliest recorded for both species and the limitations imposed by early start dates are discussed in the FEIS. The subroutine used in post-processing of SEDVEG Gen3 data for this analysis was designed to restart the count of days if high flows were encountered. Although the count period begins May 1 or May 20, all potential nesting periods up to August 15 are evaluated.

Comment 13732: *The EIS team adjusts conclusions regarding nest inundation and sandbar heights based on a "qualitative" assessment of available sediment using the team's version of the "basic principles of sedimentology" – principles that were shown earlier to be inconsistent with common scientific understanding. These qualitative adjustments are speculation, not "model predictions."*

Response: The EIS Team believes that increase in annual peak flow is a sound index of changes in potential sandbar height, especially when considered in conjunction with increased supply of sediment.

Comment 13733: *The DEIS concludes without justification that "modeled" increases in sandbar height of 2.5 to 4 inches are "significant" but that increases of 1 inch are not. These small changes in sandbar height—and the differences between them—cannot be statistically significant compared with the uncertainty in their calculation, especially in light of the models and methodology used.*

Response: The referenced section has been modified in the FEIS.

Comment 13734: *The DEIS asserts that least terns need fish as a food source, that summer water temperatures adversely affect forage fish, and that FWS' summer flow recommendations are needed to lower those temperatures and maintain the food supply. The DEIS repeats anecdotal reports of fish kills, which the EIS team attributes to high temperatures. In fact, most are local stranding events. When the river or a channel goes completely dry, however, data show that upon the return of flow, populations of minnows and other forage species explode. Huge forage fish populations have been documented in the central Platte River under a wide range of flow conditions and in many locations. Historically the river went dry quite often, and in fact the hydrograph shows increased summer flows following dam construction on the North Platte River. Native fish evolved under these harsh conditions. They seek refugia in backwaters, seeps, pools and even under the sand in areas of subsurface flow. They have effective reproductive strategies that include spawning after flows return, and are likely to spawn again the following spring prior to arrival of least terns. The DEIS does not offer evidence that fish are in short supply at any least tern nesting location along the entire Platte River or that food supply has in any way limited least tern populations.*

The DEIS cites several related studies for its claim that summer releases will reduce fish kills. There is substantial evidence in the record of Central's FERC proceeding and available to the EIS team regarding flaws in these studies. They assume fish kills occur at 35˚C (90˚F) despite evidence these fish are more hardy, especially if temperature changes are slow, and fail to recognize that the overwhelming factors determining water temperatures are atmospheric conditions and not discharge. Even if these studies were correct, however, the DEIS on page 5-72, Table 5-33 compares temperature impacts of the action alternatives and shows that, in terms of probabilities of temperatures over 90˚F, the best alternative modeled by the DEIS is only 1.6 to 3.3 percent improvement over Present Conditions in terms of days above 90˚F, or less than one fewer 90˚F day per month during the summer months. The water temperature changes are a fraction of a degree. Thus, while there is a very small mathematical improvement by the release of large amounts of water, the effect on survival of the fish – or of interior least terns -- is negligible.

Response: We agree with the Nebraska Game and Parks Commission data on fishkills related to temperature and that any reduction in summer temperatures would benefit forage fish. Most of these fishkills have been attributed to water temperatures in excess of 90°F, the state water quality standard for temperature in the Central Platte River.

Comment 13736: *In evaluating the action alternatives, the DEIS focuses on their impacts on peak spring flows. The basis for this approach is an asserted link between the occurrence of high May and June flows and the capture in the lower Platte River of pallid sturgeon which have apparently come to spawn. On page 2-10, the DEIS states: "Thirteen of sixteen captures of pallid sturgeon in the Lower Platte system corresponded with years when May to June flows in the Lower Platte River were above* *normal." Central is aware of only fourteen confirmed captures in the lower Platte River and a closer examination of data related to these captures shows that they do not appear linked to high May and June flows.*

Response: The Nebraska Game and Parks Commission maintains a database of pallid sturgeon captures in Nebraska. This database contains 23 captures considered "confirmed" in the Platte River and within the vicinity of its mouth.

Comment 13740: *At page 3-20 and elsewhere in the document, the DEIS suggests that the Program "includes a process to provide benefits for the pallid sturgeon in the First Increment of the Program." It should be clarified that "[c]onsistent with the April 28, 2004 finding of the [NRC], it is now agreed that current habitat conditions on the lower Platte River do not adversely affect the likelihood of survival and recovery of the pallid sturgeon because that reach of the river appears to retain several habitat characteristics apparently preferred by the species." Only if the assessments identified above identify impacts and "such impacts are deemed to adversely affect the pallid sturgeon" will the Governance Committee develop and implement a conservation measure to address the occurrence of adverse impacts on the pallid sturgeon. These commitments should be clarified to assure that the FEIS covers the Program as it may be implemented.*

Response: The pallid sturgeon has been identified as one of the four target species of the action. As such, it has been identified that beneficial activities for this species will be undertaken under the Program.

Comment 13741: *To the extent that the DEIS includes assertions about the environmental impacts of cycling the J-2 hydro in periods of low flow, they are without support and should be removed from the FEIS.*

Response: Comment noted. Hydrocycling activities at the Johnson-2 hydro unit are not part of the proposed Program, and are discussed in the FEIS chapter 5, "Analysis of Cumulative Effects," as required under NEPA.

Comment 13742: *In discussing "coordinated water operations" by Program water projects at pages 3-31 to -32, the DEIS refers to an attachment called "New Operations for Lake McConaughy." The attachment purports to describe how the "procedures and priorities for storing and releasing water from Lake McConaughy (operations) are changed for the Proposed Program and alternatives…." Central wants to firmly clarify that the "operations" described in the attachment are not operating procedures, operating priorities, operating rules or operating criteria. The Districts do not and would not operate in any given year precisely as described, or make operating decisions according to the charts in the attachment.*

The tables in the attachment describe modeling assumptions, not operating procedures or priorities. The Districts worked with DOI to develop these assumptions with the express understanding that they were not operating criteria, procedures or priorities. The tables do not show decision "triggers" used by the Districts. Actual operating decisions are complex and consider many more factors than the limited number of parameters in the model. For example, the tables in the DEIS use the single value for releases in each wet year. In reality, some wet years will have larger releases than those modeled, and some will have smaller releases. The values in the DEIS tables represent the mid-range, provided that water supply conditions are similar to those in the 48-year study period used by OPSTUDY. Mid-range values are reasonable modeling assumptions when more complex decision-making cannot be modeled, but are not and should not be considered "procedures and priorities for storing and releasing water from Lake McConaughy."

Attachment-101 states that "water is often released from Lake McConaughy in excess of the volume needed to satisfy downstream demands." This is incorrect and would be illegal under Nebraska law. Central sometimes releases water in excess of what FWS would like for target flows so that the Districts can satisfy downstream demands such as irrigation and hydropower. In addition, sometimes precipitation or higher than anticipated river gain causes some of the water released to satisfy Nebraska water rights to become unnecessary during transit, but a legal demand existed and was made at the time the water was released. Water is released in excess of legal demands only under certain emergency conditions or if storage is near full capacity and releases are needed to avoid uncontrolled spill. The statement on Attachment-101 invites confusion and questions of compliance with state law.

Response: Comment noted. The subject text in the Governance Committee Program Documents, Water Plan, Water Plan Reference Materials, Appendix C (OPSTUDY Assumptions Regarding Water Operations for Diversions at the Keystone Diversion Dam and Central District Supply Canal) was revised by the Governance Committee accordingly.

Comment 13746: *The EIS team has no basis for assuming that, contrary to the cost estimates in the Water Action Plan, the Districts have agreed to provide the power interference component for free. Central notes that the proposed Program document on page 15 calls for compensation to existing water related activities if a Program water project adversely impacts their water use, and permits such adverse impacts to be offset if such compensation is sought. This addresses the "third party impacts" described in the Water Supply Study excerpt quoted earlier - adverse impacts incidental to the operation of Program water projects upstream. Power interference is a financial burden deliberately incurred with the intent to directly benefit the Program, not an incidental adverse impact from an upstream project. The Districts never agreed that the costs of power interference were an "adverse impact" that could be "offset" by beneficial third party impacts.*

Response: Comment noted. Program costs have been updated based on the latest Governance Committee Program document.

Comment 13748: *On page 3-26, the DEIS describes the Lake McConaughy environmental account. In connection with the contribution of 10 percent of the reservoirs storable natural inflows to that account, the DEIS notes that the contribution is subject to limitations based on the contents of the account -- a 100 kaf reset limit upon reservoir fill and a 200 kaf maximum storage limit. At the end of the paragraph, the discussion indicates that other Program water can also be stored in Lake McConaughy, subject to "certain limits." The FEIS should clarify this Program water is also being stored in the environmental account, and the applicable limits include the 100 kaf reset upon reservoir fill and 200 kaf maximum storage limit.*

Response: This text has been corrected.

Comment 13749: *At pages 1-21 to 1-22, the DEIS states that the Districts are an example of a project that "may have license measures or permit conditions imposed as part of a completed consultation process that assumed implementation of a Program." The Districts would like clarification that while the consultation process may have assumed implementation of a Program, their license conditions do not. The Districts' licenses have "fall back" provisions that allow them to continue to operate if a Program fails or is not signed, until such time as FERC may agree to reopen the licensing proceeding and impose other conditions.*

Response: We agree.

Comment 13750: *On pages 4-91 to -92, the DEIS alleges that hydrocycling operations at Central's Johnson No. 2 powerhouse may "depress aquatic invertebrate populations, fish reproduction, and survival of larval fish within several miles downstream of the J-2 Return Channel, leading to depressed* *forage for terns and plovers," and that it will "exacerbate erosion." The DEIS offers no field data whatsoever in support of this sweeping accusation, no estimates of the extent to which forage supplies may be depressed, and no evidence that that difference (if any) in the abundant forage available in any way impacts terns or plovers. Nor is there any evidence of changes in erosion. The only "support" put forward is a literature search of the impacts of "hydropeaking," a substantially different operating regime, citing studies in rivers that are substantially different than the Platte.*

Cycling is not a long-term periodic flow fluctuation to follow load as reviewed in the "hydropeaking" literature; it is a non-routine form of operations employed when flow conditions are too low to permit efficient and safe operation of the J-2 turbine without cycling. The allegations of the DEIS are wholly without support and should be removed from the FEIS.

Response: This discussion has been revised and moved to the "Analysis of Cumulative Effects," in chapter 5 of the FEIS.

Comment 13751: *The DEIS' evaluations of the economic impacts of the proposed action and the action alternatives are extremely limited. To the extent projected economic impacts are based on projections of flow and reservoir level, they have the uncertainties described above related to the OPSTUDY model, including questions as to how well the historical data used in OPSTUDY represents reduced water supply from groundwater development or the current severe drought. In addition, the economic analyses treat a state, region or industry as if it were a single entity, and shifting economic benefits and detriments among wholly unrelated parties and industries without exploring the impacts of those shifts within the state, region or industry. For example, the extremely unsophisticated examination of the costs and benefits to hydropower producers of the action alternatives does not recognize marginal costs of production, the constraints on earnings of public power, the isolation of District projects and high wheeling costs impact on marketability of power, the need for the stability of long term contracts, or the constraints of existing power sales agreements. Central would vigorously oppose using the analyses of the DEIS to infer benefits or detriments to the District.*

Response: As with any model, the Central Platte River OPSTUDY Model is a simplified version of the system it portrays. It cannot characterize all of the nuances of the system. Even so, the current version of the Central Platte River OPSTUDY Model has been used over the last 15 years for planning level analyses in the Central Platte. We are confident it is well suited for this purpose.

The reviewer criticizes the portrayal of economic impacts in an aggregate fashion in the DEIS. Although it might be desirable to describe the impacts to each entity in the affected 3-state region—it is not possible to do so. The aggregation scheme employed in the EIS allows for a reasonable programmatic assessment of the impacts by policy and decisionmakers.

The reviewer suggests the economic analysis of hydropower effects does not characterize the range of effects potentially incurred by specific entities in the Central Platte Region. Indeed, the electric power system is quite complex as suggested by the reviewer. However, the analysis in the DEIS was not intended for a detailed assessment of impacts to any particular entity. The analysis described in the EIS was designed to provide an assessment of National Economic Development (NED) impacts as described in U.S. Water Resources Council (1983). The DEIS provides an estimate of the net economic effects over all entities in the interconnected power system, at a level of detail consistent with a Programmatic FEIS.

Western has provided for the FEIS an analysis of how their customers would be affected by Program alternatives. (See *Financial Impacts to Pick-Sloan Firm Power Customers* in volume 3).

Comment 13755: *Pursuant to the modified decree, settlement stipulations and Wyoming law, the Attorney General has advised that the Wyoming State Engineer should not honor any calls for regulation to fill Pathfinder Reservoir between May 1 and September 30 of each year. The MBCD fully supports the Wyoming Attorney General Opinion on this matter, but is concerned that perhaps the Bureau of Reclamation does not agree that it cannot have a call for regulation honored between May 1 and September 30 each year. The Bureau of Reclamation should make a firm commitment that it will not seek to have a call honored to store water between May 1 and September 30.*

Response: Additional text has been added to the FEIS section, "Water Resources" in chapter 5, to indicate that, "A request for administration for the 1904 Pathfinder Reservoir water right by Reclamation, after May 1 is assumed in the EIS to be highly unlikely. Reclamation, like all valid water right holders in Wyoming, is not prohibited from requesting a call on the river. The need to make such a request after May 1 has not occurred since the establishment of the 1904 Pathfinder water right. With this historical perspective of nearly 100 years and the provisions that were implemented in the Modified North Platte Decree, it is viewed that such a request is highly unlikely."

Comment 13757: *It is expected that the Program would obtain 8,200 acre feet of consumptive use with the remainder released to maintain return flows. There does not appear to be a guarantee that only storage water and not direct flow rights will not be leased. The MBCD would like to see a firm commitment that only storage water will be leased under the Program.*

Response: For purposes of the EIS analysis, it is assumed that water would be leased from storage in order to make more practical the management of leased water for the Program. However, it will be up to the states to determine just how water leasing would be administered under state law.

Comment 13759: *The DEIS does not consider several other alternative or components of alternatives that may be much more cost effective and feasible to implement than some of the other components which are identified and considered. In particular, incentive based programs which are good for the appropriators and the natural resources should be a focus of the Program.*

For example, Nebraska law does not appear to consistently recognize the hydrological connection between ground water and surface water. The hydrology of the North Platte Basin is that of a "gaining stream" once the river leaves Wyoming. That is, the North Platte River naturally increases in flow from ground water working its way into the river. With increasing numbers of wells and groundwater irrigation, surely there is a decrease in flow in the North Platte as a consequence of groundwater pumping. If Wyoming sends more water down the North Platte, it may not be diverted directly from the river in Nebraska, but the same effect would occur through increased groundwater pumping in Nebraska. The issue of groundwater use in Nebraska and its impact on the flows in the North Platte River must be analyzed and increases or decreases of this use must be a component of any alternatives analyzed.

The Scottsbluff office of the Natural Resource Conservation Service (NRCS) is currently working with the North Platte Natural Resource District and local producers using incentive programs to remove irrigation wells from the Pumpkin Creek Basin, which is tributary to the North Platte. This project is projected to restore flows and wetlands that have disappeared with the increased pumping. Irrigation wells will be removed and cropped areas will be reseeded to native shortgrass prairie, which will restore habitat for a number of species dependent upon this habitat. The DEIS fails to examine this project and the prospects for other similar projects upstream of the Central Platte Region, the implementation of which would increase flows and have the salutary effect of restoring uplands for livestock and wildlife.

Response: The FEIS has added discussion of the State of Nebraska's new laws (LB962) which regulate water use. The Program alternatives contain several elements which provide incentives to reduce consumptive use of Platte River water through water leasing or improvements in irrigation efficiency and other conservation measures.

Comment 13760: *The DEIS is also deficient in failing to analyze the water depletion effects of riparian forest by mature Russian olive and cottonwood forests on the entire lengths of the North and South Platte and Platte Rivers. Although there are some 10,000 acres slated for return to pre settlement conditions in the Central Platte Region, riparian forest removal on other large areas of the river corridor under cooperative agreements, incentive programs, and the like presents an opportunity to increase flows with little or no adverse effects to agricultural producers in Nebraska and Wyoming. There is no analysis in the DEIS of the cost of such programs, the increased flow per mile of river and suitability of projects in these other areas for the species of concern. The U.S. Department of Agriculture's Wetland Reserve Program (WRP) is the vehicle currently being used in the area upstream of Lake McConaughy and there is an existing project underway near Bridgeport, Nebraska with 6 applications being recently approved for funding. The U.S. Fish & Wildlife Service is also involved in incentive based projects in the area. The DEIS should examine the effectiveness of drastically expanding this voluntary incentive programs or implementing similar programs under existing authorities governing the U.S. Department of Agriculture, U.S. Fish & Wildlife Service and the Bureau of Reclamation and other state and federal agencies.*

Response: As noted by the commenter, the Program alternatives involve removal of some areas of woodlands which have moved into the historic Platte River channel. While the Program is likely to coordinate closely with other programs aimed at restoring open river channel habitat, such as the Services' Partners for Wildlife Program, it is beyond the resources available for the Program's First Increment to dramatically increase the scope and scale of forest clearing from the river channel. The COHYST study being undertaken by Nebraska may provide more information about the effect of tree and vegetation removal on riverflows in the Central Platte, which could be used to guide such efforts in the future, either within or outside this Program.

Comment 13762: *The DEIS purports to describe the "affected environment and present condition" in Chapter 4. The discussion of the agricultural economics environment begins on page 4-188. The MBCD falls within the "North Platte Headwaters" economic region. The North Platte Headwaters region includes the large geographic area of Carbon, Converse, Fremont, and Natrona Counties in Wyoming and Jackson County in Colorado. The DEIS discloses that "other hay," which is non alfalfa hay, is the leading crop harvested in the North Platte Headwaters Region, with 182,320 acres ($24,177,000), followed by alfalfa hay at 109,840 acres ($18,478,000). The DEIS does not disclose impacts on a scale smaller than this economic region, which renders it a deficient analysis.*

Response: Since it is not possible to identify exactly where components of the alternatives which rely on willing sellers or leasors (such as water leasing as well as habitat acquisition, restoration and management activities) would be implemented, a more regional approach to assessing economic impacts was used. It was decided that breaking the entire Platte River Basin into smaller economic sub-regions would provide a method to narrow the geographic scope of these economic impacts. Defining economic impact regions as groups of multiple counties allows the analyst to identify and locate, as accurately as possible, where various economic impacts are projected to occur. Much of the required economic data is only available on a county-level basis. Using single counties (or even smaller geographic areas) as economic impact regions usually results in underestimating the potential impacts of an action, especially when the counties are primarily rural with small populations and few major industries or businesses.

In addition to the availability of data, a number of other factors were used to determine which counties to include in the North Platte Headwaters economic region, such as the origin and final use of various water supplies, agricultural production areas and production practices, and the location of recreation sites and activities. Text has been added to the FEIS indicating that impacts of changes in agricultural production are assumed to be distributed somewhat uniformly throughout each economic region, with the exception of the North Platte Headwaters region. Any projected changes in agricultural production within this region were assumed to occur within the Kendrick Project area. This assumption was based on the fact that the Kendrick Project is the only irrigated area in the North Platte Headwaters region that receives water from storage and hence is an area for which water leasing would be feasible under existing Wyoming state water law, and which matches the geographic area designated for water leasing under the Governance Committee Alternative's Water Action Plan.

Comment 13763: *In describing the present socioeconomic conditions, the DEIS describes the condition Basinwide; i.e., the entire Platte River Basin, which includes the City of Denver, the northern Colorado Front Range cities, and surrounding communities and the several larger towns and cities in the Basin. The analysis of impacts to rural areas on this large of scale fails to disclose the socioeconomic environment in the generally rural North Platte Headwaters region. By using this large scale, the agencies are concealing the socioeconomic impacts to the smaller communities and rural areas within the Basinwide area by the sheer economic force of the large metropolises and cities within the Basin.*

As an example, if an alternative were implemented which required the elimination of the towns of Medicine Bow and Hanna, both of which are small communities located within the Medicine Bow Conservation District, there would be virtually no measurable impact on a Basinwide basis due to the sheer size and economic scale of the Platte River Basin. Yet, the impacts to the towns and outlying rural areas would be nothing short of devastating on the local area. The agencies' analyses of socioeconomic issues are seriously deficient. The scale of the analysis area must appropriately reflect the area impacted.

Even the agencies' use of the North Platte Headwaters Region as a scale is far too large for effective analysis. The agencies must do a better job of assessing the areas that will be most heavily impacted and disclosing the impacts on an appropriate scale. The impacts to the communities and rural areas in the MBCD cannot be hidden by comparing them to the economy of Denver, Colorado and then saying that the impacts are inconsequential. The only proper way to analyze the socioeconomic impacts is to disclose them on no larger than a county by county basis.

Response: As stated in the *Economics Appendix* in volume 3 of the FEIS, the percentage of impact was based on the IMPLAN Model with and without the proposed alternative. The changes in sales, income, indirect business taxes and employment in each economic region were compared to the current levels for those variables in the same region. In all cases, the change due to the alternative was less than or equal to one-tenth of one percent of the economic activity (e.g., sales) in the economic region. Impacts for one region were never compared to economic levels in another region.

Although socioeconomics such as sales, income, and employment are presented on a Basinwide basis for the Present Condition, the comparison of regional impacts is not to the Basin, it is to the region where those impacts are estimated. The census data for the Basin are provided only to give the reader a general understanding of the important sectors in the Platte River Basin.

As stated in the DEIS, the economic impacts areas were defined according to a number of factors including agricultural production areas and practices, location of recreation sites and activities, origin and final use of water supplies, location and size of cities or industrial markets, highways or other transportation routes, and availability of appropriate economic data. Impacts were not measured on a Basinwide basis, but rather according to the defined economic impact areas and compared with IMPLAN's 2002 baseline figures for those areas. In addition, there were no impacts to the Denver Metro economic impact area, nor was there a comparison made to Denver's economy.

A county level regional analysis would not be appropriate because impacts would be overstated for each county due to "leakage" of economic effects across county lines. As stated in the *Economics Appendix* in volume 3 of the FEIS: "The size of the impact area used in a regional economic impact analysis is important because the magnitude of impacts will generally increase as the size of the impact area increases. For example, the economic impacts on the state of Nebraska from retiring a given number of acres of land within, say, Buffalo County will be larger than the economic impacts on Buffalo County from retiring that same number of acres. This is the result of differences in the leakages that occur for different impact regions. Leakages are any payments made to entities in the region which do not in turn re-spend the dollars within the region. The state of Nebraska has many different types of businesses and industry which can supply a wide variety of goods and services. Buffalo County does not have the variety of businesses that the state has, so consumers and businesses must go outside the county to purchase some of the inputs that aren't available. Spending that occurs outside of the study area represents leakages of expenditures, which reduces the economic impact of changes in activities within the county compared to all of Nebraska. The same holds true when using individual counties as the economic area. Buffalo County would not have the capacity to absorb all of the impacts, and those impacts to surrounding counties would not be accounted for due to those counties not being in the defined economic region. For this reason, a county-level analysis would not be an accurate method to estimate potential impacts for this Program."

Comment 13766: T*able 3-3 of the Attachments contains a list of "Known Examples of Federal Water Project Actions Requiring Consultation Under ESA." Among the actions which would affect the environment and people of the MBCD are rangeland water improvements, renewal of livestock watering facilities, wildlife habitat improvement projects (water related), permitted projects on national forest lands, watershed protection and flood prevention operations under Public Law 566 and operation of Sand Lake Reservoir. Although there is some discussion of the consultation requirements for small water projects that result in depletions, there is no indication of the expected time it will take to complete these consultations or the expected cost of mitigation through payments to the mitigation fund. Additional information regarding these issues should be disclosed in the DEIS so that MBCD and other affected interests may effectively respond.*

Response: Comment noted. With a Program in place, ESA Section 7 consultations for Federal-nexus projects and their effects to target species and designated critical habitat would proceed in a streamlined manner, and tier off the Programmatic FEIS and programmatic biological opinion in subsequent NEPA analysis and biological opinions for the specific Federal action. Streamlined consultations only address effects to the target species and their critical habitats in the Central and Lower Platte River. If other listed species are present and potentially affected, then they must be addressed separately from the Program in the applicable final biological opinion for the specific project. The Program, through its programmatic biological opinion, only provides the ESA compliance measures for effects to the target species and their designated critical habitats.

With a Program in place, and for *existing* projects (those in operation prior to July 1, 1997) that need future Section 7 consultations, the anticipated time to complete a streamlined consultation for effects to the target species would be a few weeks. The time to complete future consultations on *new* water projects would primarily depend on the time needed to obtain replacement water, and this depends on the applicable depletion management plan and whether a state can assist in obtaining water (as in Wyoming and Colorado), or whether the applicant must secure the replacement water on their own. Once the replacement water is obtained, a streamlined consultation that relies on a depletion management plan can be completed within a few weeks. In the Program document, see the Depletions Plan, Platte River Basin, Wyoming in the Water Plan (attachment 5)[16] for details specific to Wyoming projects.

[16] The September 6, 2005 draft version of the Governance Committee Program Document used for the FEIS analysis is included on a CD in volume 1 of the FEIS. The final Program document is available on request from <http://www:platteriver.org>.

Comment 13767: *While the EIS frequently mentions that Platte River channels continued to narrow through the 1990s, other findings to the contrary and the well-published and empirically-supported theory of dynamic equilibrium (Johnson 1994, 1997, 2000; NRC 2005) are not mentioned anywhere in the DEIS. More specifically, the DEIS states that channels upstream of RM 206 would "continue to narrow" (page 5-92). My measurements show that these reaches have not been narrowing, so could not continue to narrow. The DEIS needs to attribute such key statements to specific sources, and to acknowledge that all sources may not agree on the rate and timing of historic channel expansion and contraction. I have the same disagreement with the statement on page 5-121 (and 5-132), "Directly related to that trend is the ever-increasing foothold of woody vegetation in the once active river channel."*

Response: The phrase "continue to narrow and deepen under all alternatives" is taken from an analysis (DEIS page 5-92) looking at what would occur in the long run, for each alternative, if sediment augmentation were suspended. In this case, the existing sediment imbalance would not be offset and the river above Kearney would return to a condition of erosion, leading to deeper and narrower channels.

The EIS studies do not find, as did Johnson (1994), the Central Platte River in the Habitat Area to be in dynamic equilibrium, if that means that the forces of erosion and deposition are in long-term balance. The DEIS describes a time-series of surveys of transects across the river in the Habitat Area indicating that the clear water returns from the canal system, which constitute nearly half of the annual flow into the Habitat Area, continue to downcut the river channel from the Johnson-2 Return to Kearney. This pattern of erosion continues to move downstream. More of these data have been included in the FEIS.

Regarding the rate and timing of historic channel expansion and contraction, more references and data have been added to the FEIS from the commenter's studies.

Comment 13770: *The NRC report (pp. 116-124) expressed concern that the single-species approach taken by the Service (and likewise by the EIS team in the DEIS) in managing the Platte River could lead to negative consequences for the Platte River ecosystem as a whole (NRC 2004). Much has been written on this subject in the peer-reviewed literature (e.g., Clark and Harvey 2002), yet the entire issue is missing from the DEIS.*

Response: The EIS evaluates alternatives for a Program aimed as restoring habitat for four endangered species. However, the alternatives are evaluated for impacts on many species. It should also be noted that restoring some amount of the habitat for the target species that existed prior to development of the river helps restore or maintain habitat for many species native to a prairie river ecosystem, including many fish and bird species. Bird species using native prairie grasslands, while not the primary objective of this Program, are among the species which have suffered the greatest declines in habitat in the last century.

The Program's monitoring and research plan will track multiple plant communities and species, giving Program managers the information to adjust the Program to ensure that benefits for many species are created and maintained.

Comment 13771: *A major deficiency in the DEIS is that the differences among the several management scenarios were determined through the use of a narrow set of relationships chosen by the EIS team with little to no apparent consideration of alternative facts, theories, or models. If the team did consult and evaluate alternatives, it is not apparent from the DEIS. Nor is it apparent on what basis alternatives may have been rejected.*

Response: The EIS Team believes that it has carefully examined a wide range of views on the Platte River ecosystem. The science related to the Platte ecosystem has also been reviewed by the National Research Council. Their review (National Research Council, 2004 (released draft May 2004)) indicated that the analytic framework employed by the EIS Team, which used field data, conceptual models, and quantitative models of many kinds, and which integrates a wide range of factors shaping the target species habitat, was a sound basis for the Department of the Interior's decisionmaking (National Research Council, 2005).

Comment 13773: *The sediment issue was taken up many notches about 5 years ago when sediment modelers joined the EIS team. While sediment is unquestionably a key issue on any regulated river, its singular importance in affecting vegetation seems to have been exaggerated relative to hydrology. This is true in the SEDVEG model itself, where sediment dynamics are detailed to a fine level while vegetation is simulated at a very coarse level, and in the DEIS overall. While the effects of changes in sediment supply can appear quickly in localized areas, such as below dams and diversions, they are generally slow to be expressed in less altered sections. The rate of change below structures often attenuates quickly with distance in braided rivers; however, slow, insidious effects can occur associated with grain size shifts, for example, as brought up frequently in the DEIS.*

Response: In the Central Platte River, variations in flow, sediment and topography produce distinct variations in plan form, while varying affects of vegetation on plan form are less pronounced ("River Geomorphology," chapter 4). However the sediment transport model, SEDVEG Gen3, incorporates all of these factors in a 1D analysis. Main concepts that SEDVEG Gen3 integrates in the analysis are: the stability (dynamic equilibrium) of a river is defined by sediment transport; vegetation affects sediment transport through bank resistance; and sediment transport and vegetation are both affected by flow.

Comment 13774: *The rates of woodland expansion from the late 30s to present correlate very strongly with changes in hydrology (Johnson 1994). Rates of change in some reaches were extremely high over very short periods of time associated with droughts. For example, approximately half of the active channel of the river became colonized by vegetation over just a three-year period during the drought of the mid-1950s. Sediment could not have caused such a rapid change. Except for small sections of the channel with obvious incision, historic changes in the channel/woodland balance appear to be controlled by hydrology, not by sediment. This is contrary to the tone in most of the DEIS that emphasizes the importance of sediment for the river as a whole. On page 4-34, however, the DEIS states "…because incision advances downstream slowly, sometimes requiring centuries to reach an end or stable condition." Lastly, the DEIS does not provide data to support the sentence, "But under this Program, that seeks to begin offsetting substantial channel incision, . . ." (page 5-61).*

Response: We disagree that the DEIS emphasizes the importance of sediment as determining the consequences for the river geomorphology. Quite the opposite, the DEIS and the FEIS stress the importance of understanding and taking account of the multiple variables which control the geomorphology of the river and hence the impact on the species habitat. As presented in the FEIS ("River Geomorphology," chapter 4), flow and the expansion of vegetation are very closely linked, while flow, sediment and bank stability (including resistance to flow from bank vegetation) have impacts on channel morphology. See "River Geomorphology," chapter 4 of the FEIS, and/or Holburn et al. (2006), or Murphy et al. (2004) in volume 3 of the FEIS for discussions of incision.

This multiplicity of causal factors is one of the most important reasons for constructing the SEDVEG Model which can integrate the changes across many variables. In the past, much work and publication on the Platte River has been handicapped by focusing too much on single-variable explanations of river dynamics.

Comment 13775: *There may be unintended consequences of island leveling to liberate sediment. There are three problems associated with acting quickly to address the sediment supply issue on the Platte River. The first is that we have very few frequently re-measured cross-sections away from bridges, dams, and diversions. The bed elevation of the river is known to be variable in the short-term, even under* *conditions with no net change in the long-term. Thus, one or two measurements over several decades time, which are the best data we have, could lead to either type I or type II error: thinking we have a problem when we don't, or not thinking we have a problem when we do. The second problem involves scientific uncertainty. Oversupplying the river with sediment, either by island leveling or by sediment augmentation, may cause downstream channel aggradation and alteration of channel flow splits. The DOI has ignored a peer-reviewed journal article (Johnson 1997) that sediment oversupply from island leveling may have caused rapid channel narrowing and vegetation expansion near Grand Island. The third problem is that of time. While correcting obvious channel degradation problems in specific locations has merit, such as that below the J-2 Return, it might be prudent to study the problem more thoroughly and employ small-scale experimentation before large-scale experiments are conducted in more natural reaches. Data from often re-measured cross-sections by the USGS at Cottonwood Ranch and from my nearby cottonwood demography plots will soon be available to examine the effects of woodland clearing on channel conditions. There is time to increase our level of certainty about sediment before conducting large-scale experiments.*

Response: See responses to Comment 13869 and Summary Comment 27 on dynamic equilibrium and Summary Comment 23 for the role of the IMRP and the AMP. Although Johnson (1997) speculates on the possible cause of change in a side channel near Grand Island, no data or analysis was performed related to this observation. A theory was put forward that vegetative clearing in the main channel led to sediment mobilization and downstream deposition which caused the riverflow to back up several miles and increase flow in the observed side channel. However, absent any field measurement of any of these processes, this remains speculation, and does not support a general presumption about the effects of vegetation clearing. As described in the Program Adaptive Management Plan, channel restoration activities will first be tested on a small scale, with intensive monitoring, before increasing the scale of restoration.

Comment 13776: *Despite over twenty years of habitat management, we have no hard data on the effects of these procedures [Comment 13775] on downstream channel conditions (i.e., aggradation or degradation), vegetation expansion or contraction, or the effect on bird populations. Data do suggest that cranes, for example, move to wider channels, but this begs the question whether cranes actually do better in wider channels (i.e., higher survival, better physiological condition, or produce more offspring).*

It is incredible to realize that after spending many millions of dollars (much of it public money) to clear and/or level islands for a span of 20 years or more, we don't really know how well the method works, except that the island is removed. The DEIS does not review the published literature (Johnson 1997, Johnson and Boettcher 1999) on the subject of possible negative effects of clearing. All in all, there is precious little hard data to give us high confidence that the management scenarios, if enacted, will produce outcome 1.

Response: See response to Comment 13705.

Comment 13778: *A more complex example of a management action that could produce an unintended consequence if implemented is the following. The management scenarios in the DEIS propose introducing a peak flow in May while reducing flows in June to protect tern and plover nests from inundation. My work found an incredibly strong correlation between the rate of woodland expansion historically and mean June flow (averaged over a number of years). Thus, creating higher sandbars in May (even though most pre-dam peaks occurred in June) and lowering June flows (counter to the natural hydrograph) will likely cause woodland expansion, if the very strong statistical relationships are borne out. Twenty years of plant demography research and monitoring has shown that tree seedling survival is highest on mid-level sandbars (Johnson 2000). Bars created in May and then exposed by reduced flows remain colonizeable for the whole cottonwood/willow seed dispersal season (mid-May to mid-July). Later peaks (June) have a lower risk of tree establishment (page 3-13). Even if May peaks were to* *produce habitat for terns and plovers in the short-term, it may reduce open channel habitat for all three listed birds in the long-term.*

Response: Johnson (1994) found that vegetation encroachment into the channel was most strongly associated with reductions in both June peak flow and volume. The Program simply does not manage enough water to keep the riverbed submerged throughout the seed dispersal period in June, as historically occurred. Therefore, the Program must use its limited water supply to build sandbars and scour new vegetation from the channel using short-duration pulse flows, and supplemented with mechanical clearing. The timing of a short duration high flow event in May is set by the species requirements for least tern and piping plover. The recurrence interval for the short duration high flow event is approximately 1.5 years, and on average, two short duration high flows occur every three years. Woody vegetation established on sandbars longer than 3 to 5 years (National Research Council, 2005) cannot be removed by scour, but the succeeding high flow occurring in the second or third year of vegetation growth is anticipated to be capable of removing new vegetation. This would be an area of continued investigation under the Adaptive Management Plan.

Comment 13779: *Because a cause and effect relationship between island squishing and increased populations of the listed species has not yet been established through research, the possibility is quite real that the action scenarios could produce the second outcome, we change the river as intended but the target species don't respond. On top of this, if our knowledge of sediment, water, and vegetation as codified in SEDVEG is sufficiently imperfect, it could lead to outcome 3, neither desired river conditions are achieved nor the species populations improve. The DEIS acknowledges that ". . . island leveling . . . would radically alter channel morphology at some sites in some bridge segments." (page 4-124) While outcome 1 is the only one identified in the EIS and may be the most probable result from the action scenarios, the other two far less desirable outcomes may be nearly as likely to occur.*

Response: The EIS analyzes or projects the changes to the environment based upon the best available information. In regards to "island squishing" (clearing of vegetation from islands in the river channel, and moving of the river sand on the islands back into the river channel), some immediate results of those actions can be projected with confidence. For example, it is clear that removal of islands in this manner results in an immediate increase in channel width and open view for the species. It is also clear that this action results in an immediate increase in sediment available to the river for transport and redeposition, and helps to offset the erosion of the riverbed resulting from clear water inflows from canal returns. Increases in area of shallow depth in the river channel also result directly from this action. The long-term effect of these actions on channel width, open view, sediment balance, development of sandbars, extent of vegetation, must be projected with models. Because these results cannot be projected with certainty, actions such as this are initially tested with pilot studies under the Program's Adaptive Management Plan. The size and scale of subsequent implementation is based upon monitoring of the pilot studies. Monitoring of all Program actions continues through the First Increment, providing data for improvement both during that phase and in any subsequent Program phases.

Comment 13780: *The DEIS does not address the chances of success (reaching outcome 1) [Comment 13779] if any of the action scenarios are implemented. The assumption seems to be that outcome 1 will be reached, albeit to varying degrees, by any of the action scenarios. I would rather have the EIS team include a section in the DEIS that openly discusses the pitfalls, shortcomings, risks, etc. of implementing the scenarios. Much effort was expended to compare the scenarios assuming that they would work as planned. My concern is that differences of opinion among scientists/managers are not addressed nor are surprises anticipated or discussed.*

Response: The requirement for a Programmatic FEIS, where the ultimate location or extent of Program actions may not be known prior to implementation, is to assess the largest likely scope and scale of

Program actions and the resulting environmental consequences. In order to do this, the EIS examines, in all cases, the full and complete implementation of the Program (First Increment). While the EIS examines what seems most likely to be implemented, and its effects, there is always the possibility that any action will not be fully implemented and the effects will be less than forecast. Under the Program Adaptive Management Plan, Program managers may then seek other approaches to achieve the Program's objectives, but it is expected that the scope and scale of the resulting effects will fall within the range of impacts evaluated in this Programmatic FEIS. If the Program managers decide to modify the Program in ways that significantly change the scope and scale of the Program such that the environmental effects are significantly different, new NEPA analysis may be required.

Comment 13781: *Annual vegetation is not scoured by spring floods because annual vegetation does not appear until summer.*

Response: The annual vegetation referred to would have been produced during the previous growing season.

Comment 13782: *Figure 2-3 incorrectly portrays the relationships between plant community distribution and floodplain environment. Lowland grassland communities are not a stable member of the floodplain. Any land overtopped by floods develops quickly into woodland, except active channel and associated backwater areas that are either too wet or geomorphologically dynamic for trees to establish. Lowland grassland occupying the floodplain is an artificial community maintained by mowing. Lowland grassland ("wet meadow") is a permanent community outside the high banks of the river slightly above floodplain level or associated with old channel scours. Also, cottonwood and willow are listed in Figure 2-3 as occurring in "grassland communities" on high benches. These are woodland communities not grasslands and they occur at a range of elevations on the floodplain from moderate to high sandbar elevations. Figure 2-3 needs to be completely redone to accurately represent the vegetation of the Platte River and its floodplain.*

Response: See response to Comment 13704.

Comment 13783: *On page 2-11 the phrase "generally un-vegetated channel" is incorrect and misleading when describing the pre-settlement Platte's vegetation. Use the more accurate and complete description in the NRC Platte report (NRC 2004). Moreover, the general (page 2-11) conditions of the natural river cannot be determined from one photograph, especially from one taken at flood stage after much timber had been removed by soldiers, settlers, and pioneers (Fig. 2-4).*

Response: Additional information has been incorporated from the commenter's work, and from the work of the National Research Council. However, we think that the phrase "generally unvegetated channel" describing the pre-settlement condition corresponds with the existing literature, such as described by Johnson, 1994. "For example, the Platte, South Platte, and North Platte rivers have been transformed from sparsely wooded pre-settlement conditions with <u>wide, unvegetated channels</u> to a modern condition with extensive Populus-Salix [cottonwood-willow] woodlands lining much narrowed channels". (Emphasis added.)

Regarding the photograph of the Central Platte River taken in October, 1866; 1) the focus of our discussion is on the river channel, not the banks from which timber may have been removed by settlers, and 2) it seems unlikely that the river as shown is in flood stage given that October is seldom a time of floods, and also given that flows are 2-3 feet below bankfull.

Comment 13784: *Page 2-23. Johnson (1994) reviewed surveyors' notes from the General Land Office Survey regarding summer river stage prior to settlement. This assessment should be included in the minimum flows section.*

Response: The many observations of low flows by settlers is described and referenced in the DEIS to Simons and Associates (2000) which reviewed this literature.

Comment 13785: *Figure 2-10 either has missing data or data points are masked by graphic symbols.*

Response: The figure has been modified for the FEIS, but it still has periods with historically missing data, which are indicated.

Comment 13786: *My estimate (Johnson 1994) that about 10 percent of the blank area on plat maps between the high banks was occupied by small, un-surveyed islands is used in several places in the DEIS (see Table 2-9). It needs to be clarified in the DEIS that the 10% estimate refers to un-surveyed islands only, many other larger islands did occur and were present on the plat maps. This relationship is misstated on page 2-42 and on 2-43 as well where it implies that all islands comprised 10% of the area between the high banks, not just the area of small, un-surveyed islands.*

Response: Corrections have been made to the table and this section has been clarified in chapter 2.

Comment 13787: *Howard (2000) and (2002) cited on page 2-40 were not included in the lit. cited section.*

Response: The references to Howard 2000 and 2002 were interim references. The final assembled report is Holburn et al., 2006 in volume 3 of the FEIS. This reference also includes cross sections (transects) from 1985 surveys done by a Reclamation area office (habitat sites), many of 1998 cross sections by Druyvestein, Johnson & Anderson, many of 2002 cross sections by DJ&A, and all 2005 cross sections by Eisenbraun (DJ&A, 2002 and 2002 and Eisenbraun and Associates, 2005). Holburn et al., 2006 is the main cross section survey reference for FEIS geomorph sections (degradation and aggradation) and occasionally the FEIS references Murphy et al., 2004 where the DEIS first presented just a few of these cross sections but did not have good references.

Comment 13788: *Figure 3-4 needs revision. Lowland grasses, as stated in point 2 above [Comment 13782], do not exist as a stable community without mowing. They rapidly succeed to woodland without management. Also, all woodland is shown to have been removed from 3-4a, yet the procedure is termed "restoration." Since woodland naturally occurred on the Platte River, any true restoration would include woodland as a community. Also, for the same reason, a 1,150 foot wide channel w/o wooded islands, which is recommended throughout the DEIS, is not true restoration.*

Response: Habitat restoration includes management of Program lands to provide target species habitat characteristics as outlined in tables in the "Habitat Complexes" and "Non-Complex Habitat" sections in chapter 3 of the FEIS. Lowland grassland management includes burning and grazing as management tools to maintain lowland grassland characteristics on Program lands. The Program would remove a small fraction of the forest now occupying the historic river channel, leaving many thousands of acres more woods than existed in the pre-development, "natural" condition.

Comment 13789: *Fig. 3-5 could be improved by including the floodplain and its channels and vegetation rather than just a blank, featureless river. This would show the topographic relationships between wet meadows and floodplain communities. Also, old channel scars are often present in wet meadows; these are not shown. This figure needs considerable work to be useful and accurate.*

Response: This DEIS figure is a simple representation of land adjacent to the river that has, through channel downcutting and deposition, become vegetated and is too dry to support wetland communities. Please see the figures in the "Bottomland Grasslands and Wet Meadows" section, chapter 2 of the FEIS, for an illustration of a surveyed cross-section of a wet meadow (at Mormon Island) for more details on topographic relationships of wet meadows, flood plain communities, and the river.

Comment 13790: *Most if not all of the elevation difference between mean river level and the tops of old wooded islands is due to normal aggradation from past floods (especially the 1983 flood), not from channel degradation, as stated in Figure 3-9. This is a very serious issue; if the EIS team has hard data showing otherwise, it should be brought up in this section.*

Response: Aggradation alone can not account for the height of Jeffrey Island with respect to the mean river level of the south channel of Jeffrey Island, or solely account for this elevation difference in the balance of the degrading reach which extends downstream to approximately Elm Creek. Also see response to Comment 13865.

Comment 13792: *Page 4-32. The first paragraph is important but needs clarification. The meaning of the phrase "final state" is not clear. Why not call a spade a spade and use the published phrase and geomorphic term--dynamic equilibrium? The river actually reached dynamic equilibrium in the 1960s for most reaches, i.e., 50 years ago, not just some time in the 20th century. This paragraph needs more detail to be clear.*

Response: The phrase "final state" has been corrected. Although vegetation is a generally useful indicator, the geomorphic definition of dynamic equilibrium is based on sediment transport. As presented in the National Research Council (2005), large changes in river width as defined by borders of vegetation, have not been apparent since the 1960s. However, surveyed repeat cross sections from the late 1980s to the present (Holburn et al., 2006) provide more precise measures of channel change and estimates of sediment transport ("River Geomorphology" sections of chapters 4 and 5). These measures show several reaches of the river that cannot be described as stable or in dynamic equilibrium. The section referred to in this comment has been revised, and a definition of dynamic equilibrium has been added to chapter 4, to help clarify this point. Also, see response to Summary Comment 27.

Comment 13793: *At the top of page 4-41 the sentence "Under the Present Condition . . ." is not understandable.*

Response: This statement has been removed.

Comment 13794: *Top of page 4-67. Braided rivers like the Platte do not have terraces, as do meandering-type rivers. If they did, however, they would be termed "benches" if they are currently on the active floodplain.*

Response: Comment noted.

Comment 13795: *The timing of nest initiation information is interesting. It suggests to me that terns and plovers might not have had sufficient time to nest successfully on the Platte in pre-development times given the lateness of the large peak flows and subsequent drawdown. Maybe the Platte wasn't (isn't?) very favorable for these birds given this time crunch. Shouldn't this be a point of discussion in the DEIS?*

Response: It is unlikely that the Central Platte River channel provided conditions that would support successful nesting by plovers and terns on an annual basis at all potential sites within the study area. However, the existence in the pre-development period of very great areas of unvegetated channel and very large peak flows (as detailed in chapter 2), ensured that some sandbar habitat was available in all years except for those with the very largest floods. The fact that the Platte River channel isn't currently very favorable for these birds is the point of this analysis. Also see response to Summary Comment 35.

Comment 13796: *No birds are included for Nebraska as state-listed and species of special concern in Table 4-47.*

Response: The only birds on Nebraska's Threatened and Endangered Species List are also federally listed (piping plover, least tern, whooping crane) and are discussed in the target species sections of chapters 4 and 5 of the FEIS. Species of special concern in Nebraska, including birds, are discussed in the *Fish and Wildlife Coordination Act Report* in volume 2 of the FEIS.

Comment 13797: *I was surprised not to see a discussion of the "snow goose problem" in the DEIS. It seems to me that the massive increases in staging snow geese in the spring in the Platte Valley must be a concern among wildlife biologists studying what appears to be a dwindling waste grain supply for cranes.*

Response: Discussions of whooping crane's use of grain fields, and inter-specific competition for waste-grain food supplies with other migratory waterbirds, are added to chapters 4 and 5 in the FEIS.

Comment 13798: *Page 5-56. Maintaining a "stable channel width" not only shouldn't be a priority of the action scenarios, but it couldn't be achieved. Expansion and contraction of active channel area and woodland area are desired outcomes because they occur naturally during wet and dry weather cycles and allow establishment of new woodland patches to replace those either eroded or senescent.*

Response: One of the adaptive management objectives of the Program is to offset ongoing erosion of the channel which leads to further deepening and narrowing of the channel and further loss of habitat. It is hoped the IMRP and AMP will provide additional data and avenues to explore the role and influence of senescence on bank stability and vegetation resistance in the critical Habitat Area of the Platte River.

The EIS Team does not see any natural forces that currently can produce an "expansion of the active channel area". The largest floods in recent times (1983) did not increase channel area or width. The ongoing erosion continues to narrow the channel. More channel area became vegetated during the recent drought. It appears that significant restoration of lost habitat will require significant mechanical intervention and flow and sediment management.

Comment 13800: *Page 5-88. Ice was found to be the major mortality factor for cottonwood and willow seedlings in the Platte River during my 20-year study. Hence, I would be surprised if reductions in flow during January on the South Platte River would have "little to no effect" on vegetation communities. The same questionable point is made regarding the North Platte River (page 5-89).*

Response: Comment noted. The winter flow changes in the North and South Platte are quite small and not likely to affect ice scour.

Comment 13801: *On page 5-102 a loaded word used is "protected," as in "protected channel." The phrase "managed channel" is more appropriate.*

Response: Comment noted.

Comment 13803: *Page 5-180. The DEIS views sediment as a long-term issue. Yet, another serious long-term issue is the lack of regeneration of new cottonwood/willow stands. Most current cottonwood and willow stands will degenerate in the next half-century at the latest. How to maintain them should be currently on the radar as a management issue, yet is missing from the DEIS except in one small place. When it is brought up, the river itself is curiously blamed for not regenerating cottonwood stands, while a major cause is the mowing and disking of much of the young vegetation on the Central Platte River floodplain to increase unobstructed channel widths.*

Response: The DEIS points out in a number of places that changes in the hydrograph, sediment load, and vegetation encroachment have changed the channel characteristics. These changes in channel characteristics have resulted in less area of appropriate substrate for the establishment of young stands of riparian species. While maintenance of cottonwood/willow stands is not a purpose of the Program, the IMRP includes monitoring of impacts of Program activities on all vegetation community types, including riparian communities.

Comment 13804: *Two of my papers (Johnson 1994 and Johnson 1997) were incorrectly listed in the literature cited section of the DEIS.*

Response: Citations corrected.

Comment 13809: *The draft EIS falls short in addressing economic impacts based on farm reduction and recreational use of Lake Minatare and the benefit to the area's economy of our wetland habitats. We would be willing to provide that information once alternatives are chosen.*

Response: Of the alternatives, only the Full Water Leasing Alternative has the potential to result in substantial amounts of water leasing in the Nebraska Panhandle area. This alternative might reduce somewhat the volumes of water being moved through the Interstate Canal and the Inland Lakes, which also may reduce somewhat the agricultural runoff and canal seepage entering the streams north of Scottsbluff. These changes are unlikely to affect the baseflow of the streams or the fish populations in lakes and streams.

Comment 13811: *The EIS needs to address the existence of Bald Eagles and their documented nesting areas in Scotts Bluff, Morrill and Garden Counties in Nebraska. We understand that Lake Alice in Scotts Bluff County has one of the longest nesting pairs in Nebraska.*

Response: The FEIS includes an expanded discussion of bald eagle nesting along the North Platte River in Nebraska.

Comment 13813: *The Draft EIS needs to address alternatives used or not used during a drought. Further reduced flows to meet Endangered Species needs will be compounded due to a drought.*

Response: The analysis of alternatives for the EIS is done using a hydrologic record (1947-1994) which incorporates one of the most severe droughts on record. So, the projected impacts or benefits of the alternatives reflect operations of the Program under severe drought conditions.

Comment 13815: *On page E-29 of the Summary in the discussion of the changes in wet meadows, it is stated that Interstate 80 in Nebraska follows the Platte River for many miles. There are a number of highways in Colorado which also follow the Platte River for a number of miles. These include I 76, US 85, US 34, US 6, US 138, and SH 144. According to the document, one of the goals of the Platte River Recovery Program is to widen the river to get it closer to its historic profile. What will be done to protect these highways from the widening river? This needs to be discussed in your document.*

Response: There are no plans to widen the river near any of the highways outside the Habitat Area (Lexington to Chapman, Nebraska). Habitat restoration in the Habitat Area will not include any river widening that could impact Interstate 80 or any other roadway.

Comment 13819: *Based on our experience with managing the Riverside system and our general knowledge of hydrology and water rights in the South Platte River basin, it is unrealistic to expect that Colorado water users will have the ability to lease up to 60,000 acre-feet of water (including 11,900 acre-feet from Riverside) to the program without drying up tens of thousands of acres of productive farm land in Colorado.*

Response: The EIS recognizes that leasing such quantities of water in Colorado for Program purposes would impact many thousands of acres of farm productivity in the state. These effects are described in the "Irrigation Water Deliveries" and "Regional Economics" sections of chapter 5. While 60,000-70,000 acre-feet of water is assumed leased in Colorado under the Water Emphasis Alternative, and roughly 30,000 additional acre-feet under the Full Water Leasing Alternative, these are gross figures from which it was assumed only 50 percent represented historic consumptive use available for transfer to Program purposes. Moreover, not all of the leased volume is available in all years. For these reasons, the average annual volume of water provided for Program in-stream flows purposes was about 31,000 acre-feet under the Water Emphasis Alternative, and about 44,000 acre-feet under the Full Water Leasing Alternative. Roughly 89 percent of this volume reached the state line.

The FEIS economic analysis assumes that as the irrigation water deliveries are reduced, farmers will initially begin to change the crop mix to try to compensate for the reduced deliveries. It is assumed that reduced deliveries will eventually result in deficit irrigation and ultimately a reduction in irrigated acreage. Using these assumptions, the estimated reductions in irrigated acreage under the various alternatives, including those incorporating Colorado water-leasing scenarios, are summarized in the "Alternative Comparison Tables" in chapter 3 of the FEIS. Water leasing in Colorado and Nebraska results in a farmed-area reduction of about 13,000 acres under the Water Emphasis Alternative and 20,200 acres under the Full Water Leasing Alternative for the combined "Eastern Colorado" and "Lake McConaughy" economic regions. As described above, agricultural productivity could be affected on many additional thousands of acres.

In any case, the potential economic and social effects of leasing such quantities of water in Colorado are substantial, and these effects are among the reasons why Colorado water leasing is not a component of the preferred river recovery alternative negotiated under the Cooperative Agreement (Governance Committee Alternative). The inclusion of water leasing in Colorado among the alternatives evaluated does not imply that any or all of the parties to the Cooperative Agreement support this strategy.

Comment 13823: *The Parsons report provides numerous citations showing that the USGS and other researchers have proven that the primary mode of sediment transport in the Platte River is in the form of large macroforms, having significant variations in sediment gradation in their leading and trailing edges, and significantly varying geometries and other properties that are neglected by SEDVEG. SEDVEG assumes that sediment uniformly aggrades or degrades throughout each reach, and that the sediment travels the 168-mile model length by a process and at rates contrary to macroform dynamics. This lack of recognition of the macroform transport process also renders implausible the vegetation growth and destruction routines, the channel widening and narrowing routines, the sand bar development routines, and the assumptions and theories regarding the need for bankfull flow in order to form "high" sand bars.*

Response: See response to Comment 14681.

Comment 13824: *The review of the SED component of the SEDVEG model showed that the procedure utilized in the model development did not properly address the sediment mass continuity or the Exner Equation. The Exner Equation is a partial differential equation, which has been utilized in the development of sediment transport models to replicate the sediment mass balance at each time step along a reach near or between cross sections. In order to be applied in mathematical models, the variables of the differential equation need to be expanded to an equivalent discrete form. It is mandatory that any differential equation discretization must conform to basic mathematical rules, one of the most important being the verification of independence of variables. There are two dependent variables in the Exner Equation that were considered independent in the SEDVEG model: the time step duration (dt) and the distance between cross sections (dx). The dependency between the two variables causes the results of the total sediment transport in the channel to be different for a range of dx/dt values. Increasing the cross* *section spacing emphasizes the bed material impact in the computation of the sediment transport capacity, and increasing the time step magnifies the sediment supply rule. The cross sections in the SEDVEG model are separated by an average distance of 17 miles, which is nonstandard in sediment transport modeling. Each river, depending on the complexity of the physical system, requires a proper spacing of cross-sections and, in general, should not be more than a mile. If this equation is not adequately balanced in the model's algorithm, the sediment transport calculation will be computed erroneously and may derive too much scour, also known as China Syndrome, or can cause excessive aggradation.*

Response: Although the original model that was reviewed (SEDVEG Gen1 Platte River Model) had a spacing of one section every 6.8 miles, the current Platte River SEDVEG Model has an average spacing of one cross-section every 1.45 miles. With this spacing, the concern over the Exner Equation is not an issue.

Comment 13829: *The impetus behind this change seems to be the need to create a river as seen in Figure 2-4. However such non-vegetated conditions are clearly a result of the large numbers of European settlers that traveled up the Platte valley in the spring and summer months during the 1850's and 1860's (West 1998, pages 229-231, Isenberg 2000, Page 109). In 1853 over 200,000 thousand head of livestock were recorded on the emigrant register at Fort Kearney by August 15 (Unruh 1993, Page 395). While the DEIS minimizes the occurrence of woody vegetation along the Platte there are numerous references to trees along the Platte River in historical accounts (Johnson 1994, Johnson and Boetcher 2000, West 1995, McLynn 2002). While a single channel that lacks vegetation may be desired by the FWS and is probably fairly well replicated by the current management practices of clearing and disking it is difficult to envision how whooping crane, least tern and piping plover populations as a whole could become reliant on habitat that existed by most accounts for less than 100 years before it became wooded again.*

Response: See response to Comment 14646.

Comment 13830: *Since there is not a preferred alternative it is difficult to say which alternative a Biological Opinion (BO) is going to evaluate. It is difficult to say what a BO will give for a reasonable and prudent alternative but if the Table on page 5-157 is any indication none of these alternatives are sufficient. This DEIS indicates that based upon the modeled results most alternatives are worse than present conditions in the long-term for whooping cranes least terns and piping plovers. Most of the benefits are short–term and a result of mechanical intervention. However, the DEIS never comes to the conclusion that not releasing water to meet target flows may be the best thing for the species. They do not evaluate any alternative that does not require additional clean water releases and thus the need for sediment augmentation. The only alternatives analyzed were those that incorporate the Fish and Wildlife Service target flows and habitat definitions. Without a preferred alternative it makes evaluation of the this EIS difficult since any alternative or any combination of the alternative plus who knows what could make up an RPA in a BO if one is even possible. The DEIS indicates that inability of depletion plans to protect flows above 4,000 cfs may be a problem as these are the most important flows for habitat maintenance (page 5-272).*

Response: Comment noted. The Governance Committee Alternative, including the state and Federal depletion management plans, are identified as the preferred alternative in the FEIS. Also see response to Comment 13943 concerning effects determinations.

Comment 13831: *This DEIS is based on the presumption that we must achieve the "habitat" as defined within Table 1 of the land plan and the target flows used as a "starting point". Achievement of these conditions will be measured by collecting the R3-1 data needs in the IMRP. However habitat is not some preconceived notion of what a species needs, such descriptions of habitat are models not habitat. Habitat is the sum of resources that are utilized by an organism for forage, shelter and reproduction to survive.*

Habitat is a species-specific concept based upon use. Habitat is not a land cover type, minimum flow or a minimum channel width. Those are potential habitat components or metrics and should be defined from use by the species. While guidelines, targets and/or goals that relate to habitat components help direct management they should not be standards to measure compliance by.

Response: Comment noted.

Comment 13834: *Nowhere in this DEIS is there a mention of how this $150,000,000 Program will impact the populations or any demographic parameter of the target species. If no benefit to the species can be clearly identified a critical evaluation of spending that kind of conservation funding needs to occur. Is getting funding for this Program taking away funds from other efforts that better benefit the species? Parameters that should be addressed are mortality, nest success, fledge ratios, dispersal and how this Program will affect those parameters.*

Response: At the request of the water users and the states, the Cooperative Agreement established habitat restoration as the objective of the Program rather than species population increase. This was done recognizing that populations for all of the target species are also affected by the quality of habitat which they use outside the Platte River Basin and, hence, outside the control of the Program. The Adaptive Management Plan and the Integrated Monitoring and Research Plan will track species response to habitat restoration, including such indicators as mortality, nest success, and fledge ratios.

Comment 13836: *The DEIS proposes that native riparian forests be bulldozed and burned, and then the resulting land should be pushed into the flowing water to overburden the stream with sediment. They conclude there are no negative impacts associated with such activities. Nowhere though do they address the potential negative biological impacts such as reductions in populations of species of concern such as yellow-billed cuckoos or Bell's vireos. Nor do they address social impacts such as possible property boundary changes if channels of the Platte River shift due to such Program activities. The DEIS clearly states that flooding has become a problem near North Platte due to channel aggradations that has reduced transport capability, yet they do not address this same issue in the central Platte River even though the goal is to cause channel aggradations.*

Response: The goal of sediment management is to offset ongoing channel erosion, and achieve sediment balance, not to create aggradation. A desired outcome for both species improvement and adjacent landowners is that the channel in all reaches of the critical Habitat Area become stable (dynamic equilibrium) over time. Present information ("River Geomorphology," chapter 4) indicates the channel in the critical Habitat Area is degrading from the Johnson-2 Return to Elm Creek and aggrading between Gibbon and Wood River. As appears to be the case between Gibbon and Wood River, aggradation can provide benefits by widening channels and improving conditions for target species. At North Platte, aggradation is reducing flow conveyance through this reach and causing flood impacts to nearby infrastructure. An important component of the land plans and sand augmentation plan is monitoring upstream and downstream of these actions ("River Geomorphology," chapter 5) to prevent any undesirable impacts. Monitoring these sites is specified in the Draft Adaptive Management Plan (AMP) (2005), and is an element of the Integrated Monitoring and Research Plan (IMRP). Also see response to Summary Comment 19.

Comment 13837: *The DEIS tables 4-36 and 4-37 do not show NPPD and Central landholdings. They do not even show all the landholdings of the Trust and The Nature Conservancy identified on a 1999 land ownership map made by the EIS Team. Add to these totals the lands managed by the Nebraska Partners Program (DEIS page 4-209) and the magnitude of channel manipulation becomes quite large. The DEIS down plays this impact by playing number games such as doubling channel area in the 90 mile reach to*

180 miles of bank or comparing the total owned in the central Platte to the total river miles from Hershey to Chapman. According to the 1999 land ownership maps produced by the EIS team approximately 35 miles of the 90-mile reach from Lexington to Chapman is controlled in some way for conservation purposes. Some alternatives could result in conservation groups ultimately owning over 65% of the central Platte River from Lexington to Chapman.

Response: Tables 4-36 and 4-37 in the DEIS represent areas managed for cranes for the "Present Condition"; in other words, areas that existed in 1997 (the baseline agreed upon and established by the signatories of the Cooperative Agreement 1997), managed as crane habitat, and on the main channel of the river. Areas not meeting those criteria are not included. Also, see response to Comment 13701.

Comment 13838: *The DEIS claims corn acreage will continue to increase in the central Platte (page 5-161). However recent studies have shown an increase in soybean acreages and a reduction in available waste corn for sandhill cranes (and whooping cranes since they migrate later) because of increased harvest efficiency and competition (Krapu et al. 2004). Krapu et al. (2004) also shows that use of soybeans by sandhill cranes is almost non-existent and that soybeans cannot meet the nutritional requirements of birds. Soy beans require 12% less water than corn (Klocke et al. 1990) so limiting irrigation, or demanding offset of new water may exasperate the change from corn to beans and cause series concerns for not just cranes but all migrating waterfowl.*

Response: Regional cropping patterns respond to numerous variables including economics, weather, and the availability or lack of irrigation water. Corn—grown for grain—is the dominant row crop in central Nebraska (see "Agricultural Economics" section of the FEIS). Although the proposed action alternatives would cause some reduction in irrigated crops—including irrigated corn—corn will likely remain the dominant row crop in the region for the foreseeable future. Some farm managers experiencing reduced irrigation water may convert to dry-land corn. However, even with the advances in dry-land corn yields (100 plus bushels/acre depending on location in central Nebraska), it is unlikely that total corn acreage (irrigated and dry-land) would continue to increase indefinitely—as the identified DEIS passage could be interpreted to mean. The appropriate sections of the FEIS have been modified to reflect these issues.

Results from *The Platte River Ecology Study* (Fish and Wildlife Service 1981) in the late 1970s indicated abundant waste corn available to meet the needs of wintering livestock, waterfowl, and spring-migrating sandhill cranes using the Central Platte study area. In the 25 plus years since that study, increased harvesting efficiencies and large increases in numbers of waterfowl using the area, warrant further study of food availability for migrating sandhill cranes and other wildfowl. It is unclear whether there is currently enough waste corn to meet all needs, but it is likely that further reductions in waste corn availability will occur. For example, Krapu et al., (2004) reported a loose kernel loss of about 88 pounds/acre (average of 1997-98 data), which is an above average (about 78 pounds/acre) loss according to the *Corn Production Handbook* (available from the Agricultural Experiment Station and Cooperative Extension Service at Kansas State University). The Handbook indicates that an experienced operator ("expert") using a well adjusted machine in a field with at least 90 percent of the stalks standing and a moisture content below 25 percent should be able to reduce the loose kernel loss to 28 pounds/acre. The issue of reduced waste corn abundance and availability for sandhill cranes is addressed briefly in the *Sandhill Cranes Appendix* (volume 3[17] of FEIS), but in general, is beyond the scope of this FEIS. We believe waste corn availability is an appropriate topic for further study and monitoring under the adaptive management process.

Comment 13842: *On page 1-6 it states "Significant changes in the operation of water projects throughout the Basin may be required by the Federal action agencies to offset negative effects on the species and their habitats." Who decides if there is or isn't?*

[17] Volume 3 is available upon request at <http://www.platteriver.org/>

Response: It is the responsibility of the Federal action agency to ensure, in consultation with the Service, that their actions are not likely to jeopardize the continued existence of a listed species or adversely modify designated critical habitat.

Comment 13844: *Page 1-6. The first place it is mentioned that future water uses cannot undermine habitat and species benefits. Later this is defined not as the existing new depletion plans but also something that protects peak flows (page 5-272). Please indicate what exactly is meant here.*

Response: This section has been clarified. However, we note that the DEIS on page 5-272 does not mention protection of peak flows. The state and Federal depletion management plans identify measures to be taken to replace depletions to species and annual pulse flow targets (target flows). Although impacts of future development on peak flow characteristics are not directly addressed by the depletion management plans, the extent of impact to peak flows that is allowed during the Program's First Increment is bounded by the impact analysis in the FEIS and programmatic biological opinion.

Comment 13850: *Page 2-10. Where is the rocky substrate in the lower Platte? Please provide data, references that show high spring flows are particularly important for pallid sturgeons using the Platte River.*

Response: Firm substrate suitable for pallid sturgeon spawning is found primarily in the form of gravel bars that occur sporadically throughout the Lower Platte River. See response to Summary Comment 47 in the "Summary Comments and Responses" section of this document.

Comment 13851: *On page 2-11 the picture depicted and the information from (Murphy et al. 2003) is not reality. Lowland grasslands lower in elevation than cottonwood forest are not present along the river. While there are grasslands on islands within the outer boundaries of the woodland these grasslands are higher than surrounding woodlands. The picture is in conflict with most accepted ecological principals of floodplains (Mitsch and Gosselink 1986).*

Response: This conceptual illustration of wet meadow resources has been replaced with a diagram based upon a survey transect from an existing wet meadow to illustrate the same resources. An aerial photograph of this wet meadow complex is also included in the FEIS.

Comment 13853: *Page 2-21. These depletion numbers only make sense if the 7-year period of 1902 to 1909 is an actual valid baseline for flow in the central Platte (see discussion in Murphy 2003, which cites Randle and Samad 2003). The EIS is referencing their own work to support their positions. Please indicate why 7-year period should be considered baseline in an area known for climatic cycles that often exceed a decade.*

Response: The development of river enhancement actions does not rely on selecting a "baseline" condition but does rely on understanding that the river conditions at the turn of the century vary largely from conditions today. The 1895 to 1909 flows are the earliest available estimates of gauge information and are from Randle and Samad (2003) and Simons and Associates (2000). Estimates from this period:

Are used to help understand the water budget and flow depletions that have occurred since that period,

Are used to understand the processes that produced the plan form shown in USGS topographic maps from 1896 to 1902, and

Are compared to flows in later periods to understand the processes of plan form change that occur between these periods.

Comment 13854: *Page 2-23. If you cannot document low flows due to lack of records how are peak flows and annual flows documented?*

Response: It is possible to analyze peak flows without having flow records for the entire year as long has there are records available for the high flow periods. However, the same is not true for low flows as a complete year of flow data is needed to determine lowest flows. Low flow can be influenced by any diversion and there are no flow data available prior to any development on the Platte River. Further, early gauges often did not measure very low flows, due to gauge placement.

Comment 13856: *Page 2-25. Figure 2-10 is incomplete and misleading. Some data manufactured and not identified.*

Response: The figure has been changed for the FEIS, but it still has periods with historically missing data, which are indicated.

Comment 13857: *Page 2-35. Were the same techniques used to measure grain size at each measurement time? While the changes are large relative to one another they are small overall and any error could be significant.*

Response: See response to Comment 14601.

Comment 13858: *Page 2-47. If there was no documented use by the species prior to water development how did water development cause loss of habitat. Habitat is a function of use by a species not a land cover type. If you cannot correlate changes in the Platte River to declines in the species populations how do you know such changes had anything to do with population declines?*

Response: See response to Comment 14256.

Comment 13859: *Page 2-47. Whooping cranes declined prior to water development and have increased since. In fact at the time of filling of Lake McConaughy there were 16 whooping cranes, in 2003 there were 184. How has the operation of Lake McConaughy and all the identified problems in this DEIS contribute to the decline of the species?*

Response: Chapter 1 explains the Program and the FEIS addresses alternatives for species recovery under ESA Section 7(a)(1), and, in programmatic terms, measures to offset collective habitat impacts under ESA Section 7(a)(2). The impacts of individual water development projects, which would be addressed through individual Section 7(a)(2) consultations, are not within the scope of a Recovery Program EIS. Also see response to Summary Comment 48.

Comment 13862: *Page 3-15. Are bank full discharges the desired condition? The FWS considers the short duration pulses to fall under their "annual pulse" and thus are scored as an improvements to target in the DEIS. Would this be true if the short duration pulse came outside the time frames outlined for the annual pulses?*

Response: The description of "short duration near-bankfull flows" was clarified in the Governance Committee Alternative (see chapter 3 of the FEIS). The Program document Water Section (section E.1.b) states that: "To the extent that FWS uses Program water to produce or augment peak, pulse, or other flows, such use shall not decrease the target flow shortage reduction credited to the Program's initial three water projects or to any subsequently approved Program water project."

Comment 13863: *Most information (Kirsch 1996, Sidle and Kirsch 1993, Lingle 1993) indicates reproduction is equal or better at pits than islands.*

Response: Interior believes that recovery for these species will involve maximizing production at all breeding locations including river channel sites. Terns and plovers can successfully produce young on managed sandpits and such management may provide short-term benefit by supplementing production at Lake McConaughy and the Lower Platte River. However, the National Research Council (2005, page198) concluded that artificial habitats, including sandpits, ". . .cannot provide the full complement of essential habitat requirements for piping plovers over the long term and therefore cannot substitute for riverine habitat. . . ." Therefore, restoration of riverine habitats in the Central Platte River is necessary for the long-term recovery of these species. Also, see response to Comment 14651.

Comment 13864: *Page 3-45. This assumes a channel capacity of 3,000 cfs what if that does not produce desired conditions? What is Plum Creek Lake?*

Response: The Governance Committee has committed to achieving 5,000 cfs of Program water below the Johnson-2 Return. Therefore, if 3,000 cfs capacity at North Platte does not achieve the desired results, adjustments will be made to the Program until 5,000 cfs of Program water is possible below the Johnson-2 Return. The use of the name "Plum Creek Lake" was an error in the DEIS, which has been corrected in the FEIS.

Comment 13865: *Page 3-46 Figure 3-9. The whole theory on island elevation is wrong for the majority of cases. The bed does not incise and then the island vegetates. Vegetation gets established on moist mineral soil near the water surface then as it grows it increases channel roughness and higher subsequent flows deposit material on the bar and the landform increases in height. The vegetation grows through the new substrate increasing its root zone and becoming better established. This process keeps working until island height is near peak flow levels. Since the DEIS theory on how islands are formed is wrong their approach to fixing it stands a large chance of not working with out continued mechanical intervention. The lowering of islands just sets the process back and with out mechanical maintenance these islands vegetate this is why the FWS now disks 40 miles of river. The pulse flows identified could exasperate low bar formation and thus increase vegetation encroachment just as easily as fix the problem.*

Response: The text in the referenced sidebar and in the "River Geomorphology" section of chapter 2 has been changed to reflect that vegetation has colonized expanded areas in the historic flood plain primarily due to reduction in flows, and not necessarily due to channel incision, although in the degrading reach of the river this is also a factor. Continued disking of vegetation on channel lands is currently required due to a lack of bankfull flows that could remove new vegetation.

Comment 13866: *(Reference pages 3-68 to page 3-75.) Nowhere in this document does it include how these changes from present benefit the target species. For example, on page 3-68 it appears that the EIS made the assumption that least terns and piping plovers initiate nests at the same time, which is not the case. It also seems to assume that both species come to the Platte Valley and wait for water to recede before nesting, again not true since most birds nest on sandpits. The nest elevation is actually sandbar height and is an assumption that the model portrays such a process correctly. These quantitative assessments of days, changes in acres, grain size, flood occurrence, etc. is in conflict with the statement made throughout the DEIS that the model is used for qualitative comparative purposes only.*

Response: Piping plover and least tern material in chapters 4 and 5 of the FEIS have been modified. Material in the FEIS addresses the logic behind selection of impact indicators, their analysis, strengths and weaknesses of the analysis, and an interpretation of results. The modified materials from chapters 4 and 5 have been used to modify the referenced tables that occurred on pages 3-68 to 3-75 of the DEIS.

Numerous analyses, using a variety of approaches including various models and model outputs, were conducted to develop the material presented in the DEIS and FEIS. The study of complex systems such as the Platte River Basin must address uncertainty. We have used the statement "the model is used for qualitative comparative purposes only", and similar statements to remind readers that we are dealing with a complex system and the uncertainty that accompanies such analyses. Where values are presented as specific metrics, their importance lies in the direction and relative magnitude of change from Present Condition. For example, on page 3-68 of the DEIS, the "Out of channel habitat-change in acres" row indicates that the Wet Meadow Alternative would provide an estimated 18 percent increase over Present Condition. The actual value may differ from 18 percent. The importance of the estimate lies in its relation to Present Condition, and to a lesser extent to other alternatives. The 18 percent estimate indicates that the Wet Meadow Alternative would provide the largest positive increase in habitat—about twice as much as the Governance Committee Alternative.

Comment 13868: *Page 4-31. Why was sediment augmentation simulated throughout the analysis period? If 50 acres of islands need to be squished per year in the first increment why not in subsequent years? How long does it take for the sediment to move through the system? What is the potential for causing channel narrowing in the stretches that are currently widest thus most prone to sediment deposition?*

Response: The sediment augmentation plan is simulated throughout the 48 years of hydrologic record in the FEIS to assess performance over a wide range of conditions. The model results reflect both sediment erosion as well as deposition. Also see response to Comment 13705.

Comment 13869: *Page 4-32. The DEIS claims channels are still changing with no reference or data presented. Please provide data or reference. Cottonwood and willows at least do not colonize the higher elevation sandbars.*

Response: Data on repeated surveys of the river channel, and the rates of degradation are presented and cited in the DEIS (see page 2-40). Additional data is presented in the FEIS. Also see Holburn et al. (2006) and Murphy et al. (2004) in volume 3 of the FEIS.

Comment 13871: *Page 4-62. Could the EIS team give a quick over view of the percentage each one of these land cover types makes up of Nebraska as a whole?*

Response: A detailed GIS database of the entire state of Nebraska is not available. Therefore, a comparison of percentage of land cover types described in the Reclamation GIS database across the State of Nebraska is not possible at this time. Data of the nature requested may be obtainable through the Nebraska Department of Natural Resources.

Comment 13875: *Page 4-79 and 80. According to the Platte River EIS Geographic Database maps the EIS team gave the GC the table should look like this.*

Segment	***Length***	***Single Bank***	***Both Banks***	***Total Controlled***	***Entity***
Chapman to Highway 34	*12.0*	*0.0*	*0.0*	*0.0*	
Highway 34 to Highway 281	*7.5*	*0.0*	*0.0*	*0.0*	
Highway 281 to Alda	*5.8*	*4.0*	*1.8*	*5.8*	*PRT*
Alda to Wood River	*5.0*	*3.0*	*1.4*	*4.4*	*PRT/TNC*
Wood River to Shelton	*8.0*	*1.1*	*0.6*	*1.7*	*PRT/TNC/NGPC*
Shelton to Gibbon	*5.5*	*1.6*	*0.0*	*1.6*	*PRT*
Gibbon to Highway 10	*5.5*	*2.2*	*2.0*	*4.2*	*NAS*
Highway 10 to Kearney	*7.0*	*3.2*	*0.5*	*3.7*	*TNC/WWDC*

Segment	*Length*	*Single Bank*	*Both Banks*	*Total Controlled*	*Entity*
Kearney to Odessa	*9.0*	*0.5*	*0.0*	*0.5*	*NGPC*
Odessa to Elm Creek	*6.5*	*0.6*	*1.6*	*2.2*	*PRT/TNC/NGPC*
Elm Creek to Overton	*8.5*	*1.0*	*3.0*	*4.0*	*NGPC/NPPD*
Overton to J2 Return	*7.2*	*6.0*	*0.0*	*6.0*	*CNPPID*
J2 Return to Lexington	*2.5*	*0.0*	*1.0*	*1.0*	*CNPPID*
Totals	*90.0*	*23.2*	*11.9*	*35.1*	

In other words 40 % of the river from Lexington to Chapman currently has at least one bank under the control and is being managed for cranes. This is the area of interest and should be reported in the EIS.

Response: See response to Comment 13892.

Comment 13876: *Page 4-81. With out redoing the table if you add in NPPD and CNPPID acres the total acres controlled come to about 18,000 acres. If you add in two game and parks areas between Kearney and Overton they did not count that total goes to around 19,000 acres. When did it become necessary to obtain ownership of both sides of the river?*

Response: The referenced table in the "Whooping Crane" section of chapter 4 has not been revised in the FEIS because it includes only lands that were being managed specifically for crane habitat in 1997 (the Present Condition baseline).

Comment 13878: *Page 4-98. A consistent area of interest and number of fish needs to be reported for pallid sturgeon.*

Response: Pallid sturgeon captures are reported for the Missouri River Basin (including the Platte Basin) in Nebraska. For the purposes of the FEIS, captures are considered to be in the area of the Platte River confluence if they fall within three river-miles of the confluence jetty.

Comment 13880: *Page 4-128. Why were herbaceous islands included as a visual obstruction in 1998 and 1995? How much of a difference did this make in the final outcome?*

Response: In the GIS Land Cover/Land Use classification, herbaceous islands are permanently vegetated islands, not sparsely vegetated sandbars. These islands are considered an obstruction because they are generally greater than 3 feet in height (not overtopped by high flows) and are, therefore, a visual obstruction to roosting cranes.

Comment 13882: *Page 4-209. If you add the Nebraska Partners Program projects to all TNC, Trust, NPPD, Central and Audubon and this Program how much of the river from Lexington to Chapman will be under management for conservation purposes.*

Response: The referenced paragraph is a description of lands that will be credited toward Program land objectives; Nebraska Partners Program is not a part of the Program's First Increment lands.

Comment 13883: *Page 4-205. NPPD's Cottonwood Ranch Development and Enhancement Plan was written in 1999 and does not in any way support the analysis done in the EIS. The whole definition of habitat has changed since the time the Plan was written.*

Response: See response to Comment 13660.

Comment 13885: *Page 5-42. High flows alone will not discourage vegetation establishment. Flows at the wrong time may actually promote vegetation establishment.*

Response: A numerical model (SEDVEG Gen3) is used to help track the response of vegetation to flows and to track water surface elevations and susceptible bank areas during cottonwood germination periods. Vegetation mortality is currently analyzed for scour based on velocity, inundation of the plant, ice effect, bank stability, and desiccation when the groundwater level drops faster than root growth.

Comment 13886: *Page 5-67. It is extremely difficult to see how an increase in channel width of 1 to 8 percent % will have any biological significance.*

Response: Comment noted.

Comment 13888: *Page 5-92. In the second paragraph under "Habitat Suitability" the model indicates all alternatives are as bad or worse than present condition for sustaining habitat. Why was a present condition alternative not evaluated as the no action alternative?*

Response: The Governance Committee Alternative in the DEIS has been reformulated in the FEIS and habitat values reassigned.

Comment 13890: *Page 5-98. The contention that grasslands on alluvial wash soils are unproductive in direct contrast to the representative picture on page 2-11 and many of the "restoration" activities along the river are trying to get grasslands in these areas please address these discrepancies.*

Response: The conceptual illustration on DEIS page 2-11 is modified in the FEIS.

Attempts to create wet meadows and grassland indicate the high value that conservation land managers place on this cover type. However, it does not indicate whether the desired functional attributes and food material production on "restored" sites have actually been achieved. To illustrate these shortcomings, the FEIS cites the example near Kearney where crane feeding is not observed on islands and accretion areas that have been cleared of woodland and "restored" by seeding to grass. The EIS contrasts this with the established grasslands and wetlands on property immediately adjacent to, but outside, the channel and island accretions where cranes feeding is observed.

The monitoring and research component of the Recovery Program identifies the need for rigorous site selection, close oversight, and development and application of rigorous evaluation standards, for creation of functional wet meadow habitats. This is appropriate because wetland scientists regard creation and restoration functional wetlands as difficult and attempts often fail.

Comment 13892: *Page 5-102. I am not sure what had to be assumed to figure out how many miles of bank the Program would acquire but, if the table on 4-80 is corrected by adding the Districts land and two NGPC areas that were not counted in to it there is already 35.1 miles or 39% of the 90 miles has at least one bank protected. Why the discussion about Hershey to Chapman.*

Response: The referenced table in chapter 4 under the "Whooping Crane", "Area:Perimeter Ratio" section represents areas managed for cranes for the Present Condition baseline; in other words, areas that existed in 1997, managed as crane habitat, and on the main channel of the river. Areas not meeting those criteria are not included.

Hershey to Chapman is discussed because chapter 4 explains that the database of confirmed whooping crane observations indicates whooping crane migrational crossing of the Platte extends from Hershey to Chapman, Nebraska. This parameter addresses the portion of the affected area of the project, within the cranes migrational crossing of the Platte that is managed as crane habitat.

Comment 13894: *Page 5-108. What are the error margins for the Tern and Plover model?*

Response: See response to Comment 13728.

Comment 13896: *Page 5-154. How is it that increased spring flows scour vegetation with in the central Platte and benefit willow and riparian communities in Wyoming?*

Response: Program pulse flows in the spring, which scour vegetation, will only occur in the Central Platte habitat reach (Lexington to Chapman, Nebraska).

Comment 13898: *The foundational CA "Program Goal" of "testing the assumption that managing flow in the Central Platte River also improves the pallid sturgeon's lower Platte habitat" is rendered moot under DOI's current plans. The DEIS is used by the DOI to trump the plans and intentions originally laid out to do any assumption testing. Their foregone conclusion of jeopardy for the species trumps the need for or worth of any assumption testing. Despite the extremely limited knowledge of the habitat needs of pallid sturgeon and limited understanding of their rare use of the Platte, Program participants would be forced to pony up more resources or face a jeopardy opinion by the Service. This increased focus on the lower Platte River comes at the expense of efforts on the central Platte.*

Response: Following release of the DEIS, the Governance Committee completed their negotiations concerning how to address the pallid sturgeon issues, including the role of future depletions plans. See the Integrated Monitoring and Research Plan section in the Governance Committee Program Documents, Attachment 3, Draft Adaptive Management Plan[18].

Comment 13899: *The DEIS significantly understates the benefits of the land and water management activities laid out in the negotiations of the GC. The adaptive management of 10,000 acres in addition to the several thousands of conservation lands already being managed as well as the Service's operation of the Environmental Account of water in Lake McConaughy and elsewhere is inappropriately discounted in the DEIS analysis.*

Response: The requirement for the EIS is that it focuses on measuring the <u>changes</u> in habitat, and other variables, compared to the baseline or Present Condition, that is, the increase or decrease in suitable habitat as the measure of the impact of alternatives. However, additional information has been added to the FEIS regarding existing conservation lands and activities.

Comment 13900: *The Central Platte NRD believes the Central Platte OPSYUDY model needs some updating and changing. Number one is to develop better documentation of the program, inputs, and outputs including the daily flow algorithms for converting monthly flows to daily flows. Second, the review of daily flows reviled for some alternatives that pulse flows were being simulated but there is no discussion of the operating rules for how, when, and where those flows are generated. Third, if the pulse flows are releases timed with rainfall runoff events the changes in section gain and losses with runoff events need to be accounted for using a bankstorage function. Fourth, the OPSTUDY water accounting model should have the present conditions sections gains re-analyzed and update for the FEIS analyses. See details of need for these updates in the appended OPSTUDY review by Becker.*

Response: See response to Comment 14698.

[18] The September 6, 2005 draft version of the Governance Committee Program Document used for the FEIS analysis is included on a CD in volume 1 of the FEIS.

Comment 13902: *Analyses used in the DEIS need updating and opinions need to be supported. The DEIS is replete with unsupported opinion which should be eliminated. References supporting DOI positions should be included or bolstered and undocumented statements should be removed. DEIS sections describing the DOI's understanding of target species historic use and needs of Platte River habitats and other habitat across their range as well as impact assessments are most in need of updating and substantiation in this regard.*

Response: Comment noted.

Comment 13903: *The DEIS assessment and description of the present status of Platte River habitat and target species conditions is flawed and not supported by the best available science. Much of the opinion noted in the DEIS describing "present conditions" is based on information ten or more years old. Outdated models addressing whooping crane habitat do not include data collected as part of the CA. Least tern and piping plover nesting data on riverine and off-river habitat is incomplete and outdated. The DEIS fails to incorporate geomorphic, hydrologic and long-term vegetation studies that directly bear on the available habitat in the Central Platte River. Pallid sturgeon data is deficient. The baseline data developed by the Service in an attempt to satisfy CA milestones was deemed inadequate to be used as a qualitative measure of present conditions. These deficiencies include the use of non-peer reviewed documents and models, use of outdated target species data, failure to factor in changing river conditions and environmental conditions and changes across the target species ranges, changes in conditions between species observations and documentation of habitat conditions.*

Response: Comment noted. The whooping crane PHABSIM roost habitat analysis is revised (see response to Summary Comment 51). Latest and best geomorphic scientific information is incorporated and cited in the EIS. (See the National Research Council (2005) panel review of Platte River science.) Also see response to Summary Comment 35.

Comment 13905: *The DEIS fails to look beyond the "associated habitats" along the Platte - it needs to look at a far broader. If the management activities associated with various alternatives are to be successful, they must take a regional ecological perspective in addressing the target species.*

Response: The proposed Integrated Monitoring and Research Plan will take into consideration information about the species and their use of habitat outside the Central and Lower Platte River.

Comment 13910: *Page 1-23- The DEIS section that addresses activities outside the Program inappropriately fails to address at least two significant issues. The text focuses on the "growth in agricultural, municipal and industrial use…" without recognition of the recent efforts made to manage groundwater and surface water use in the basin (e.g., passage of LB 962 in Nebraska and well-drilling moratoriums instituted by local NRD's). The passage of the bill into law and actions taken by the NRD's place Nebraska in a significantly better position to affect water related activities outside the Program.*

Response: Discussion has been added to the FEIS to reference Nebraska's recently adopted water management laws (LB962) and how they affect water use in Nebraska in chapters 4 and 5, sections, "Water Resources," "New Water Uses in Each State."

Comment 13913: *The top paragraph on the page (page 2-9) describes the DOI's perspective on flows they deem important for least tern and piping plover nesting, including "flows (that) must recede early in the nesting season to allow birds to initiate nests." It seems the DOI ignores the direct conflict between the perceived need for these "receding flows" and the timing of historic and planned Program peak flows. This seems tantamount to having ones cake and eating it too. There is (are) no data presented in the DEIS that shows there were nesting birds, and so it seems arbitrary to use this argument to describe how nesting habitat is created.*

Response: The identified paragraph describes conditions in which all site components would come together to support successful channel nesting by plovers and terns. As discussed elsewhere, it is unlikely that such conditions occurred every year historically, or would exist every year under the proposed alternatives. However, the high peak flows and the very great extent of unvegetated channel which existed in the pre-development period ensured that some areas of sandbar habitat were available for nesting except in those years having the very largest floods. A description of optimum conditions provides a management goal against which Program accomplishments can be measured. A description of optimum conditions can also serve as a hypothesis to be tested under the Adaptive Management process.

The timing of historic and proposed flows has been addressed in responses to other comments (e.g., Summary Comment 35). This paragraph has been modified to identify it as the Service's assumed optimum condition description for channel nesting by plovers and terns.

Comment 13916: *How is the DOI able to describe "how (Platte River) habitats (for target species) have changed over the last 150 years", when the Technical Committee of the CA has come to the conclusion that such data doesn't exist in sufficient fashion to include it in the CA Baseline Report?*

Response: Obviously, detailed data about changes in Platte River habitat are more readily available in more recent times, as detailed riverflow records (starting roughly in the early 1900s) and systematic aerial photographs (starting in the late 1930s) became available. However, numerous maps and photographs from the mid- to late 1800s document the general width and plan form of the Platte River in the Habitat Area. While there continues some discussion about the extent of vegetation and trees along the riverbanks and on the scattered islands, there exists consensus that the great majority of a mile-wide river channel was unvegetated, as it was subject to annual scouring flows, as described by the National Research Council.

"The active channel of the river was generally without vegetation except during summer low-flow conditions, when annual plants colonized portions of the exposed bed. Although the stream was not normally more than a foot deep (except during floods), its current was swift, and the unstable sandy sediments were not a suitable substrate for vegetation." (National Research Council, 2005, page 64).

Thus, it is clear that the historic Platte provided extensive unvegetated sandbars with long unobstructed sight distances, as well as a regime of high spring flows that were seldom exceeded by summer flows. These aspects of the physical habitat, and others, have been dramatically changed over the last 150 years.

Comment 13917: *Page 2-25, Figure 2-10 is incomplete and misleading. Some of the data depicted are manufactured and not identified as such.*

Response: The figure has been changed for the FEIS, but it still has periods with missing data.

Comment 13918: *Page 2-47. If there is no documented use of the central Platte by the target species prior to water development then how is water development conclusively the cause loss of habitat and a major contributor to the decline of the species? Whooping crane populations declined prior to development on the central Platte and have increased since then.*

Response: See response to Comment 14256.

Comment 13920: *Why does the text for pallid sturgeon focus on the Missouri River and larvae not known to be pallid sturgeon? What is the logic behind the statement in the last paragraph "because of its importance to the lower Missouri River Basin, the Platte figures prominently in the recovery plan for the pallid sturgeon."? Are the "42 occurrences" of pallid sturgeon "confirmed" or are they based on* *common angler reports? Even experts have trouble distinguishing pallid from shovelnose sturgeon. The text here mentions that 20 observations are from in or near the Platte. The DEIS (page 2-10) talks about 16 captures in the Platte. Why doesn't the document use a single number?*

Response: Confirmation of angler captures is made via examination of fish or detailed interview of angler by Nebraska Game and Parks Commission biologists. Based on interview responses, reports are confirmed or unconfirmed based on NGPC biologist judgment. It is important to note that in using interview responses, only the fish displaying the strongest "pallid" characters are confirmed (e.g. largest size, greatest disparity in barbel length and placement, etc.). As a result, the angler captures considered confirmed are a very conservative estimate of angler capture rate.

Comment 13921: *Page 3-4 and 3-5- Why does the DEIS up the ante on mitigation for the No Action Alternative? Specifically, what is the logic for increasing the overall goals for restoration of lands and riverflows above the levels set in the Program? Why would there have to be "less flexibility" for individual mitigation for use of non-complex habitat? If such habitat would provide benefits to the species, why factor it out of the equation?*

Response: The overall goals for habitat restoration and flow improvement are essentially the same with and without a Program. The difference the commenter notes is due to implementing recovery actions in a Basinwide, phased, incremental, adaptive management approach (for a 13-year First Increment) versus completing consultations on a project by project basis.

In order to avoid the likelihood of jeopardy to the target species, the Program must address the causes of jeopardy and adverse modification of designated critical habitat resulting from Platte River depletions. This includes effects to riverine habitats, and focusing on off channel sand pit areas solely will not provide ESA compliance.

Comment 13923: *The Service's claim of lack of specific prospective habitat locations for the GC Alternative appears disingenuous given their input into development of the Land Plan and given the fairly limited geographic extent of the study area. What bearing on potential benefits to the target species does the Service find troubling? They have designated the entire project area as piping plover critical habitat and all the area west of the Shelton bridge as whooping crane critical habitat. Why wouldn't Program habitat development in any location in the area between Lexington and Chapman provide benefits to the target species?*

Response: Acquisition of Program lands is based on "willing seller" and specific habitat locations cannot be determined prior to Program implementation. Any potential habitat between Lexington and Chapman, Nebraska will be considered for restoration. Also see response to Summary Comment 05.

Comment 13926: *Page 3-72- The changes in agricultural revenues between the two GC Alternative scenarios range from annual values of -$2,350 to -$4,409,000. This analysis appears useless in that the range differs by orders of magnitude.*

Response: The lower bound of the range shown in the DEIS is a typographical error. The range of annual values shown in the FEIS is from -$2,350,000 to -$4,409,000.

Comment 13928: *Pages 4-54 and 4-55- If, as the DEIS indicates, four heavy metals would be liberated into Platte River waters if sediments from islands are pushed into the channel, how does the DOI intend to deal with these contaminants liberated in squishing islands? All it says on page 4-57 is that the "data will be evaluated". The issue is dismissed, in large part, because the DOI's assessment of these changes is "not very precise". If this same analysis standard is applied across the board in the DEIS, the DOI would likely come to no conclusions at all on any topic.*

Response: The EIS analysis is more precise when the nature and location of Program actions are known. Where the location of Program actions is not known, as is the case for channel restoration, a "programmatic" analysis is done, in which impacts are evaluated at a more general level. The Programmatic FEIS thus sets the framework for the later impact analysis for site specific implementation of the alternatives or elements within those alternatives. Rarely will the impact analysis in a Programmatic FEIS be such that site specific developments will be able to proceed without further NEPA compliance.

The impact analysis presented for the sediment management activities is essentially an analysis to identify potential effects of the Program, prior to knowing where habitat lands might be acquired by the Program. The data indicate that there is a great deal of variability in the metals concentrations in the sediments. In general, it appears that riverbed sediments are lower in the metals concentrations than the banks, but higher than the islands. In addition, concentrations are higher upstream than downstream. The flags can be used for the future identification of potential impacts when site specific developments are undertaken.

Comment 13933: *Page 4-94- The DEIS notes that "large sections of the Central Platte (went dry) during summer months in 2001, 2002 and 2003, resulting in large fishkills." And goes on to note that "(a)ll of these fishkills were determined to be the result of lethal temperature conditions." How did the DOI determine that water temperature caused these deaths and not the absence of water?*

Response: The detailed treatment of forage fish has been modified and relocated to a new section in the FEIS: "Central Platte Fisheries" in chapter 4. Specifically, the text has been reworded to read "High water temperatures (>32˚C) and low flows were observed for many of the fishkills."

Comment 13934: *Page 4-98. The pallid sturgeon numbers noted in the DEIS are inconsistent. Page 2-10 notes the observation of "(t)hirteen of sixteen captures of pallid sturgeon in the Lower Platte system". Page notes 20 sightings "are from the Platte River, Elkhorn River, or the Missouri River near the Platte River." Page 4-98 notes that "(s)ince 1979, 19 of 23 captures of pallid sturgeon in the Platte River or Missouri River near the Platte confluence" between April and June and another four captures in July and September.*

Response: The inconsistency has been corrected in the FEIS.

Comment 13936: *Page 5-61. Table 5-30 shows that after 13 years of a Program, the "present condition" outranks the GC alternative. Apparently, the status quo is an improvement to the Program in the DOI analysis.*

Response: The referenced table indicates that the rate of sediment deposition is greater under Present Condition (continued for 13 years) than under the Governance Committee Scenario 1. This is due to the fact that clear water inflows to the Central Platte Habitat Area from the Johnson-2 Return are increased somewhat under this DEIS alternative, without any sediment inputs to the river.

Comment 13938: *Page 5-92- The second paragraph points out that the model indicates all alternatives are as bad or worse than the present condition for sustaining habitat. The next paragraph indicates that the model that predicts this cannot predict such things even though the majority of the DEIS is based on the predictions of the SED/VEG model. Without mechanical means none of the alternatives change the sediment transport processes any more than the present condition.*

Response: This section is clarified in the FEIS to indicate that, in relative terms, Present Condition provides worse channel habitat sustainability characteristics for sediment supply than do the FEIS Action Alternatives—all of which have a sediment augmentation component.

Comment 13943: *Page 5-157- Table 5-57 notes there is no RPA.*

Response: Table 5-57 on page 5-157 of the DEIS presented a Summary of Effects Determinations for the Target Species. This section, which indicates that there are adverse effects to the species listed in the table, should not be interpreted as meaning that a Reasonable and Prudent Alternative (RPA) is needed or not, or whether the proposed action is likely to jeopardize the continued existence of a species. That determination is made within a biological opinion and not within an EIS. The Effects Determinations are a part of the required biological assessment provided to the Fish and Wildlife Service during consultation (in this case, the FEIS) and as explained in the footnote of the referenced table:

> By policy, if a Federal action will (or is likely to) result in both adverse and beneficial effects to listed species, the appropriate determination is "may affect, likely to adversely affect." This is true even where net effects may be positive (U.S. Fish and Wildlife Service and National Marine Fisheries Service, 1998).

The only exceptions are if the effect is entirely beneficial, insignificant, or discountable (i.e., extremely unlikely to occur).

Comment 13945: *In reviewing the DEIS, the Agency finds that the Recovery Implementation Program would pay the Central Nebraska Public Power and Irrigation District and the Nebraska Public Power District for any reduction in the value of power caused by shifting of turbine releases from the September - April period to the May - August period, yet no similar compensation is envisioned for LAP power customers. Why does it make a difference that Central Nebraska holds a Federal license (FERC) for power generated at a facility on the North Platte while LAP customers have a long term federal contract for power from the same river? Do my customers not deserve the same protection as those of NPPD? Why should LAP contractors be left holding the financial bag while others are held harmless? This blatant inequity must be remedied by compensating the Pick-Sloan Missouri Basin Program (PSMBP) for any reduction in the value of power generated caused by the returning of turbine releases.*

Response: Comment noted.

Comment 13947: *For the past two years LRCD has been working closely with the USFWS, Wyoming office, and private land owners to implement Safe Harbor Agreements to reintroduce the endangered Wyoming Toad. We are in the final stages of these agreements and are hopeful that we may release tadpoles this spring. One of our most promising sites is in the North Platte drainage above Pathfinder. Should this draft plan be implemented and the drought continue, the toad habitat would almost certainly be lost, along with the irrigation rights junior to Pathfinder.*

Response: FEIS analyses indicate there will be no significant effects to areas above Pathfinder Reservoir and that area is not being considered for water leasing activities. In addition, Program activities, including water leasing, will be subject to site specific impacts analysis.

Comment 13948: *The timing of monthly generation is also a concern. All alternatives change the present generation schedules, so that less energy is generated in winter months and more is generated in early spring and fall months. If generation is shifted from winter months, when energy prices are high, to months of lower energy prices, it would produce a financial impact that would be negative even if the annual generation is increased from what it is today.*

Response: See response to Comment 14038 under Western Area Power Administration in the "Responses to Comments from Cooperating Agencies" section in this document.

Comment 13951: *We do agree that the Upper Basin water users can only be affected if regulation to rights junior to 1904 is called for. Because of this additional demand for an Environmental Account, we feel there will be more calls for regulation and that these calls will go into the irrigation season unless protection is given to irrigators that prevent these calls. At present, post May 1 protection is based entirely on an interpretation of water law by the State Engineer. We can foresee, in times of drought, where the holders of this 1904 water right will try to restrict water use in the Upper Basin at any time of the year so water can be made available for environmental use. It can trigger a new interpretation of Water Law.*

Response: See response to Comment 13755.

Comment 13952: *It has not been proven that historic water use in the Upper Basin has had, or will have, a significant impact on the causes blamed for habitat loss for these endangered species in Central Nebraska. We maintain that the direct flow irrigators of the Upper Basin are not a cause for this habitat loss, and that the primary reason is the many large storage projects below us with their associated large diversions from the Main Stem of the Platte River.*

Response: Comment noted.

Comment 13968: *The bottom line is that all agriculture producers will be adversely impacted when the irrigation water they rely upon for their livelihoods will be taken to support endangered species habitat. The agriculture producers appreciate the need to increase flows to support these species. However, they also believe that they should be compensated for the taking of this water. Wyoming law notes that those appropriators who intend to change the use of water or the point of diversion must ensure others are not hurt by that action. The water in Pathfinder and other reservoirs on the Platte River system were authorized by Congress for irrigation and other uses. The burden is suppose to be on the part of the appropriator to show no injurious effects.*

Response: Comment noted.

Comment 13969: *All of the effects of reduced irrigation caused by this program have not been fully evaluated. Taking water away from irrigation for agriculture has many adverse impacts. These include:*

--Reduced numbers and acres of artificial wetlands,

--Reduced habitat for species at risk that occupy riparian and artificial wetland areas,

--Reduced turnover of new dollars resulting from the typical sales of crops and livestock outside the local area and the typical agriculture expenditures within local economies, and

--Drying of numerous perennial streams that are recharged by irrigation water.

Response: The EIS assesses the consequences of reduced irrigation deliveries from elements of the alternatives which are known at this time. These irrigation shortages are shown in "Water Resources," chapter 5. Because the reduction in deliveries from these elements are a small percentage of any district's water deliveries, it is not expected that any significant impact will occur to return flows that might support wetlands or other species habitats.

Site-specific impacts from water leasing, the location of which will depend upon voluntary participation, will be assessed in subsequent NEPA analysis.

Comment 13970: *The program should consider opportunities to evaluate the transfer of water from under-appropriated drainages. Second, officials need to find opportunities to provide incentives for conserving water.*

Response: The EIS did examine the potential for importing additional water into the Platte River Basin from other river Basins (See *Platte River EIS Screening Report* in volume 2 of the FEIS). Virtually all areas of the Platte River Basin are already overappropriated. Elements in the Program alternatives, such as water leasing, do provide incentives for conserving water.

Comment 13971: *Project costs do not include costs for research and monitoring. Yet, the whole purpose of the first increment of 13 years is to conduct monitoring and research to determine the changes that may be necessary during the next increment. Moreover, the DEIS notes that adaptive management will be used to make changes during the 13 years of the first increment. Yet no costs were identified for this monitoring and research. Funding for monitoring and research is critical to the success of this program. The costs for monitoring and research need to be identified.*

Response: The Governance Committee Program Documents include the proposed budget for the Governance Committee Alternative, which includes the costs for the research and monitoring.

Comment 13973: *Fish and Wildlife Coordination Act (FWCA). The DEIS indicates on page 6-6 that "Discussions of the alternatives and possible impacts to States' wildlife resources have been held with each States' wildlife agency." The only action alternative described in the DEIS that the Colorado Division of Wildlife has reviewed is the Proposed Program referred to as Governance Committee Alternative (GCA). Formal FWCA coordination has not occurred with CDOW. The CDOW has not been consulted on the other three alternatives by the Service as mentioned. We are concerned about the potential impacts the other three alternatives may cause to fish and wildlife resources in Colorado. The CDOW request the appropriate Service representatives meet with its staff to discuss more fully these other three alternatives.*

Response: The Service's Field Office's in Colorado, Wyoming, and Nebraska have been involved with coordinating FWCA issues with state wildlife agencies, including the Colorado Division of Wildlife. See the *Fish and Wildlife Coordination Act Report: Platte River Recovery Implementation Program* in volume 2 of the FEIS.

Comment 13975: *Substantial impacts to waterfowl, passerines and other migratory birds are likely to occur through the water leasing and water emphasis alternatives. These impacts need to be further analyzed. The water leasing and water emphasis alternatives would result in negative impacts to wetlands in the South Platte Basin in Colorado. This issue was not addressed, and impacts to wetlands and waters of the United States as well as the associated mitigation strategies need to be developed and described.*

Response: Impacts of specific water leasing plans will be assessed through future NEPA analysis. Also note that the preferred alternative (Governance Committee Alternative) does not involve water leasing in Colorado.

Comment 13976: *The DEIS states that water that has been retimed through the Tamarack Project would flow downstream and be protected from consumptive use to the habitat area (page 3-31). This protection is limited in that any Tamarack accretions would be for beneficial use in Colorado consistent with state law and interstate compacts.*

Response: This text in the FEIS has been clarified.

Comment 13977: *Figure 3-2 would better illustrate the location of Tamarack Project Phase I and II if the small dots were deleted and the general area between Fort Morgan and the state line were highlighted.*

Response: The referenced figure has been clarified in the FEIS.

Comment 13978: *Page 3-19 (7): Our concern is with the last sentence which states: "Operations of the Pathfinder Dam EA and the Tamarack Project Phase I, would be in accordance with rules approved by the Governance Committee." We would like added clarification that CDOW will not relinquish control of those operations conducted on the portion of the Tamarack Project located on state wildlife areas. CDOW's control is to ensure that there is no inadvertent injury to fish and wildlife resources in Colorado including endangered, threatened, and species of concern on state wildlife area property as a result of project operations.*

Response: Comment noted. The discussion of Colorado's Tamarack Project, Phase I of the Governance Committee Alternative in chapter 3 of the FEIS was revised to reflect that the accounting methods used by Colorado's Tamarack Project shall be approved by the Governance Committee, as discussed in the Program Document.

Comment 13979: *On page 4-183, we recommend the following description. Tamarack Ranch SWA is owned and operated by the CDOW. This 10,696-acre area is located in Logan County in the far corner of northeastern Colorado. The wildlife area stretches along 14 miles of the South Platte River and is intensively managed for waterfowl, upland game, small game, and non-game wildlife. The area is a very popular quality hunting property with reservation hunting available. Other recreation on the property includes fishing, wildlife viewing, hiking, and camping. The property provides habitat for waterfowl, upland game, small game, deer, turkey, raptors (including bald eagles), and many migratory neo-tropical birds. In addition to the South Platte River, the property provides sandhill grasslands along the riparian corridor which greatly increases plant and wildlife species diversity.*

On page 4-184, Jackson Lake State Park, we recommend the following description. The north side of Jackson Lake is owned by the DOW and managed as a 400 acre SWA. The property is managed to provide shallow seasonal wetlands and provides habitat for large numbers of waterfowl, shorebirds, raptors (including bald eagles), upland game, deer and transient neo-tropical birds. The property provides hunting, fishing, and wildlife viewing recreation.

On page 4-184, Jumbo/Julesburg Reservoir we recommend the following description. CDOW owns a portion of this 3,185 acre property and manages the entire property for recreation. Uses include hunting, fishing, wildlife observation, boating, and camping. A user fee is required. This property is heavily utilized by waterfowl, shorebirds, raptors (including bald eagles), and migratory neo-tropical birds.

Response: Descriptions on the referenced pages have been clarified in the FEIS.

Comment 13982: *Page 5-88 South Platte River. This paragraph shows general predicted flow changes. Flows are generally increased in March, April, May, August, September, and October and reduced in November, December, and January. In general this flow regime may benefit many fish species and riparian plant communities. There could be impacts to wintering waterfowl and native fish if natural slough flows are reduced by pumping in late winter. These warm water sloughs provide important habitat for many species including small fish in the winter.*

Response: Please see the *Fish and Wildlife Coordination Act Report: Platte River Recovery Implementation Program* in volume 2, for information regarding impacts of reduced winter flows to species in the South Platte River below Tamarack.

Comment 13983: *State Listed Species and Species of Special Concern. We need to recognize that use of wells for pumping in the South Platte River for recharge can have some effects on natural warm water sloughs by decreasing water volume and flows. Placement of wells near these sloughs can show adverse* *impacts. These wells should be placed nearer to the main channel of the river. Higher water tables from recharge in a wet meadow may be beneficial.*

Response: Comment noted.

Comment 13984: *Pages 5-217-228. We agree with some of this summary of impacts but there are other factors that should be considered before there is a general assumption of no impact or beneficial impact to recreation in Colorado.*

It should be noted that any of the alternatives that result in loss of irrigated agricultural lands or reservoir storage levels could have recreation impacts in Colorado. Loss of water from reservoirs has obvious negative impacts to fisheries. These are all fluctuating reservoirs in NE Colorado so reducing water in these lakes can cause severe fisheries impacts. Also by reducing irrigated agriculture along the river you may reduce hunting opportunity, particularly for geese and ducks that depend on these fields for winter feed. There is also the possibility of reducing populations of upland game, small game, and deer who also feed heavily in these fields, particularly in the winter. Reductions in these populations will also reduce hunting and viewing recreation.

The assumption that operation of the Tamarack project will automatically provide increased recreation may also be somewhat misleading. We believe that these recharge projects can provide increased recreation if the timing of pumping is done to provide hunting habitat for waterfowl at the correct times. Pumping in September and October, as an example, increases harvest opportunity for early migrating waterfowl. Pumping in Feb and March produces almost no hunting opportunity but provides enhanced habitat.

Response: No impacts to Colorado reservoir recreation are assumed under the alternatives that do not include water leasing in Colorado. Where changes in agricultural production and/or water leasing occur, recreation impacts may occur, but analysis will depend upon site-specific proposals to be evaluated at that time. The degree of impacts due to the Tamarack Project is dependent upon the design, locations and operation of the project. This is now clarified in the text.

Comment 13986: *CDOW has concerns that this plan [reference to page 5-123 of DEIS] focuses on the Lower Platte River area regarding the management actions proposed for terns and plovers. It is stated that in 2003, plover counts at Lake McConaughy were 94 pairs, 114 nests, and 194 fledglings. This is far and away higher numbers than anything reported for any other segment of the Platte River. We question why this area, along with the nearby segments of the North and South Platte Rivers are not a focal point for recovery for this species. We are concerned that the plans presented could negatively affect this population for the establishment of another. Piping plovers are a state Threatened species in Colorado and these plans could have a substantial impact on the riverine system here in Colorado.*

Response: The piping plover is a federally threatened species and the least tern is a federally endangered species—thus the focus of this study. Plovers and terns have responded to drought conditions and the resulting expansion of beaches at Lake McConaughy during the last four to five years (see the table "Piping plover and least tern nest data from selected sites in central Nebraska, 1992-2004" in the FEIS, chapter 4). Over 100 young plovers have successfully fledged annually during the last four years (371 fledged in 2004). However, it is unlikely that such favorable conditions will persist. Vegetation will become established and/or the reservoir will refill in the future. Numbers from the mid 1990s are likely more representative of long-term production at Lake McConaughy.

The Service believes that current channel conditions within the Central Platte River can be made to support plover and tern nesting. Successful channel nesting would complement successful sites at Lake McConaughy, sandpits, and the Lower Platte River, and provide another tool to address management of Platte River plover and tern populations.

Comment 13987: *We are requesting confirmation from the Governance Committee that any costs incurred from the federal treasury for financing this program will be considered non-reimbursable and will not be considered a multipurpose cost of any of the federal hydro-projects involved.*

Response: See response to Comment 14798 under Western Area Power Administration in the "Responses to Comments from Cooperating Agencies" section in this document.

Comment 13989: *One of the more serious limitations of the economic analysis in the Platte DEIS report is a lack of information that would allow the reader to identify the how the results were arrived at and the specific contributions of the economic components to the overall impact assessment. Specifically, Table 5-103 of the report provides the Average Annual Total Regional Economic Impacts associated with alternate programs. However, the information provided in the report, and in the related attachments and technical appendices, is not sufficient to allow the reader to attribute a share or portion of the total impacts to the specific elements contributing to the overall totals. It is important for the reviewer to be able to identify the component contributions to the overall regional impacts for each program scenario considered. It is also important for the reader to be able to identify the magnitude of the direct economic effects, by program or scenario element, and the secondary economic effects associated with each of the direct economic effects. Such information could be provided in a technical appendix or attachment.*

Response: See response to Comment 14676.

Comment 13990: *The assessment of the recreational and other economic impacts compares the predicted conditions for the alternative actions with the "present condition" where the present condition is defined as a "state" that existed at some point in the past. A more appropriate and useful analysis would be to assess the potential economic impacts by comparing the predicted conditions for the alternative actions with a set of economic conditions for a "state" that may be anticipated to result without a recovery program. Obviously, the same set of conditions that existed in the past do not exist in the present and will not exist in the future without a Platte River Recovery Program.*

Response: The Present Condition, to which the alternatives are compared, is not a "state" that existed in the past. For most resources it is the state of the resource that existed in 1997. For some resources, the Present Condition is based upon more recent data, such as for Agricultural Economics. The EIS Team believes that, for most of the affected resources, the Present Condition is the best quantification of the state of the resource in 13 years without a Program and therefore serves as a sound basis for NEPA analysis.

Comment 13992: *A curious section in the Regional Economics Technical Appendix relates to the discussion of how the analysis treats payments to landowners for leasing or retiring land (page 7). While I would agree such payments represent a positive regional impact because of the "new" income flowing into the region, I question the logic used for assigning the proportion of such payments that would remain in the region. The referenced document states: "Research and Surveys from UNL on land purchases by local farmers indicate that active farmers/ranchers are the primary buyer group of farmland (greater than 70% in the late 1990's). Therefore, it is assumed that 50% of the income generated from land and water sales can be used of the amount of money that may stay and be spent in the region." (page 7).*

In the case being evaluated, we are not considering who will purchase the land (or water). We know it is not a local farmer or rancher. Rather we are considering the disposition of the proceeds of sales of these resources, which is unrelated to the propensity of local farmers and ranchers to purchase land when available.

Response: These corrections have been made in the FEIS.

Comment 13993: *Assessing the impacts of changes in the storage and operations of Platte River reservoirs is a difficult matter. Mid-West is not comfortable with the use of analytic tools that only measure economic impacts on a national basis. There are real economic impacts at the local and regional level that disappear in a national analysis. Mid-West would ask the Bureau to consider analyzing economic impacts at the local and regional level and including those assessments in its decision-making process.*

Response: Impacts are measured on a regional level according to the defined economic impact areas as defined in the "Agriculture Economics" section of chapter 4 of the EIS.

Comment 13994: *All of the action alternatives will impact Pick-Sloan Missouri Basin Program power customers. Even though two action alternatives – the Governance Committee and Water Leasing alternatives – appear to increase generation, they alter the timing of releases, which can have a dramatic impact on power revenues. Shifting generation from the winter months -- when energy prices are high -- to the spring and fall months – when energy prices are low -- will mean less power revenues. Those lost revenues will have to be made up by the firm power customers of the Western Area Power Administration in higher rates. Thus, alternatives with higher generation do not necessarily mean an increased benefit to power.*

Response: See response to Comment 14039 under Western Area Power Administration in the "Responses to Comments from Cooperating Agencies" section in this document.

Comment 13995: *The action alternatives being considered also will reduce dependable capacity for Pick-Sloan. If significant, that might affect the allocations of federal firm power customers in Colorado, Wyoming and Nebraska.*

Response: As the reviewer states, a reduction in dependable capacity at hydropower plants in the North Platte Basin may result from some of the alternatives examined in the DEIS although the impacts are quite small.

Comment 13998: *Water supply alternatives must comply with Wyoming water laws and the modified North Platte Decree.*

Response: Comment noted.

Comment 14000: *The second major issue that we would like to address is the Glendo re-regulation space. The Wet Meadow alternative and the Water Emphasis alternative, on pages 3-53 and 3-59 respectively, describe the proposed use of this space. However, the description of the use of the re-regulation space does not discuss the existing operation whereby water is stored in the re-regulation space to 1) replace water that passed the Wyoming-Nebraska state line in excess of the amount ordered by canals with storage contracts below the Wyoming-Nebraska state line as the unintended result of physical limitations on the ability to control water deliveries; 2) replace evaporation from the storage ownership accounts of Pathfinder Reservoir, Guernsey Reservoir, Seminoe Reservoir, Alcova Reservoir, and Glendo Reservoir; and 3) supplement the natural flow that is available for apportionment between Wyoming and Nebraska (Nebraska v. Wyoming, 534 U.S. 40 (2001), Final Settlement Stipulation, Appendix A – Modified North Platte Decree at XVII(g)).*

Those three uses are included in the Wyoming water right held by the U.S. Bureau of Reclamation (USBR) for Glendo Reservoir. A change of use for that water right would be required to implement the revised operations proposed in the DEIS. This pertinent information needs to be included in the DEIS. It does not appear that the hydrologic analyses of this water supply alternative addresses the above existing *operations in its present condition and, therefore, the DEIS may understate the impacts of this alternative.*

Response: The Department of the Interior is aware of the difficulties involved with converting 100,000 acre-feet of the restorage space in Glendo Reservoir to use in the Program. These include a change of use to Reclamation's existing water rights that would most likely be junior to all current uses on the North Platte River.

All alternatives (including Present Condition) include the existing uses of the space in Glendo Reservoir (1-3 of the comment). The amount of space that is available for those uses is reduced under the Wet Meadow and Water Emphasis Alternatives.

Existing uses of this space are discussed in section 2.1.5.5 of the *Water Resources Appendix*.

Comment 14002: *Page 2-18, Table 2-3 lists irrigated land estimates for the Platte River Basin, 1995. The latest version of the Wyoming Depletions Plan estimates the irrigated acreage in the North Platte River Basin in Wyoming to be 553,462 acres. The estimate in the plan should be used.*

Response: For purposes of combining data for the three states, it is preferable to use a single, published source.

Comment 14003: *The disclaimer on page 3-7 needs to be revised to inform the reader that many of the alternatives may require institutional changes, such as changes in state statutes, authorizations of federal projects, and state and federal policies. The DEIS assumes that any required institutional approvals will de facto be granted.*

Response: The disclaimer has been expanded to cover these possibilities.

Comment 14004: *On page 4-13 under the heading Irrigation Deliveries, the second from the last sentence in that paragraph should be revised to read "Nonproject lands are lands irrigated by private individuals or districts that take water from the North Platte River system above Lake McConaughy and that do not have contracts with Reclamation to receive water from the North Platte Reservoirs".*

Response: The language has been clarified in the FEIS.

Comment 14005: *Page 5-11 describes the spills at Guernsey Reservoir. There is no meaningful difference between any of the alternatives. They all reduce spills by 10-11 years over a 48-year period; however, the paragraph preceding the table does not describe it this way.*

Response: In the DEIS, the alternatives reduced the number of years with spills by 2 to 3 years not 10-11 years. The table indicates the number of years with spills, not the change in the number of years with spills.

Comment 14008: *The header that appears on the even numbered pages refers to the document as a "Draft Programmatic Environmental Impact Statement." It is understood, due to the regional extent, cost and complexity of the issues involved, that a programmatic, less detailed assessment is the only viable option. However, when it comes to the water projects that are proposed by the three states, the analysis should be sufficiently detailed for water users to determine the consequences of the proposed action as it relates to their particular enterprise.*

Response: The EIS analysis is aimed at providing sufficiently detailed analysis of all proposed water elements so that interests associated with affected facilities will have complete information about how their water use may be affected.

Comment 14010: *Description of Alternatives/Consequences-The descriptions of the various water supply components of the action alternatives are not sufficient to allow the reader to understand their potential consequences. There should be a summary of the assumptions made regarding each component. The hydrologic impacts of each water supply component should be identified and discussed.*

Response: The approach to modeling each alternative is described in the FEIS, with more details in the *Water Resources Appendix* in volume 3.

Comment 14013: *The document needs to be edited to make sure that tables and figures match the referencing text and that the hydrologic references are accurate and make sense.*

Response: These corrections have been made in the FEIS.

Comment 14014: *Page 1-12, third paragraph -The discussion relating to the "streamlined" consultation needs to be expanded. You should explain how a consultation can be "streamlined", yet all ESA requirements for Section 7 consultation are still completed.*

Response: Volume 2, section "The ESA Section 7 Consultation Process With and Without a Cooperative Program" and FEIS section "Endangered Species Act Section 7 Consultation Process Within The Program," in chapter 1 were revised to more clearly describe future streamlined consultations that tier from the programmatic biological opinion.

Comment 14015: *Page 1-13, Footnotes 13 and 14 -Why does the DEIS paraphrase, rather than use, the definitions in the last version of the Program Document? The definitions in the Program Document will prevail during the implementation of the PRRIP.*

Response: These definitions have been updated in the FEIS to correspond with the Governance Committee's Program Document.

Comment 14018: *Page 3-8, Table 3-1 - Is the reader to assume that the lands in Tables 3-7 and 3-9 meet the criteria in Table 3-1?*

Response: The land plan scenarios for each alternative all involve restoration and management actions that attempt to accomplish the criteria for suitable habitat.

Comment 14019: *Page 3-38, footnote 26 - This footnote is no longer accurate. The issue of channel capacity has been resolved in recent meetings of the Governance Committee.*

Response: See response to Comment 14743.

Comment 14020: *Page 3-42, top of the page - Please reiterate the "three factors." Are you referencing the factors listed on page 3-38?*

Response: Descriptions of alternatives have been modified for clarity.

Comment 14022: *Page 4-9 - It would be helpful if the dEIS provided the specific assumptions used in the development of the hydrologic baseline for the present condition. (These assumptions were listed in subsection 2.1.5 of the technical appendix entitled "Water Resources-North Platte and Central Platte.")*

Response: We believe that these detailed modeling assumptions are more appropriate to the *Water Resources Appendix* in volume 3 of the FEIS where they can be found.

Comment 14023: *Page 4-193 - Table 4-69 shows the "North Platte Headwaters" and "Eastern Wyoming" regions to have 0 harvested acreage of irrigated sugar beets however Table 4-70 shows a weighted average for both regions - 17.59 tons and 20.36 tons. Why is there a discrepancy?*

Response: The values shown in the DEIS are typographical errors. The referenced table has been corrected in the FEIS.

Comment 14024: *Page 5-3 - The definitions of the three (3) basins used in this section are incomplete and confusing. For example, the North Platte River Basin extends from the headwaters in Colorado to the confluence with the South Platte River. However, the chapter appears to be addressing the federal reservoirs in the North Platte River Basin in Wyoming.*

Response: This section of the DEIS and FEIS describe the significant impacts of the alternatives in the North Platte Basin. Most, but not all of these effects are related to the Federal reservoirs in Wyoming. Note also that this part of the discussion covers the river down to Lake McConaughy. The next part of the discussion covers operations of the CNPPID and NPPD facilities, starting with Lake McConaughy and continuing down to Grand Island, Nebraska.

Comment 14025: *Page 5-4 and Table 5-6 on page 5-13 - The analysis in the dEIS relating to flows below Kortes and Grey Reef is misleading. The USBR/Mills operation of the system can typically be adapted to provide 500 cfs under the Present Condition and any of the Action Alternatives unless there are extenuating circumstances. The dEIS modeling efforts should be changed accordingly. While the change may show minimal effects on reservoir evaluations, providing 500 cfs below Kortes and Grey Reef Reservoirs cannot impact project ownerships. Project ownerships are the priority use.*

Response: The analysis for the FEIS has been changed to keep more water in Seminoe Reservoir when reservoir levels are low. This has resulted in a reduction in the number of months with flows less than 500 cfs below Kortes Reservoir for the Governance Committee Alternative. However, there are months under the alternatives when there is not enough inflow and storage above Kortes to maintain flows above 500 cfs. The number of months with flows less than 500 cfs is fewer below Grey Reef compared to below Kortes.

Comment 14027: *Page 5-16 Irrigation Shortages - The Wyoming Water Development Commission (WWDC) contracted with the Bureau of Reclamation in Mills, Wyoming (BOR/Mills) to complete hydrologic analyses for the Pathfinder Modification Project (PMP). The results of those hydrologic analyses for the dEIS and the results of these analyses for the PMP were compared. Discrepancies were discussed with the dEIS Team. While some discrepancies were resolved, the Final EIS will need to address the following problems:*

a._Kendrick Project

The deliveries to the Kendrick Project calculated by the dEIS and the PMP analyses for their respective Present Conditions were compared. The deliveries were basically the same with the following notable exceptions:

Yrs	***dEIS (AF)***	***PMP Analyses (AF)***
1965	*54,000*	*48,900*
1966	*60,900*	*9,000*
1967	*32,800*	*0*

This would indicate that the dEIS did not consider the "Water Service Contract Among the United States, the Casper-Alcova Irrigation District (District), and the City of Casper, Wyoming," dated April 15, 1982. It should be in the environmental baseline or Present Condition for purposes of the dEIS.

The dEIS assumed that the delivery of water to Casper would occur under its Action Alternatives, but not under its Present Condition. Not including the deliveries to Casper under the Present Condition, but including them in the Action Alternatives, results in the impacts of the deliveries to Casper being attributed to the Action Alternatives, thereby overstating the impacts on Kendrick deliveries due to the Action Alternatives.

Although the above referenced contract has not yet been exercised, it is still necessary to properly address its effect. Therefore, to adequately address the referenced contract's potential demand, the hydrologic analyses in the dEIS should use the following information for both the Present Condition and Action Alternatives:

City of Casper - Assume that the city will exercise its entitlements under the above referenced contract, call for and deplete 7,000 acre-feet of Kendrick storage water during the months of May through September. The depletions will likely occur in the same monthly distribution as Casper's historic water use. However, it should be recognized that the city might not be entitled to use 7,000 acre-feet of storage water every year.

In March 1980, Wright Water Engineers, Inc. published a document entitled "Report on Proposed Municipal Use by Casper of the Kendrick Water Supply." This report was likely the basis of the negotiations that lead to the above referenced contract. The report indicates that 62,242 acre-feet per year of Kendrick storage water must be delivered to the Casper Alcova Irrigation District before 7,000 acre-feet of water per year can be saved from the improvements to the irrigation system and provided to Casper. The contract states: "In years of deficient water supplies, the quantity of water being supplied to the City under this contract will be limited to that quantity of water that is determined by the Contracting Officer to have been saved that year by the District's water conservation measures." The Contracting Officer is the Area Manager of the Bureau of Reclamation in Mills, Wyoming. The dEIS Team should contact the Area Manager for additional information relating to this matter and, in particular, the distribution of water during "deficient years."

Casper Alcova Irrigation District - After Casper begins using the 7,000 acre-feet of Kendrick storage water, it should be assumed that the District would adapt to this new demand. Recent studies completed by the Wyoming Water Development Commission indicate that the delivery of 70,000 acre-feet of water per year is a reasonable amount to irrigate the 24,000 acres within the District. The District relies primarily on Kendrick storage water to meet its irrigation demands and is not impacted by the variances in natural flow. Therefore, it is realistic to estimate that the District will revise its operation from that depicted in the period of record used in the dEIS and place a constant demand of 70,000 acrefeet per year on Kendrick storage water. Recent hydrologic records indicate that the District may have already began making this adjustment.

Response: These changes have been made to the model for the FEIS.

Comment 14029: *Pathfinder Modification Project. The assumptions relating to the deliveries of storage water from the Wyoming Account in the Pathfinder Modification Project are outdated. Appendix F to the Final Settlement Stipulation in the settlement of the Nebraska v. Wyoming lawsuit specifies the following uses of the 9,600 acre-feet of annual yield from the Wyoming Account. The following listing also depicts the priority in which Wyoming will use the water:*

1. *To supplement Wyoming municipalities' water rights during times of water rights regulation;*
2. *To satisfy any Wyoming obligation under the Modified North Platte Decree; and*

3. To replace depletions as outlined in the Wyoming Depletions Plan or to annually market to the Platte River Recovery Implementation Program (PRRIP).

Response: This information has been incorporated into the analysis.

Comment 14030: *It is recommended that the table on page 113 of hydrologic report prepared for the dEIS be revised to accommodate the following projected demands on the Wyoming Account during dry, wet and average years:*

Dry Years – During dry hydrologic years municipalities will likely use the entire yield. If there is unused yield available, it would be used to satisfy Wyoming's obligations under the Modified North Platte Decree.

Wet Years – During wet hydrologic years municipalities should not need to supplement their existing water supplies nor would obligations under the Modified North Platte Decree likely be met by the Wyoming Account. Wyoming may be willing to annually market the 9,600 acre-feet of yield to the PRRIP.

Average Years – During average hydrologic years, it should be assumed that approximately 1,700 acre-feet will be required for municipal purposes; 4,000 acre-feet will be required for purposes of the Modified North Platte Decree; and approximately 3,900 acre-feet may be available to market to the PRRIP on an annual basis.

It should be assumed that all of the releases from the Wyoming Account used in Wyoming (i.e. not marketed to the PRRIP) will be totally depleted and any water marketed to the PRRIP will be released in September.

Response: These changes have been made to the model for the FEIS.

Comment 14031: *Page 5-17-Effects of the Program on Water Use Above Pathfinder Reservoir - This entire section of the dEIS should be expanded to address . . . the following additional comments:*

a. Appendix F to the Final Settlement Stipulation in the settlement of the Nebraska v. Wyoming lawsuit specifies that the recaptured space in the Pathfinder Modification Project cannot place regulatory calls on existing water rights upstream of Pathfinder Reservoir other than the rights pertaining to Seminoe Reservoir. This stipulation limits the impacts to water right holders in the Upper North Platte Basin in Wyoming. This important fact should be documented and thoroughly explained in the narrative.

b. The dEIS attempts to interpret Appendix E of the Final Settlement Stipulation relating to the allocation of water during periods of shortage. The interpretation is incomplete and misleading. Allocation years occur when the supply for the North Platte Project (storage and forecasted runoff) is less than 1.1M acre feet at the time of the first release of storage water. The North Platte Project includes Pathfinder Reservoir, the Inland Lakes in Nebraska, and Guernsey Reservoir. The USBR completes monthly forecasts of the projected supply in February, March, and April. If the estimates indicate that an allocation year should be anticipated, the USBR is deemed to have requested a priority call until May 1st for Pathfinder Reservoir (excluding the Pathfinder Modification Project), the Inland Lakes (April only), Guernsey Reservoir, and Glendo Reservoir. The State Engineer retains the authority to determine if the call is valid. If the State Engineer deems the call is valid, regulation for the benefit of Pathfinder Reservoir can occur above Pathfinder Reservoir. Regulation can also occur between Pathfinder Dam and Glendo Reservoir for the benefit of the Inland Lakes, Guernsey Reservoir, and Glendo Reservoir. The description in this section of the dEIS ignores the role of the State Engineer as it assumes that the only prerequisite for administration is a forecasted supply of less than 1.1MAF. For example, Table 5-10 is entitled "Number of Times Water Right Administration Was Necessary on the

North Platte River Above Pathfinder Reservoir." The more accurate title would be "Number of Times the USBR Would Have Had an Automatic Call for Water Rights Administration."

c. The above referenced allocation stipulation envisions that water rights administration may occur in February, March, and April. The analyses in the dEIS incorrectly suggests there could also be water right administration in October. In October, the only information available for forecasts is the 30-year average inflows above Pathfinder and between Pathfinder and Guernsey and the existing storage water in the various reservoirs. It is unlikely that a call would be honored based on this information. In February, March, and April when calls have been honored, the State Engineer has real time information regarding the forecasted supply in the form of monthly forecasts provided by the Bureau of Reclamation.

d. The WWDC and BOR/Mills completed an analyses similar to that completed for the dEIS (Table 5-10 on page 5-18). The dEIS suggests there would be automatic calls in 39 months under its Present Condition, while WWDC/BOR/Mills analyses suggests there would be automatic calls in 27 months under its Present Condition. Part of the discrepancy is explained by the fact that the dEIS unrealistically suggested there would be 3 calls in October. However, there is still a 9-month discrepancy. The dEIS analyses (Present Conditions-NP above Pathfinder-Allocation Analysis.xls-Allocations) suggests there would be allocations in the following months, while WWDC/BOR/Mills analyses does not:

February 1959, 1977, 1981, 1991
March 1977, 1981, 1991
April 1981, 1991

The dEIS Team has advised that the discrepancies are due to errors in calculating the inflow into Pathfinder Reservoir and that Table 5-10 on page 5-18 will be revised in the Final EIS to include inflow from the Sweetwater River and more accurately estimate the Kortes to Pathfinder gains.

Response: a. Chapter 4 of the FEIS states that: "Under the Cooperative Agreement, it was agreed that the Program would not make a call on these junior rights in order to fill the 54,000 acre-feet of storage in Pathfinder Reservoir that is restored through the Pathfinder Modification".

b. Chapter 4 of the FEIS states that: "If the State Engineer places a call for water right administration on the North Platte River above Pathfinder Reservoir in response to a determination that an allocation year may be necessary, water rights junior to Pathfinder are not be allowed to divert water and water rights senior to Pathfinder are limited to 1 cfs per 70 acres (appendix G, exhibit 5, page 191, of the Nebraska vs. Wyoming Settlement Agreement). Prior to May 1st, the Bureau of Reclamation is deemed to have the right to place a priority call for Pathfinder Reservoir whenever there is a projected allocation of the North Platte Project, without the need to formally request such call. After May 1st, the Bureau of Reclamation has the right to place a priority call for Pathfinder Reservoir whenever there is a projected allocation of the North Platte Project, but Reclamation must formally request such a call. Administration of water rights on the river is at the discretion of the Wyoming State Engineer."

c., d., and e. The analysis for the FEIS that calculates allocations has been corrected and there are no allocations or calls for water rights administration in October and there are automatic calls in 27 months under Present Condition. Also, the analysis has been corrected to include inflow from the Sweetwater River and more accurately estimate the Kortes to Pathfinder gains.

We believe that the DEIS and FEIS provide detailed analysis of the potential effects of the alternatives on water storage, riverflows, diversions, irrigations supplies and shortages, to the extent that the alternative actions are defined at this time.

Comment 14032: *On page 5-80, sixth paragraph, a reference is made to Figure 4-12 regarding selenium distribution. Figure 4-12 addresses turbidity.*

Response: The referenced figure citation has been corrected in the FEIS.

Comment 14033: *Page 5-89 - The description assumes that leased lands will revert to a "fallow" condition. Couldn't the lands be grazed or dry-farmed? The point is that it is assumed that the land will not be irrigated during the term of the lease.*

Response: The economic impacts of changing from irrigated agriculture to dryland farming are different than the change from irrigated land to fallowed land. Therefore, two different conditions were used to analyze a reasonable range of potential impacts to agricultural production resulting from changes in irrigation water deliveries. One condition assumes that dryland farming or grazing would be substituted for irrigated agriculture, where these practices are feasible. Under this condition, the economic analysis shows the minimum level of impacts that are projected to occur under the action alternatives. The other condition assumes that lands which no longer receive irrigated water would be fallowed without substituting dryland farming or grazing for irrigated farming. This condition provides the maximum potential impacts for any action alternative.

Comment 14034: *Page 5-102 - The numbers in the narrative for the Wet Meadow Alternative in the text (1st sentence) and Table 5-50 don't match. Is 37% the correct number?*

Response: This has been corrected in the FEIS.

Comment 14035: *Pages 5-219 to 221 - The text on page 5-219 discusses 4 reservoirs in Wyoming. The tables (5-88 & 5-89) address three reservoirs in Wyoming. Please explain.*

Response: This section has been revised and addresses all four reservoirs.

Comment 14036: Page *5-230 - The designation of the economic regions should be aligned with state lines.*

Response: The purpose of the economic analysis is to capture, as accurately as possible, the regional economic consequences of the Program. To accomplish this, the geographic area is divided based upon economic trading patterns. To divide the Basin strictly along state lines would fail to capture the strong economic linkages across those lines.

Comment 14037: *Page 5-232, Table 5-95, Changes in Consumptive Use - It is impossible for the reader to correlate the information in Table 5-95 with Table 5-9-Shortages to Irrigation Deliveries. For example, Table 5-9 indicates that the Governance Committee Alternative increases shortages under the federal projects in Wyoming by 59,000 acre-feet per year or 41,000 acre-feet per year more than the Present Condition. Yet, Table 5-95 indicates that the total impact of the Governance Committee Alternative on consumptive use of irrigation water in the "Scottsbluff Area" and "North Platte Headwaters" is only 8,700 acre feet per year. While this may be correct, it is confusing and clouds the issue of economic impacts resulting from the action alternatives.*

Response: Three different hydrology models were used to estimate water deliveries for each of the three subbasins of the Platte River Basin and each model expresses water delivery results somewhat differently. In order to maintain consistency of input data used in the agricultural model, the irrigation water output from each of the hydrology models was converted to acre-feet of water consumptively used on farm. The procedure used to make the conversion from the hydrology models to on-farm consumptive use is detailed in the addendum to the *Water Resources Appendix* and the Agricultural Economics section in the *Economics Appendix*.

Comment 14040: *I am concerned about the economic impact the Alternative Plans of the Platte River Recovery Implementation Program pose for my business. My son and I purchased land and recently* *constructed a new building to provide service to the fisherman using the North Platte River in the Grey Reef area. With around 60,000 angler days/year, any reduction in the quality of the fishery would dramatically affect our business. Our license sales this year are over double what they have been the past three years and the number of people utilizing our business is nearly triple what it has been in the past. This is because of the quality of the fishery and the fact that we took the risk and put up a new building. Small businesses face enough obstacles in the normal course of business and should not be subjected to arbitrary decisions without input.*

All four of the alternative plans show river flows below 500 cfs and show reservoir levels below 200,000 acre feet at one time or another. Based on various conditions (weather, time of year, etc.),this could cause a dramatic negative impact on the fisheries and on the use of the reservoirs and the river. This will obviously have a negative impact on our business, boat sales, license sales, motel and restaurant usage and many other economic aspects of the communities of Casper and Alcova, Wyoming.

Response: See responses to Comment 14272 and Summary Comment 15.

Comment 14041: *We understand the issue of doing what we can to save endangered species and support the desire to do so, however we feel those impacted should have input into the decisions that are made. My question becomes, "Why weren't the recreation/fishermen interests represented on the committee" and "Why wasn't a recreation/fishery alternative plan offered as an option"?*

Response: Because most of the water projects and facilities which depend upon the Program for compliance with the ESA have significant fishery and recreation value, the EIS analyzed the impacts on recreation at these facilities. While enhancement of lake and fishing recreation is not a purpose of this Program, one reason for including the Full Water Leasing Alternative in the FEIS was to explore the cost of meeting Program purposes while minimizing impacts to reservoir and stream fishing and boating resources.

Comment 14045: *Various reaches of both river systems are experiencing ongoing drought conditions the likes of which the system has not seen before and as a result water impact projections need to be revisited.*

We refer to our abovementioned comments about the ongoing drought in relation to the projected years various projects could experience irrigation delivery shortages (table 3-21 page 3-65 in the draft EIS). We would suggest you revisit these projections based on worst case scenarios as experienced in this on-going drought.

Response: See response to Comment 13813.

Comment 14046: *RMFU would also like to see more population growth projections for the entire Platte River system and the associated impacts and conflicts this growth will undoubtedly cause. Growth projections are an important variable in projecting future water leasing opportunities, because leased water could be much harder to obtain from municipal sources than from agricultural sources. Power generation to meet increased future demand could be impacted based on the timing of water releases from the system reservoirs which could cause increased power costs to our members for both domestic and irrigation uses.*

Response: Population projections for the Platte River Basin have been added to the "Population and Demographics" subsections in the "Social Environment" sections of chapters 4 and 5, and to the *Social Environment Appendix* in volume 3 of the FEIS. The Program would not influence population change in the Basin, and is expected to have negligible effects on new or additional water supply uses. Most existing water conflicts will continue. For a more detailed discussion about the Program and future water supplies and demands, see "New Water Uses in Each State" of the "Water Resources" section in chapter 5. It is highly unlikely that the Program will lease water from municipal sources because it is too expensive.

Comment 14047: *RMFU finds it surprising that no alternative looked at developing additional storage beyond the Pathfinder modification to provide the needed water to assist in recovery of the listed species. In a water short river system, we have serious concerns about reprioritizing existing water from any source for the recovery of the listed species. Storage opportunities need to be researched extensively before any other options are implemented. We hope such an alternative will be explored before a final EIS is issued.*

Response: Many options were examined for new or expanded water storage facilities. See the *Platte River EIS Screening Report* in volume 2 of the FEIS.

Comment 14048: *We cannot support alternatives that project a drop in agricultural revenues. We are having a hard time determining the reasoning used to predict changes in agricultural revenues (pages 3-72 & 73 in draft EIS). The rational used in Chapter 5 Environmental Consequences that discusses changes in cropping patterns to less water intensive crops fails to look at crop returns, equipment requirements and soil types to name a few of the factors that weigh in the producers decisions to grow a specific crop. Without better background information we can't fully understand what these projections are, and we are therefore not sure of their validity. We find the estimated drop in agriculture revenues in the North Platte Headwaters in all alternatives totally unacceptable! As an example, due to the climatic conditions in the growing area encompassed by the North Platte Headwaters region, cropping alternatives don't readily exist. Irrigated agriculture is the only viable option. We assume the revenue loss projections are based on less water to flood irrigate meadows in early spring thus reducing overall production. While this option delivers more water, the negative impacts to this area far out weigh the benefit to the targeted species 400+ miles downstream. The Governance Committee Scenarios 1 and 2 also project a revenue drop for producers in Eastern Wyoming that we cannot support. While we realize it is difficult to project effects on revenues for an individual farmer or rancher, we are gravely concerned over the impacts on revenues that are generalized. On the other hand, however, water users at or near the end of distribution systems will feel greater impacts than those near diversion points and be impacted more severely. Also, growers of specific crops could feel greater impacts due to water requirements of that particular crop. The multi million dollar revenue drops for Eastern Colorado projects in the Water Leasing and Water Emphasis alternatives are not acceptable to our members. Water leasing could cause a change of irrigated land status to non irrigated land, dropping local tax bases which can have a significant impact on local taxing entities.*

Response: As indicated on page 5-234 of the DEIS, two different responses were modeled to estimate the range of potential impacts to farmed acres and agricultural revenue. The first response assumes that as irrigation water deliveries are reduced, farmers will initially begin to change the crop mix typically grown under No Action to try to compensate for reduced water deliveries. If water deliveries are reduced to the point that changing the crop mix can not compensate for the shortage, farmers will either resort to deficit irrigation or they will remove irrigated land from agricultural production entirely. In either case, a reduction in agricultural production is the result. This response represents the maximum predicted impact to farmland and farm revenue. The second response assumes that, where feasible, farmers might also consider dryland farming as a possible response to a shortage of irrigation water. Converting irrigated land to dryland represents the minimum impact predicted to occur in an impact region.

As the commenter has noted, the analysis of agricultural economics in the DEIS predicts reductions in agricultural revenue in the North Platte Headwaters impact region under all alternatives. This reduction in agricultural revenue is the result of a decrease in farm production which is, in turn, caused by less water being delivered to irrigate agricultural lands within the region. We agree with the comment that alternatives to irrigated agriculture are not readily available in the North Platte Headwaters region. This inability to easily change from irrigated agriculture to dryland farming is why the impacts to farmed acres and farm revenues in the North Platte Headwaters region are the same for all alternatives under both responses described above.

Comment 14049: *We question why the North Platte Headwaters is projected to lose between 2,300 and 8,400 ac ft of irrigation water when this segment is located the greatest distance from the species habitat location. We would prefer to see more water needs met nearer the listed species' target habitat. As an option we recommend a greater share of additional channel flows at the critical times come from the ground water mound formed by seepages from and below Lake McConaughy. This dome is in a prime location to assist in meeting the water needs outlined in the draft EIS. The selenium concentration would be diluted to the extent not to cause water quality problems.*

Response: Comment noted. The Governance Committee Water Action Plan specified the location of water leasing in Wyoming. See response to Comment 13762.

Comment 14082: *The NPS notes there are at least 23 Land and Water Conservation Fund-assisted sites located within the project area. There is a strong likelihood of negative impacts to the recreation utility of these sites. It is the responsibility of the Bureau of Reclamation, the U.S. Fish and Wildlife Service, and the State Liaison Officers (SLO) from Colorado, Wyoming, and Nebraska to determine the degree of impact and appropriate mitigation alternatives for each site based on the scope of the Land and Water Conservation Fund projects.*

Response: The EIS Team contacted the SLOs in Colorado, Wyoming, and Nebraska and determined that no Land and Water Conservation Fund project sites within the project area would be impacted by any component of the alteratives.

Comment 14095: *The DEIS at page 1-23 states: "Growth in agricultural, municipal, and industrial use – while the State and Federal Depletion Management Plans are designed to offset adverse effects on the target species and annual pulse flows, the possibility [is] that some increases in water use may not be addressed, and they may diminish habitat value or other Program benefits." This statement is not valid for Colorado's Future Depletions Plan. The Final EIS should reflect the fact that the Colorado Future Depletions Plan assumes that new population growth will cause a net increased water supply on an average annual basis to the South Platte River and is designed to address all impacts from new water related activities. While Colorado does not agree that the FWS target flow, peak flow and pulse flow recommendations are biologically or hydrologically necessary to benefit or recovery the species, Colorado has addressed concerns about potential impacts on peak and other flow and sediment transport issues by the following conditions to its Plan:*

New water related activities will not be covered by this plan once the average annual water supply to serve Colorado's population growth attributed to the sources of "Wastewater Exchange/Reuse" and "Native South Platte Flows" exceeds 121,000 acre-feet. The 121,000 acre-feet figure represents gross water deliveries (supplies) to meet new demands for an average hydrologic year, and is not a consumptive use or diversion limitation. In analyzing proposed new water related activities that have supplies derived from the storage of native South Platte flows, only those supplies resulting from diversions to storage during the period from February through July will be counted toward the 121,000 acre-feet. In the event that a new water related activity is not covered by Colorado's Plan pursuant to this subsection I.H.3, Colorado and the activity's proponent can consider amendments that will allow Colorado's Plan to provide ESA compliance for the activity as provided in Section E of the Program Document.

The Colorado Plan for Future Depletions does not cover the construction of a major on-stream reservoir located on the main stem of the South Platte River anywhere downstream of Denver, Colorado. In *addition, the Colorado Plan for Future Depletions does not cover hydropower diversion/return projects that divert water including sediments from the main stem of the South Platte River anywhere downstream of Denver, Colorado and return clear water to the South Platte River."*

Response: This new language in the Colorado Plan responds to the Service concerns about potential impacts to high flows and sediment transport, and is now cited in the FEIS. (However, the final Program language differs somewhat from the language cited in the comment above, as it was subsequently modified by the State of Colorado). In chapter 4, the FEIS does note that the Colorado Future Depletions Plan assumes that new population growth will cause a net increase in flows on an average annual basis to the South Platte River at Julesburg. Also see response to Summary Comment 11.

Comment 14100: *Reasonable, appropriate scientific methods are not used in the DEIS to evaluate present conditions. The most recent species and habitat information is not used (i.e., whooping crane and sediment investigations conducted during the Cooperative Agreement, data regarding tern and plover use of non-riverine habitat, and vegetation studies). The limitations of baseline data are also not disclosed. A technical review of the baseline data revealed significant deficiencies which previously lead the Service to conclude that the information could not be used as a quantitative baseline. [See C.A. Technical Committee comments dated October 22, 1999, and subsequent comments through 2003; see also John Nickum comments, U.S. Fish and Wildlife, April 2000 Technical Committee minutes]. Yet the information is erroneously recreated in the DEIS. Examples of deficiencies include: lack of defined methodologies for data collection, changed conditions between observations and data collection, use of non-peer reviewed models and methods, and use of models that have not been updated with current information.*

Response: The DEIS includes data from sediment investigations collected during the Cooperative Agreement. The only reference in the DEIS to the Service's report on baseline conditions is for data collected regarding the use of channel habitat by whooping cranes (figure 2-2 "Whooping crane use of channel areas of various widths versus availability of channel areas of varying width" in chapter 2). As suggested by the commenter, the FEIS has incorporated the data on whooping crane use of habitat collected over the past few years by the Governance Committee and recently made available. These new data are in agreement with the data used in the DEIS.

Comment 14104: *Of greater import are the significant water depletions that the Forest Service itself projects will occur during the first Program increment from increased forest density on land it manages. The general requirement to manage new (post-1997) depletions under the Program stems from the 1997 Cooperative Agreement, as amended in 2000. In particular, Milestone W9-EXT of the December 15, 2000 Extension of the Cooperative Agreement provides:*

W9-EXT. The FWS will work with the U.S. Forest Service (USFS) and the states to develop a new depletion plan for USFS lands in the Platte River Basin. This will include establishing a baseline against which the impacts, including channel stability, of past and future vegetation management will be measured. By September 1, 2001, the FWS and/or USFS will work with the states to identify what types of water related activities will be covered and the FWS and/or USFS will determine what will be covered by the plan for new depletions. By September 1, 2001, the FWS and/or USFS will conduct an analysis of potential effects the plan may have on pulse flow frequency and magnitude.

Response: Comments noted. Following the DEIS, the Governance Committee continued their negotiations on the relationship of Forest Service activities and water yields from forested landscapes. The Governance Committee agreed on December 6, 2005 as to how these topics would be addressed. See section III.F.2 of the Governance Committee Program Document and Attachment A to the Federal Depletions Plan (Water Plan, Section 10)[19].

Comment 14105: *These Forest Service statements and the 2000 Troendle Report suggest that the federal team should consider a re-analysis of the forest management alternative, with particular attention to the potential costs and benefits from management activities on the National Forests in the North Platte Basin, should the elements of the Proposed Program be re-examined. That basin's existing inability to "capture" increased May and June peak or pulse flows (and/or the benefits of re-regulation of such flows through Federal reservoirs) do not appear likely to change in the future. [See DEIS, p. 5-274 (finding it "unlikely that new water development in Wyoming would significantly reduce the larger flows that occur in the Central Platte area" because of compact limitations and presence of Lake McConaughy)].4*

Response: The comments appear to suggest that if the elements of the Governance Committee Alternative are re-examined, Forest Management, which was an element considered and discarded by the Water Action Plan Committee of the Governance Committee, should be reconsidered, perhaps by the Governance Committee or by the EIS Team. All of the elements of the Water Action Plan, which is part of the preferred alternative (Governance Committee Alternative), will be subject to feasibility analysis prior to being proposed for implementation. During that process, the Governance Committee may choose to substitute for one or more elements another approach that produces equal water yield. These comments could be considered at that time.

At this time, the EIS Team's analysis indicates that Forest Management near the headwaters of the Platte River Basin will not be a cost effective means to improve achievement of target flows in the Central Platte.

Comment 14106: *We believe the analysis of the Proposed Program with respect to the Water Depletions Plans falls short of what will be needed in the Final EIS. We recognize that the DEIS authors were under the constraint of trying to analyze depletion plans that were, and still are, unfinished and in draft form. Clearly, for the Final EIS, Final Biological Opinion, and Final Record of Decision to be legally defensible, they will need to be based on water depletion plans that are in final form (or, at a minimum, include some clear, enforceable commitments with respect to their operations).*

Response: See response to Comment 14195.

Comment 14107: *The Draft EIS does provide some assessment of the potential water quality impacts of the Proposed Program, but it appears to miss one potentially important water quality benefit. The Middle Platte River fails to meet some important water quality standards in Nebraska, standards which are promulgated under Nebraska's federal Clean Water Act authority. This part of the river fails to meet bacteria standards during certain high flow periods in the spring (likely the result of runoff from livestock operations), and in low flow periods in the summer. Our assessment is that the low-flow violations occur because of inadequately treated municipal waste, which enters the Platte at a time when low river flows are inadequate to dilute this pollution. The Proposed Program, by reducing the number of low-flow summer occurrences and generally improving summer flows, should improve the situation by providing additional flows that will help dilute this pollution, at least until the inadequate wastewater treatment problem can be remedied.*

Response: Agree. According to the most recent assessment by the Nebraska Department of Environmental Quality, these wastewater treatment deficiencies have been corrected through the National Pollutant Discharge Elimination System Program.

[19] The September 6, 2005 draft version of the Governance Committee Program Document used for the FEIS analysis is included on a CD in volume 1 of the FEIS.

Comment 14109: *The DEIS does not appear to address the reliance of downstream municipal water users on recharge from the Platte. Platte River and tributary flows are critically important to maintaining groundwater wells for cities in the Middle Platte. According to the DEIS and other available information, flows from the Critical Habitat reach also provide a substantial proportion of the water recharge for well fields near Ashland that supply the City of Lincoln, and for a large proposed well field along the Platte designed to supply water to western Omaha. As the Platte's flows continue to decline, and the municipal demands continue to rise, the Platte's recharge capability becomes more and more important.*

Response: The "Water Resources" section in chapter 5 of the FEIS discusses the fact that the Program will improve river flows through re-timing of releases which will improve conditions for downstream municipal water users. We agree with the remaining statements in this comment.

Comment 14112: *We believe the stream-flow impacts of USDA conservation programs, especially the EQIP water conservation program, need to be assessed either in the Platte River Program EIS, or in a separate EIS through the USDA. Our understanding is that the DEIS analysis was based on the assumption that Nebraska's Depletion Plan would have a neutral impact on river flows. As Nebraska has constructed its Depletion Plan, that is clearly not the case. The depletions to the river that are already in place, both to the established target flows and depletions in excess of those target flows, are substantial. Without a clear understanding of those depletions already in place, and any future depletions to be authorized under Nebraska's depletion plan, the impacts on the Proposed Program assets, on the habitat, and ultimately on the protected species are impossible to estimate. Nebraska's plan, based as it is contemplated to be on a hydrologic model (COHYST) that is not completed, and on a model for tracking those flow changes through to the habitat that is not yet on the drawing board, cannot provide the predictability or certainty needed for appropriate analysis. Nebraska must add to its depletion plan interim measures that are acceptable and offer appropriate predictability to model impacts, and that will serve as enforceable interim measures when and until it finishes depletion plan provisions that are acceptable to the Governance Committee.*

We believe this same precedent should apply for any other state (or federal) depletion plan that must rely on models or measures that will not be completed before the Proposed Program needs to be finalized in early 2005, in time for the Final ElS and BO.

Response: See response to Comment 14195.

Comment 14115: *The DEIS contains extensive opinions which should be removed from the document. The history of habitat use and trends for the target species and the impact analysis are not objective and unbiased. The DEIS should be a factual summary of the no action and action alternatives and a factual assessment of the outcome of the federal action. In addition, data substantiating the positions or outcomes that are stated must be provided and referenced.*

Response: Comment noted.

Comment 14116: *The summary of river trend and fluvial processes does not adequately take into account the natural variability of the system. Sufficient data is not presented to support hypothesis and conclusions. For example, there is no description of the presence and configuration of "sand bar habitat". No data is presented describing historic versus current trends in the frequency, distribution, size, and elevation of sand bars. A more qualitative analysis is appropriate where there are uncertainties, lack of quantitative data, and system variability.*

Response: Historic detailed and comprehensive surveys of sandbar habitat do not appear to exist to quantify the extent of sandbar habitat historically. A quantitative analysis of the extent of unvegetated, sandy riverbed in 1938 and 1998 has been undertaken based upon aerial photographs. This has been included in the FEIS. Climate patterns and their influence on the hydrologic cycle and sediment transport are addressed in response to Summary Comment 28 (in the "Summary Comments and Responses" section of this document); chapter 2 of the FEIS; and Murphy et al., 2004, in volume 3[20] of the FEIS.

Comment 14122: *We would note that the Nebraska Wildlife Federation is an independent entity from the National Wildlife Federation. In the section of the DEIS and DEIS Summary that describes the participants in the process, Duane Hovorka was representing the Nebraska Wildlife Federation, not the National Wildlife Federation, and we believe the language should be revised to reflect that both organizations were represented at one or another time as Governance Committee delegates and alternates.*

Response: Corrections have been made in the FEIS.

Comment 14125: *P. 1-9, 1-10 The Platte River has not been documented as being part of the historic range of the Pallid Sturgeon. The U.S. Fish and Wildlife Service (Service) erroneously references Bailey and Cross 1954 as the source document for the historic range of the Pallid Sturgeon. This reference document presents no evidence that the Platte River was ever used by the Pallid Sturgeon. In addition, the reference to remedies and loss of habitat on the lower Platte for the Pallid Sturgeon should be removed. The limited recent occurrence of Pallid Sturgeon in the Platte River is the result of expatriation of the species from the Missouri River, which is its habitat. There is virtually nothing known about historic use of the Platte, the type of potential habitat that was/is available, the quantity and distribution of this potential habitat, or trends in this potential habitat. Finally, there is no evidence in the literature that suggests that increased sediment transport in the lower Platte is needed for the Pallid. This fact has been confirmed by the National Academy of Science (NAS).*

Response: While numerous citations have described pallid sturgeon as using the Platte River, the most relevant and recent work is currently in draft form describing a detailed 5-year study conducted by the University of Nebraska, in the course of which a number of pallid sturgeon were captured and tracked in the Platte River.

Comment 14127: *The DEIS states that this Chapter [chapter 2] will provide a summary of habitat use and trends. The Chapter does not achieve the stated purpose and should be rewritten or it should be stated that the purpose cannot be fulfilled. Data on how the species historically used the habitat and how changes altered the habitat and use is not provided.*

Response: Comment noted.

Comment 14128: *As part of the Cooperative Agreement (CA), the Service was tasked with developing a "baseline document". The Service completed a draft documenting existing conditions. This draft proved completely inadequate as a quantitative documentation of existing conditions and should not be used here. Internal review by the Service confirmed that it could not be used (see review information by John Nickum, U.S. Fish and Wildlife Service, CA Technical Committee minutes, and Colorado comments).*

Response: See response to Comment 14116.

Comment 14130: *P. 2-3. The data for the Whooping Crane is inaccurate and not reflective of the best available science. Please incorporate data from EE and Amy Reichert.*

Response: Information in this brief sketch and elsewhere where the whooping crane status is addressed in the FEIS has been updated with current data including the Austin and Richert (2001) comprehensive

[20] Volume 3 is available upon request at <http://www.platteriver.org/>

review of migrational data. The comment reference to unknown “EE data” lacks the specificity needed to be addressed.

Comment 14134: *P.2-9 No data is presented for the central Platte to substantiate the opinions stated at the top of the page regarding spring high and early season flows and sandbar formation.*

Response: Chapter 2 of the FEIS has been revised to include more information on open channel and sandbar habitat prior to water development. Formal nesting surveys for terns and plovers were not conducted in the Central Platte prior to 1986.

Comment 14137: *P. 2-23 The DEIS states it cannot quantitate historic late season flows given lack of early gauge records. Yet many conclusions are provided on other historical flow periods.*

Response: The DEIS presents the available gauge data (also see the Technical Report, Platte River Flow Characterization Report). Generally, low flow conditions are the conditions for which records are the least reliable or often simply not recorded.

Comment 14139: *Figure 2-10 If one assumes that the opinions in the DEIS are true in regard to roosting and nesting, how could roosting and nesting take place in the historic high flows of June- July and March, April?*

Response: See responses to Comments 13795, 13913, 14890 and 14895 in this section and Summary Comment 35 in the “Summary Comments and Responses” section of this document.

Comment 14140: *Table 2-9 Simons and Associates, 2000 did not examine all these topics. The opinions should be removed regarding bedforms and vegetation. Please cite specific sources.*

Response: Simons and Associates, 2000, examined all of the topics summarized in the referenced table. Please see Simons and Associates, 2000, *Physical History of the Platte River in Nebraska: Focusing upon Flow, Sediment Transport, Geomorphology, and Vegetation*, table 3.9, page 44, in volume 3 of the FEIS.

Comment 14141: *Figure 2-11 shows that the South Platte has not impacted sediment transport.*

Response: Comment noted.

Comment 14143: *P.2-37 indicates that negative trends could result in a channel width of 800 feet. Species data indicate that at these widths the Platte would still provide suitable habitat. The standard should not be increased because of the preferences of federal agencies.*

Response: As indicated in the DEIS on the referenced page, the prediction of an equilibrium width of 800 feet for the section of the Platte from Kearney to Chapman is the “total width of all channels”. As discussed in this section, one of the trends in the Platte River over the last several decades is the breaking up of the river into multiple subchannels. While a single channel of 800 feet may provide suitable habitat for whooping cranes, terns, and plovers, three divided channels of 250 to 300 feet in width do not. The standard for suitable habitat referred to by the commenter is for the width of a single channel.

Comment 14144: *It is stated that by the late 1880’s the waters of the North Platte River Basin were largely over-appropriated. Historically, this statement is no accurate and is not supported in the document. The bulk of the water rights on the North Platte Projects were not granted until the 1900’s. Some of the in-stream flow rights were granted in the 1880's but most of the projects were developed after 1900.*

Response: The text in the FEIS has been modified to indicate that the direct flow rights to the river were overappropriated by the late 1880s. This is what gave rise to the need for storage projects and the granting of storage rights.

Comment 14146: *Pg 2-47 What is the source of the data for the Whooping Crane? The population has increase almost 10 fold since water development. The DEIS must recognize that during migration the principle threat and mortality for this species is the result of physical trauma, not water development in the central Platte.*

Response: Known threats, and indirect and direct mortality factors, have been added to chapter 2 of the FEIS. Also, see response to Summary Comment 48.

Comment 14148: *P. 2-48 The DEIS should make it clear that the trend data is not for riverine nesting but for sandpits. The riverine data should be presented separately which would indicate not riverine nesting or fledging.*

Response: This section of the FEIS has been revised.

Comment 14151: *Missing entirely from the list of issues of concern is any consideration for wildlife needs other than target species. Surely we need to consider the impact on all species of wildlife that depend on the river least we push some other species onto the threatened or endangered list. Has there been any study done to determine the species which may be negatively impacted in the area of Eastern Wyoming and Western Nebraska?*

Response: Species other than the target species are addressed in chapters 4 and 5 of the FEIS in the "Other Federally Listed Species and Designated Critical Habitat" and "State Listed Species and Species of Special Concern" sections. In addition, other wildlife issues are addressed in the *Fish and Wildlife Coordination Act Report: Platte River Recovery Implementation Program* in volume 2 of the FEIS.

Comment 14152: *The description of Alternatives affords inconsistent treatment of Alternatives. For example, under No Action, the DEIS authors state that one cannot speculate on the outcome of consultations. Yet under the Governance Committee Alternative and other Action Alternatives, the authors indicate that they wish to capture the scope and scale of possible outcomes, which is also speculative. In addition, the DEIS authors did not develop a range of possible outcomes for the Land and Water Emphasis Alternatives.*

Response: In the DEIS, a range of implementing strategies was developed for the Governance Committee Alternative because, in several instances, specific objectives or methods for habitat restoration were not yet defined. For the DEIS, the EIS Team established the specific methods and objectives for the Water Leasing, Wet Meadow, and Water Emphasis Alternatives and, therefore, a range of implementation approaches was not needed in order to project the environmental consequences. Also see response to Summary Comment 05.

Comment 14153: *P. 3-10 The DEIS discussion should be revised to reflect that habitat management methods only include proven methods used to date. Management of sand is considered monitoring and research until it is established as a proven method. This is consistent with the agreed upon adaptive management provisions of the Proposed Program.*

Response: Comment noted.

Comment 14154: *We are aware that the whooping crane has been seen on areas of the North Platte River above Lake McConaughy and on wet meadows of streams in the panhandle of Nebraska. What impact will the alternatives have on these areas to provide habitat for the Whooping Crane.*

Response: Information has been added to chapters 4 and 5 of the FEIS to describe the effect of action alternatives on whooping cranes on the North Platte River and Platte River above Lexington, Nebraska.

Comment 14157: *Table 3-4 Maintaining "higher spring flows" for the entire summer will increase nest flooding potential and is inconsistent with Table 3-3.*

Response: The referenced table has been revised in the FEIS to clarify key biological benefits of species flows.

Comment 14160: *Figure 3-2 Tamarack Phase I and 3 should be depicted as an area extending from approximately Fort Morgan to the State line. Not as points.*

Response: This change has been made to the FEIS.

Comment 14162: *P. 3-33 The 8 bullet points for the Pallid Sturgeon research are not an accurate reflection of how the Proposed Program will conduct research. There is a decision point at which research could continue or research could end.*

Response: The FEIS has been updated with the latest pallid research plan adopted by the Governance Committee.

Comment 14164: *River Otter, a Nebraska threatened species is primarily found on the upper reaches of the North Platte River in Nebraska and on the return flow tributary streams. Any reduction in or change in flows in the river could cause problems for this species and this needs to be explored.*

Response: Chapter 5 of the FEIS has been revised to include impacts to the river otter in the upper reaches of the North Platte River in Nebraska.

Comment 14165: *Black Tailed Prairie Dogs range as listed in the study shows a disposition to ignore certain areas of the Platte River in the study. This is also true of the discussion of the Bald Eagle and the River Otter. Your study seems to attribute their existence entirely to the Central Platte. We know this to be incorrect.*

Response: The Program's primary focus is on target species in the Central Platte Habitat Area from Lexington to Chapman, Nebraska. Therefore, the EIS focuses on impacts to resources in this area. Also see responses to Comments 14432 and 14164.

Comment 14169: *P. 4-17 The depletion tool value should be .27af/person.*

Response: This has been corrected in the FEIS.

Comment 14171: *P. 4-39 The DEIS should reference the data supporting the statements made regarding sandbar formation and annual peak discharge, bed size, and sediment transport. The DEIS states that river mile 206-160 has a greater potential to build sand bars and, in an earlier section under present conditions, that over a half million tons of sediment is being deposited in this reach. The DEIS should describe the frequency and distribution of sand bars in this reach as opposed to other reaches, together with the number of terns and plovers that have nested and fledged chicks in this reach. The actual conditions do not appear to support the opinions espoused here.*

Response: This section has been revised in the FEIS. Also, the discussion of sandbars has been expanded to include consideration of plan form since in-channel sandbars are found predominantly in braided reaches, and chapter 4 contains a more detailed breakdown and description of river reaches and plan form. Also see chapters 4 and 5 for an indicator of sandbar height potential.

Comment 14172: *P. 4-71 The DEIS should reference the data supporting these opinions. Are the opinions for cranes or whooping cranes?*

Response: Citations and clarifications have been added to the text in the FEIS.

Comment 14173: *P. 4-75 The references to program lands only constituting 10 percent of the 90 mile study area as the basis for evaluating geomorphology of the entire river is erroneous. The Service and the Management Joint Study process established the habitat requirements to support a fully recovered population of the target species. These estimates were and included safety factors. These habitat estimates ultimately became the habitat goals for the Program. The DEIS should not expand upon these habitat requirements.*

Response: The Program's First Increment, analyzed in this EIS, is proposed to manage 10,000 acres of land in the Central Platte Habitat Area. This is just over 2 percent of the Habitat Area. This section of the DEIS chapter 4 indicates that the length of the river channel that might be managed in the First Increment may approach 10 percent of the 90-mile reach. It is not clear how this is "expanding upon these habitat requirements".

Comment 14175: *P. 4-76 The DEIS provides no quantitative data correlating river stage and groundwater depths in wet meadows. In addition, no quantitative data or trends in ground water depths or wet meadow hydrology is provided. Only opinions are offered and should be removed from the DEIS.*

Response: Information from available investigations of groundwater and groundwater-surface water relationships is cited in the FEIS. No alternate data analyses are known to exist.

Comment 14176: *P. 4-88 The DEIS should cite the studies correlating sand moisture content and invertebrate density.*

Response: This section of the FEIS has been revised to include expanded discussion of plover forage.

Comment 14177: *P. 4-91 Please provide the data that substantiates the opinion that hydrocycling exacerbates channel erosion.*

Response: Statements suggesting that hydrocycling exacerbates channel erosion have been removed from the FEIS. Interior continues to be concerned that certain kinds of variability in riverflows, including short-term variability associated with hydrocycling, could negatively affect channel habitat conditions for the target species. However, to date no studies of such effects have been undertaken in the Platte River. The Program's Adaptive Management Plan establishes procedures by which this concern can be evaluated if and when such an evaluation is appropriate.

Comment 14178: *We further want to take issue with the economic analysis which shows impact on the Scottsbluff area of reduced irrigation deliveries. This would be impossible to calculate unless we know how the leased water is to be handled. The idea that additional jobs would be created when net farm income is reduced is really difficult to believe. We have talked to several economist and they find this hard to rationalize.*

Response: See response to Comment 14357.

Comment 14179: *P. 4-101 This section on sediment transport highlights many inconsistencies in the DEIS and the use of SedVeg. First early in the DEIS, it is stated that SedVeg cannot be quantitative but* *that trends should be evaluated; here it is used to estimate tons of sediment transported. Second, while stating that maximum sediment is transported at high flows, there is no documentation of how much is moved per unit time and how flow frequency effects the total sediment movement. Third the section moves into a rate per day assessment, but then says it may not be representative of a typical day. The section then concludes with the admission that the lack of data does not allow a determination of the level of impairment of sediment transport in the Lower Platte River as it relates to water development; in other sections, the DEIS suggests that habitats may need to be mitigated.*

Response: The comment illustrates some of the difficulties in estimating the effects of the alternatives on sediment transport in the Lower Platte River. The SEDVEG Model was developed to gain insight as to how sediment is transported, mobilized, and deposited in the Central Platte River, while the pallid sturgeon habitat within the system exists entirely in the Lower Platte River. For this reason, a particularly cautious approach to use of SEDVEG information is practiced in this section. Because information on Lower Platte River sediment transport is extremely limited, the SEDVEG information is used, however detailed information on absolute sediment transport rates under different conditions are not presented. Quantitative estimates are given for the purposes of comparison only, and a disclaimer to that extent is included in the text. The uncertainty around sediment specific impairment of pallid sturgeon habitat is correctly identified in this section. Other references to known pallid sturgeon habitat impairment in the EIS refer to hydrologic alterations in the system.

Comment 14180: *P. 4-101 The DEIS cites fish kills with no data of when, how many, and over what area. Its speculation that: "undoubtedly some were due to elevating temperature" is inappropriate.*

Response: Fishkill reports are compiled annually by the Nebraska Game and Parks Commission and can be obtained from that agency.

Comment 14182: *P. 5-6, P.41, 42 Colorado disagrees with the implication that the Western Canal will have irrigations shortages associated with the Governance Committee Alternative. The DEIS should explain its assumptions and methods as we believe they are incorrect. Colorado's Tamarack Operations are consistent with a junior water right and Compact obligations. Colorado will respect the Western Canal water right pursuant to the Colorado-Nebraska Compact.*

Response: The inclusion of Colorado's future depletion management plan in the FEIS analysis causes shortages to the Western Canal to be reduced under the action alternatives compared to Present Condition.

Comment 14183: *P. 5-46 The table is misleading and should be revised because it assumes all water is from the EA. Water for forage fish could come from other Water Action Plan projects.*

Response: The title of this table has been modified to make clear that the achievement of target flows is based upon all Program elements, not just releases from the Lake McConaughy Environmental Account.

Comment 14184: *There is no data or evidence suggesting that the addition of sediment will result in the formation of more sand bars at higher elevations. In is unclear how high the stage change may need to be and the duration of the event. In addition, the effects of lateral forces versus horizontal forces in the formation of sandbars is ignored by the DEIS.*

Response: See response to Comment 14602. Smith (1971[21]), 34 years ago, had accepted the influence of peak flow and water surface elevation on initial bar height, and was looking at subsequent and more detailed mechanisms of bar morphology in lateral and transverse directions.

Comment 14189: *The DEIS should also talk about the timing of the actions. How long does it take to create a wider channel via land management verses the hypothetical processes, which are outlined.*

Response: The referenced discussion has been added to chapter 5 in the FEIS.

Comment 14192: *P. 5-61 The DEIS states that a channel is stable when it does not aggrade or degrade. Please explain if a braided channel is a stable channel. If it is aggrading, then one would assume it is unstable and can not be maintained over time. Why is the DEIS seeking to create a form which cannot be maintained from a fluvial geomorphic standpoint? Maintenance of sufficient habitat via mechanical means for the benefit of the species is an attainable goal; the DEIS appears to establish an unattainable situation.*

Response: A braided condition is not synonymous with an aggrading or unstable condition (Leopold and Wolman, 1957; Yalin[22], 1992; Thorne, 1997)

Comment 14195: *The DEIS largely ignores the operation of the state depletion plans, or assumes they will operate as intended to keep the state's commitments to protect 1997 base flows. It is not entirely clear how the DEIS team looked at the New Depletion Plans, especially in Nebraska, with respect to how much water is being taken out of the stream overall (versus the amount replaced to target flows?) Do the models give us a look over time at the impact (e.g., if we take water out for Tamarack that isn't getting back to the river for 40 years or more, are the models looking at the end of the process 13 or 40 years down the road?) The Final EIS should clarify this issue.*

Our understanding is that the DEIS analyses incorporated some, but not all, of the depletion plans, because the depletion plans are still in draft form. Given the importance of the depletion plan operations on river flows, the Final EIS and Final Biological Opinion must be based on versions of the state and federal depletion plans that provide firm commitments with respect to impacts on river flows. We do not yet have acceptable Depletion Plans. The Plans need to be clear in how they will operate, and strong in meeting the commitments made in the Cooperative Agreement. This is important both for Increment 1, and in terms of the water available for an Increment 2.

In our view, the assessment of the federal depletion plan still appears inadequate, in that there has been no assessment of the affects of the Environmental Quality Incentives Program on streamflows. Our preliminary analysis indicates that some EQIP-funded activities can actually increase consumptive water use, while reducing on-site pumping, but the program has not been subjected to an environmental impact analysis under this or any other proceeding.

Response: Comments noted. The finalized depletion management plans are contained in the Water Plan attachment to the Governance Committee Program. The effects of the plans on streamflows are included in the hydrologic analyses of the FEIS.

Regarding EQIP, neither the states depletion management plans nor the Federal depletion management plan explicitly addresses that Federal program. It remains the responsibility of individual Federal agencies to initiate Section 7 ESA consultation with the Service for Federal actions that are likely to

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[21] Smith, N.D. (1971) "Transverse Bars and Braiding in the Lower Platte River, Nebraska", *Geological Society of America Bulletin*, v. 82, pp. 3407-3420.
[22] Yalin, M.S. (1992). *River Mechanics*. Pergamon Press, Tarrytown, New York, 220 pp.

affect listed species, including water and land conservation activities implemented on privately-owned agricultural lands in the Platte River Basin that may result in new depletions.

Comment 14196: *The adverse impacts on Managed Sandbar Elevation Potential in relation to least tern nesting opportunities are not well explained (DEIS, pp. 5-107 to -111, 5-118). We assume this is due to a three-year management scheme becoming a predator sink but that explanation is not provided. This needs clarification.*

Response: This section of the FEIS has been revised.

Comment 14197: *P. 5-66 The DEIS should not speculate as to what is harder or easier to maintain. There is no Figure 5-16.*

Response: Comment noted.

Comment 14198: *We suggest that the interior least tern be added into table 4-40 on page 4-104.*

Response: This table has been revised in the FEIS.

Comment 14199: *On the habitat, in reading the DEIS it appears there are negligible benefits, particularly for terns and plovers, in many cases (see, for example, DEIS Table 3-21, pp. 3-67, 68). What are the key things driving this condition?*

Response: The key elements driving availability of tern and plover nesting habitat include pulse flows, sediment transport, and sandbar formation, and the ability of the alternatives to improve these factors. All of these elements are related to species target flows.

Comment 14200: *In the section titled Roost Habitat Quality (DEIS, pp. 5-94, 95) there is no mention of actual habitat quality in the text. The differences or categorizations are not described and no reference is made in this section to low vs. high or good vs. bad, or some other less dichotomous scale (i.e. low, medium, high). If areas of potential habitat are increased through the alternatives, as postulated in this section, then perhaps the section should be named "Roost Habitat Quantity." The use of the word improved to refer to increases in acreages is misleading as there is no explicit definition of quality parameters anywhere in this section or even in Section 4 of the DEIS. We suggest that the word increased be substituted for the word improved in this section and any references to quality be eliminated, unless there is an explicit definition of quality provided.*

Response: Comment noted.

Comment 14201: *In the discussion of birds associated with bottomland grasslands (see DEIS, p. 4-64) several words used seem arbitrary and non-specific. For example what is large (in terms of area) and what is the definition of healthy in the statement "…in large, healthy tracts of bottomland grassland…" Also what are the definitions of average size and good condition in the statement "…in an average size and good condition grasslands…". Clearly there is either information available that is not being presented (for example all tracts have been quantified and we know what an average size of tract is) or these concepts are being used arbitrarily in which case they are misused. The words healthy and good condition say little about the state of the grassland vegetation community (which we assume to be the reference) without specific definitions of how the terms will be used or some scale that defines the parameters being considered in referring to an area as healthy vs. in good condition. For example does healthy mean more native species present vs. good condition? We believe that using arbitrary terms without clear definitions will lead to inconsistent interpretations and confusions.*

Response: The FEIS has been revised to remove or define qualifying language.

Comment 14202: *In the section titled Indicators and Methods of Analysis (DESI, pp. 4-70 to -71), the bullet on "Channel habitat" ends with the statement "...wide open views and expanse of water likely provide a sense of security." We are not sure who would know this for a fact. Instead the statement should change sense of security for something along the lines of "appropriate characteristics for roosting sites." We do not think we can ever know if the cranes have a sense of security at any location and we do not know of any documentation in this regard. If it exists it should be cited.*

The section titled Channel Roosts Habitat (DEIS, pp. 4-71, 76) mentions that cranes use sandbars in rivers. However, sandbars are not the only way a roost site can be categorized, and sandbar has a very specific meaning when referring to rivers, so perhaps a different word should be used to define roost location of cranes.

Response: Comment noted. The wording of roost habitat descriptions and crane behavior in chapters 4 and 5 of the FEIS has been clarified.

Comment 14203: *The DEIS states that channel habitat, cropland and wet meadow near the river, and protection of habitat from disturbance and intrusion "…were evaluated for both quantity and quality of conditions…" How was quality evaluated and how is it defined? Most data available on whooping cranes is not specific enough to suggest quality parameters. For example, we could not even categorize whooping crane habitat into low, medium, and high quality in a quantitative way. Unless the values for quality are specifically defined, the DEIS should not suggest that the quality of conditions as being evaluated. Doing so will result in misleading conclusions regarding the benefits that will be provided by land areas that may be acquired. If quality is implicitly being referred to as areas with some conditions as potential habitat equals good, versus areas with bad (e.g., trees) conditions equal bad then it should be made explicit here. The reader needs to know what is meant by quality (we generally assume that quality is good) when used in this document.*

Response: Comment noted.

Comment 14205: *In the same section, the statement is made that "[U]se of areas for roosting appears to one of the major factors in habitat selection of stopover sites by migrating whooping cranes." (DEIS, p. 4-71) We think this statement is misleading in at least two ways: 1) we do not know what habitat selection is in the ecological sense since it has never been quantified satisfactorily; and 2) we think calling sandbars one of the major factors in habitat selection suggests we know and have documented a suite of factors affecting habitat selection. In our view, based on the information available, the term "habitat use" should replace "habitat selection." Selection requires us to know the actual percentage of habitat types available to that proportion being used. If this is so the other factors are not mentioned or discussed. Because there are no reports on habitat selection saying that we know what the major factor in habitat selection is, this is misleading. More caution should be used in defining habitat use versus habitat selection.*

Response: Comment noted.

Comment 14206: *In the discussion of Roost Habitat Quality (DEIS, p. 4-72) the statement is made that the selection of open water for roosting is an innate behavior of cranes. We question this assertion in that whooping cranes in captivity and reintroduced young birds will not roost in water unless taught to do so. Water providing a sense of security is again mentioned. If security is going to be used throughout the DEIS, perhaps sense of security as it relates to whooping cranes needs to be defined and explained. It certainly is not a term used often in ecology to refer to wild birds.*

Response: The wording of roost habitat descriptions and crane behavior in chapters 4 and 5 of the FEIS has been clarified. As Aransas-Wood Buffalo whooping cranes are not raised or conditioned in captivity and are not reintroduced, we believe it is appropriate to consider water roosting innate behavior to these birds (See Gee et al., 2001).

Comment 14207: *P. 5-82 The DEIS must explain how Governance Committee 1 (per the DEIS) can have less sediment additions than Governance Committee 2, and yet increased Cu, Pb, Ni, and Zn. The impact analysis does not explain how mobilizing sediment will increase total and dissolved metals in the water column.*

Response: The main difference in the results of the analysis of the two scenarios relates to the source of the sediments. Scenario 1 only involves bank sediments, which have a higher metals concentration than the bed sediments. Consequently, addition of the bank sediments increases the concentration of metals in the bed sediments. Scenario 2 involves addition of both bed sediments and island sediments. Island sediments have a lower concentration than either the bed or bank sediments and tends to reduce metals concentrations when added to the river. In addition, the metals concentrations at the lower end of the habitat reach tend to be lower than those at the upper end. So the location of the activities also affects the results. The analysis was based on sediment projections using the SEDVEG Model output. The different results for the two scenarios still primarily reflect the difference in the concentrations of metals in the source sediments when sediment manipulation is involved.

There is no way to project changes in metals concentration in the water column from the currently available data. However, it would seem likely that a large fraction of the total concentration is not particularly soluble because the bed sediments, which have relatively high concentrations of the metals, are frequently exposed to water.

Comment 14209: *In the section on Out-of-Channel Habitat--Wet Meadow (DEIS, pp. 4-76 to 78), the DEIS suggests that grasslands, and particularly wet meadows, are habitat for whooping cranes. Considering the previous comments regarding quantity and quality of habitat, grasslands should be classified as to the quality of habitat they provide. Because prey items are mentioned, it is assumed that the reference to wet meadows is based on their implication as feeding habitat for cranes. It is also implicit in the quantification of acreages of wetlands by bridge segment that every acre of grassland is whooping crane habitat. These are erroneous assumptions that must be qualified. First of all, unmanaged wet meadows are not good habitat for whooping cranes due to the height of the vegetation. Therefore, implying that all grasslands are equal and equal 100% whooping crane habitat out-of channel habitat is misleading and will suggest to readers that certain alternatives will provide for more habitat than they actually will in reality.*

Response: Comment noted.

Comment 14210: *P. 5-91 We question the objectivity of this DEIS analysis of Governance Committee 1 that assumes the alternative is "comparable to present conditions". How can the protection and management of 10,000 acres result in no change?*

P. 5-92 The assertion that no alternatives restore habitat sustainability is incorrect. The Platte River system will undergo changes in response to natural variability. The DEIS correctly acknowledges that the system has reached a state of dynamic equilibrium following water development. The habitats currently used by the species have been and are being maintained. Through the program the habitats will be provided greater protection, management, and where necessary restoration. The DEIS creates an artificial concept of habitat and sustainability and fails to analyze the direct benefits of the Program.

P. 5-94 Table 5-41 illustrates a fundamental flaw in both the DEIS portrayal of the Governance Committee Alternative and the method of analysis. A "0" percent change from present condition simply is not plausible.

Response: Note that the Governance Committee Alternative in the DEIS has been reformulated by the Governance Committee and reanalyzed in the FEIS and habitat values reassigned. In the DEIS, Scenario 1 for the Governance Committee Alternative emphasized protection of existing habitat rather than habitat restoration. As such, the approach produced little increase in habitat, and was similar to Present Condition in many respects.

Comment 14212: *(reference pages 5-106 to 5-111). The DEIS has erroneously set up the analysis based solely on sediment transport and used a model that cannot quantitatively predict outcomes. Many of the outcomes appear to be within the accuracy and precision of the model and its input parameters.*

Response: Comment noted.

Comment 14213: *In the IMPACTS ANALYSIS discussion of GC, Scenario 2; Water Leasing; and Wet Meadow (DEIS, pp. 5-94-95) that set a priority on channel widening primarily upstream of Kearney leaves us with some concerns. While we recognize that the creation of more habitat is essential, available information suggests that habitat manipulations or acquisitions should focus on the area downstream of Kearney. We support the view that the location of areas considered migratory stopover habitat for whooping cranes that will be provided by the program should be prioritized as to the location. One concern that we have is that restored habitat, particularly upstream of Kearney, may not benefit the whooping cranes noticeably during the next 10-20 years.*

We recognize that the program clearly designates the river channel from Lexington to Chapmen as our study area and that it will be a challenge to find 10,000 acres of properties to buy in the 8-10 year period.

From our point of view, of the four bullets related to land acquisition in the PRRIP, the three most important are:

Those with habitat that can be most reasonably improved and that is not already being protected for target species purposes by another entity.

Those bridge segments with existing habitat that is not already being protected for target species purposes by another entity and that appears likely to be lost or degraded without Program protections; and

Those bridge segments that do not currently have any protected habitat.

Funding needs to focus first on long-term conservation of the most important habitat, including:

Riverine habitat, before buffer areas
Habitat with demonstrated use by the bird species
An emphasis on long-term protection (easement and purchase versus lease)

In addition, the Program's IMRP needs to be able to monitor the amount of various kinds of habitat created by the Program, assessing both quantity of habitat and quality of habitat.

Response: Comment noted. The EIS analysis of the Governance Committee's proposal is based upon the land management priorities stated in the Program document.

Comment 14215: *We recognize that the limitations of the SEDVEG model means that its results can only be used in a comparative sense, but would like a more detailed description of the EIS team's view of the model's performance since it began working with it.*

Response: See the final report *Platte River Sediment Transport and Riparian Vegetation Model* (Murphy et al., 2006) in volume 3.

Comment 14217: *P. 5-116 The DEIS is contradictory and unclear. For example, the sand bar elevation for managed bridge segments is described as "significant progress" yet the DEIS later says "none of the alternatives would result in significant benefits". The DEIS then goes on to say that unmanaged bridge segments "..would demonstrate benefits". In some cases the same data is presented with different results when different species are discussed.*

Response: This section of the FEIS has been revised to address inconsistencies.

Comment 14219: *The DEIS and the above appendices [technical appendices: 1) Platte River Recovery Implementation Program: Economics -- Agricultural Economics; 2) Addendum to Water Resources -- Hydrology and Agricultural Economic Appendices (On-Farm Consumptive Use); 3) PRAM; Platte River Agricultural Model--Model Documentation; and 4) Platte River Recovery Implementation Program: Economics -- Regional Economics] explain, in a clear way, the assumptions, the models, and the data that were used to generate estimates of agricultural and regional economic impacts. In our view it is a daunting task to try to estimate the economic effects of a relatively small activity in a region like the Platte watershed that is both geographically and economically large. Recognizing the difficulties of the task, we do, nonetheless, have some critical comments. We think that one of the weaknesses of the PRAM model, in addition to all that might be said about region-based agricultural mathematical programming models, is its reliance on data for many of its parameters from other regions or generic sources. About the regional economic input/output model, we have some of the same concerns. We also think that the results of both the PRAM model and the regional economic model may be very sensitive to conjectures about inter-regional leakage rates and other such necessary assumptions. In addition, we think that the assumptions made about what land and water lessors would do with these revenues underestimate their regional economic effect and that the estimates of the economic value of bird watching in the central Platte may well be low. Marginal changes in any number of assumptions may have affected the agricultural and regional economic results substantially.*

Response: Comment noted. Also see responses to Comments 13992 and 14676. The EIS Team believes that reasonable changes in these assumptions would change the relative impacts of the various alternatives.

Comment 14222: *With regard to the Lake McConaughy impacts, we have a question for the EIS team as to whether it is able to distinguish between impacts associated with the FERC license and the impacts of the new water plan projects not yet in place. Given the substantial value of what the licensees have received, we think it is important to separate the impact calculations. Our understanding, based on information provided by the EIS team but not included in the DEIS, is that the negative economic impacts in the Lake McConaughy area are driven by the FERC license requirements (including the operation of the Environmental Account), and that the additional Water Action Plan and other elements of the PRRIP have a neutral impact on reservoir levels and thus regional economics.*

Response: The Federal action evaluated in this EIS includes all aspects of the proposed Recovery Implementation Program. The EIS does not attempt to assess separately the impacts of individual elements, such as the Lake McConaughy EA.

Comment 14223: *P. 5-140 The entire discussion on Pallid food availability is pure speculation and should be removed. What is the food, and what is its availability in dry years? How was the alleged impairment measured and quantified? What was the impairment?*

Response: Discussion of the pallid sturgeon food base can be found in the description of indicators in chapter 4 of the FEIS.

Comment 14224: *P. 5-167 The DEIS shows that flows in the 800cfs to 1600 cfs range provide maximum habitat for sandhill cranes. If the recommended changes are made to the whooping crane model, the results would show similar values for optimum whooping crane flows. It is also noted that the Central Platte River currently provides habitat for over 500,000 sandhill cranes the DEIS should disclose why this amount of habitat is not sufficient for a fully recovered population of whooping cranes. An analysis of habitat carrying capacity should be used to evaluate current conditions as well as the total Proposed Program first increment (10,000 acres and overall land goal 29,000 acres. The 20,000 acre value which was derived during the Management Joint Study days was essentially and "land use" approach (in which river bank, buffer, and foraging habitat was used to calculated a value) to determining the land goal not a biologically based approach. Given the potential impact on current land use, existing species, and economics impacts the DEIS should evaluate if a less costly habitat goal is appropriate.*

Response: The model criteria identified in the sandhill crane habitat evaluation have not received favorable review from whooping crane biologists/experts. Also see response to Summary Comment 51 in the "Summary Comments and Responses" section of this document.

Habitat losses are affecting both sandhilll and whooping crane conservation but in different ways. The mid-continent population of sandhill cranes has a social learned migration behavior, and returns annually to stage *in-mass* on the Platte. Over decades, staging that once spread for over a hundred miles has contracted and crowded the population into a small proportion of the former river habitat area. In contrast, whooping cranes migrate singlely, or as family groups or flocks of a few birds. Chapter 5 of the FEIS indicates the travel of these individuals or small flocks are scattered in time, and in any given migrational season cross the Platte at various locations within the broad migrational path. Biologists indicate individual whooping cranes also have some learned tendency to reuse stopover sites successfully used in past migrations, and the population as a whole has tendencies for stopovers at certain geographic areas—including the Platte—that provide for their physiological, behavioral and ecological requirements. For the individual or small flocks of whooping cranes to stop on the Platte, however, the river habitat near their crossing locations must be suitable. At the local scale, whooping cranes using the Platte are more sensitive to disturbance than sandhill cranes, and appear to be more selective of disturbance-free areas and wider channels. River habitat losses have reduced opportunity for reliable stopover, requiring whooping cranes to continue flight and to seek alternatives less suitable and less reliable habitat. Despite differences in migration behavior both species would benefit from restored distribution of suitable riverine habitat.

Chapter 3 identifies habitat objectives adopted by the Cooperative Agreement for the Program, which are based on scientific and technical habitat components recommended by an interagency committee: the Platte River Management Joint Study, Biology Workgroup. Chapter 3 also describes Program-defined 10,000 acres agreed upon by the Platte River Cooperative Agreement, Governance Committee, and explains that any longer-term goals of the Governance Committee would be implemented through one or more additional increments (and future NEPA/EIS review) following an adaptive management process.

Comment 14225: *Regarding the Pathfinder fisheries question, it looks like there are positive benefits for area wetlands, but negative impacts on the reservoir fishery. Is that correct? If so, why?*

Response: The FEIS analysis suggests that changes in pool elevation at Pathfinder Reservoir are not expected to be substantial enough to change the wetland vegetation and habitat values at the Pathfinder National Wildlife Refuge, because the changes in frequency of water surface elevations at the level of the wetlands is quite small.

Impacts to the reservoir fisheries are still possible during severe drought events, when the Program alternatives can incrementally draw the reservoir pool down below levels critical to the fishery.

Comment 14227: *P. 5-275 Colorado remains concerned that the United States Forest Service and USFWS have not adequately addressed hydrologic impacts and issues associated with vegetation management on United States Forest Service lands. Hydrologic affects associated with United States Forest Service Lands must be addressed consistent with the requirements of Cooperative Agreement Milestone W-9 EXT.*

Response: Comment noted.

Comment 14228: *P. 5-272 Colorado characterizes six sources of water not five (conservation is distinct from reuse).*

Response: This has been corrected in the FEIS.

Comment 14229: *An overarching issue not dealt with in the draft is the likelihood that the measures that will constitute a program will be carried out successfully and completely when they depend on local/state actions. This is certainly an issue for the Biological Opinion, and should be discussed in the DEIS.*

Response: Comment noted. The FEIS analysis assumes full Program implementation in order to assess the likely largest environmental effects of the action.

Comment 14230: *P.B1-32 The Bibliographical references provided in the DEIS provide a good start at identifying relevant literature. This reviewer has noted several inconsistencies, as outlined in the specific comments, where the cited literature does not support the opinion stated. In fact many of the cited references support very different conclusions than the stated opinions. Included in these comments as Attachment B are additional references that should be made part of the administrative record in the proceedings related to the DEIS and Final EIS and Biological Opinion for the Proposed Program.*

Response: Comment noted.

Comment 14231: *For a first time reader, the analysis of the impact of bridges, as described in the DEIS, suggests their effects are great on necking down the river (on average, a mile for each bridge), but their removal (of one or more) is dismissed in the screening report with little explanation other than that it would be costly. Why?*

Response: The analysis of bridges has evolved since the DEIS. (See discussions on bridges in "River Geomorphology" sections of chapters 2 and 4 in the FEIS.) It is now recognized that bridge foundations, under Present Condition, can reduce an overwide river corridor (historic flood plain) and consolidate flows into a single channel. A reach of river with anastomosed plan form changes to braided river at many bridge crossings when side channel flows are diverted back to the main channel by the bridge abutments or protected banks. The bridge is a disturbance factor so the braided river at the bridge is not valued as good habitat, however the braided plan form can persist for a short distance downstream. Therefore, the removal of bridges is not considered as a management objective since it would result in the loss of some braided reaches of river.

Comment 14232: *It must be acknowledged that activities in Wyoming have had less of an impact on the hydrology of the Central Platte and Lower Platte Rivers than activities in the other two States. Lake McConaughy is located immediately upstream of the "critical habitat." There has been extensive groundwater development in Nebraska over the last fifty years. Colorado's population has exploded,* *while at the same time it continues to irrigate a substantial amount of acreage. Wyoming's irrigated agriculture is necessarily constrained by the limited groundwater supplies, by the restrictions included in the North Platte Decree, by the "ownership" of the water it the Federal Reservoirs, and by the general hydrology of the system.*

Response: Comment noted.

Comment 14233: *There is little to no evidence to support a conclusion that agriculture activities in Wyoming (or any activities for that matter) have affected or will affect the Lower Platte River or the pallid sturgeon. Any relationship is far too tenuous to be documented or to provide the basis for imposing restrictions in Wyoming for the benefit of a species that may or may not rely upon the availability and timing of flows over five-hundred miles downstream from the Wyoming border. The intervening activities are simply too numerous, and account for such an enormous amount of water development, management and use, that irrigated agriculture in Wyoming should not be burdened with addressing issues in the Lower Platte River.*

Response: The Program is designed to benefit the four target species and their habitats, including the pallid sturgeon and its associated Lower Platte River habitat. As Wyoming is a partner in the action, it is anticipated that Wyoming will participate in any Program recovery efforts in the Lower Platte River.

Comment 14234: *The watershed boundary/subbasin appears to be too narrowly drawn in Nebraska, and may exclude a substantial portion of the "groundwater mound," which was created in large part by percolation of flows from the North Platte River. The Program must include the groundwater mound, both for purposes of determining the "fair share" and responsibilities of the respective States, as well as for the purpose of tapping into the groundwater mound as a water resource available to address habitat issues and to augment flow. The groundwater mound, a resource that is easily accessed and managed, is a critical component to the success of the Program and to providing the flows that the FWS and USBR have determined are necessary.*

Response: Comment noted. Several of the alternatives include management of the groundwater mound to improve riverflows.

Comment 14238: *If the "Governance Committee Alternative, Scenario 2," alternative is adopted, the land component of the Program will focus upon the upstream section of the habitat area where little suitable habitat remains. It would be prudent to focus Program resources on those areas where the most benefit will be achieved. That may mean focusing on those areas downstream of Kearney where, with a limited amount of work, the existing higher-quality habitat can be improved, thereby providing greater benefits to the species. If the focus is on the species, their needs should take precedence over an effort to change the river dynamics in a manner that may provide no benefits whatsoever. This is most clearly true for the whooping crane, an opportunistic species that will rely upon the area downstream of Kearney just as readily, if not more readily, as upon the area upstream.*

Response: See response to Comment 14213.

Comment 14240: *The water leasing, wet meadow, and water emphasis alternatives would disproportionately and unfairly impact the State of Wyoming. As noted above, Wyoming activities and uses have caused the least impact to the Central Platte River of any of the three States. That fact is reflected in the "fair share" negotiations that have taken place, with Wyoming being responsible for contributing approximately one-half of what is being contributed by Nebraska and Colorado. The water leasing, wet meadow, and water emphasis alternatives (especially the latter two), however, would result in Wyoming contributing substantially more water than the other two States. Such a result would throw the entire Program into doubt, and would severely impact historical uses in Wyoming, thereby upsetting the very hydrologic regime that has provided innumerable benefits to countless fish and wildlife species.*

The water leasing, wet meadow, and water emphasis alternatives also have the potential of upsetting the terms and conditions of the North Platte Decree. That Decree, which was adopted by the United States Supreme Court, was based upon protecting the historical uses in the North Platte River Basin, including the historical agricultural uses that depend upon Glendo Reservoir.

Response: Comment noted.

Comment 14241: *Dedicating 100,000 acre-feet of Glendo Reservoir water to the Program is technically and legally insupportable. Glendo Reservoir has one of the latest priorities on the system. The water in Glendo Reservoir is currently appropriated, including the 100,000 acre-feet that is being eyed for inclusion in the wet meadow and water emphasis alternatives. There is insufficient space to create a "new" water right. Taking an additional 100,000 acre-feet out of Glendo Reservoir would wreak havoc on existing long-standing users, including agricultural users. . . would undermine the very basis for the Cooperative Agreement and the Program – which was to protect all pre-July 1, 1997 uses. . . . would result in a disproportionate and unfair impact on the water users in Wyoming, skewing the Program away from the "fair share" concept. Glendo Reservoir is hundreds of miles upstream of the critical habitat, and would be more difficult to manage for the species than would Lake McConaughy or use of the water that is readily available in the groundwater mound. The DEIS is completely inadequate in terms of analyzing the true impact (economic, hydrologic, societal, cultural, etc.) of taking an additional 100,000 acre-feet out of Glendo Reservoir for the benefit of the species. Ironically, while Glendo water is considered in the "wet meadow" alternative analysis, it would probably do less to create meadows than would the proper management of Lake McConaughy and the groundwater mound.*

Response: The EIS Team appreciates the steps involved with converting 100,000 acre-feet of the restorage space in Glendo Reservoir for use in the Program. These include a change of use to Reclamation's existing water rights that would most likely be junior to all current uses on the North Platte River. We agree that such a right would impact current uses in the North Platte River Basin. These impacts are analyzed with regards to hydrology, economics, social, and cultural impacts in the FEIS. An EIS is required to look at alternatives to the Proposed Action that explore a range of actions. In this FEIS, the preferred alternative is the Governance Committee Alternative and the Full Water Leasing, Wet Meadow, and Water Emphasis Alternatives explore a range of actions from more water with less land to less water with more land.

Comment 14242: *The FWS and USBR must acknowledge the importance of habitat such as sand pits, gravel pits, and other "man-made" structures. The data shows that the species have used and relied upon such habitat for quite some time.*

Response: Please see the revised section "Non-Channel Nest Sites" in chapter 4 of the FEIS.

Comment 14243: *The water emphasis alternative is focused upon the River, rather than on the needs of the species. The water emphasis alternative downplays the importance of the habitat.*

Response: The Water Emphasis Alternative was formulated to focus primarily on achievement of target flows for the species, with less emphasis on land habitat management.

Comment 14244: *The wet meadow and water emphasis alternatives appear to confirm what many have feared with regard to the purpose of the Program – that it is being pursued to address general river dynamics and hydrology, rather than to protect allegedly endangered and threatened species. The DEIS shows that these alternatives would provide little benefit to the species, but at the same time would have* *an overwhelming negative impact on historical water uses throughout the basin, most specifically in Wyoming.*

Response: The Wet Meadow Alternative was developed to examine and analyze the benefits of increasing the emphasis on restoring wet meadow habitat, a key resource for migrating whooping cranes, and less water for riverflows. The Water Emphasis Alternative explored the converse approach – putting more emphasis on attainment of target flows and less emphasis on land habitat restoration. The objective and the measure for all alternatives are the habitat characteristics described in the Governance Committee's Land Plan.

Comment 14245: *In evaluating the impacts of the alternatives on wildlife species, the DEIS refers to the "Prebles meadow jumping mouse" (Prebles). The WFBF strongly believes that any reference to the "Prebles" mouse severely undermines the legitimacy of the work that is being done. As Wyoming has long contended, and as has now been established by DNA testing, the Prebles does not exist as a separate subspecies, is identical to the other "jumping mouse" that is pervasive throughout the Rocky Mountain Region, and should be delisted. Reference to the Prebles in the DEIS undermines its credibility, undermines the credibility of the Federal agencies involved in its listing, and indicates that the Endangered Species Act has been manipulated for political (zoning and land use restrictions) rather than conservation purposes.*

Response: After a complete analysis of the petitions to remove the Preble's meadow jumping mouse (*Zapus hudsonius preblei*) from the list of threatened and endangered species, the U.S. Fish and Wildlife Service has determined that the action is warranted and has begun the process to formally delist it. This action is based on new research that indicates that the Preble's meadow jumping mouse should not be classified as a separate subspecies of meadow jumping mouse. Until a final determination is made in 2006, the Preble's meadow jumping mouse will continue to be protected under the Endangered Species Act and therefore, must be addressed in the EIS.

Comment 14246: *The nature and source of data relied upon by the USBR and FWS in describing the "historical" conditions should be clarified. The "pre-development" conditions described in the DEIS are most likely based upon modeling and assumptions, as the type of information that is represented as being hard data used was not available in the late 1800's, and the data that was available was often flawed. To the extent that any "historical" data is based upon modeling, assumptions, extrapolation, etc., that fact should be noted. The quality of data that is available should also be addressed. The FWS and USBR should identify the quality of the data relied upon and identify the data that is of limited scope and utility.*

Response: The description of pre-development conditions is not based on any modeling, but rather on an analysis of the field data available from many sources. More information about the field data used to describe historic conditions and trends in river habitat has been added to chapter 2.

Comment 14250: *The analysis of each alternative's economic affect on the agricultural economy considers the impacts of reduced water deliveries through water leasing, purchases etc., changes to water deliveries through operating changes to Platte River storage or diversion facilities, and the impacts of habitat acquisition. The analysis completely ignores the new depletions component of the program and thus, is sorely inadequate. Has the DOI concluded the new depletions component of the program will not impact the growth of the agricultural economy in the Platte River basin? As noted earlier, the new depletions component will, in effect, place a cap on new irrigation development in the basin. Producers cannot afford both the cost of land development and equipment installation for irrigation, and the cost of providing offsets to target flows. The new depletions plan will slow, if not halt, the increase in irrigated acres in the basin. The reduced growth rate in irrigated acres will result in reduced economic activity and should have been analyzed in the DEIS.*

Response: Comment noted. See “New Water Uses in Each State” in the “Water Resources” sections of chapters 4 and 5 in the FEIS.

Comment 14251: *The DEIS does not contain an analysis of the economic impacts on the cost and availability of municipal water for Platte Basin communities. It does not consider the implications of municipal water pooling, alternative water pricing and potential conservation measures that may result. Finally, it does not consider the impacts any estimated changes in municipal water cost and availability will have on current firms and or future economic activity in the Platte Basin. Future economic activities in the basin will be affected by future water availability under each alternative. The economic analysis in the DEIS should have considered the impacts on future economic activities that are dependent on the use of water provided by municipalities and self-provided water supplies.*

Response: It is not expected that the Program would impact the availability or pricing of water for municipal water supplies for two reasons. First, the Program alternatives involve leasing of relatively small amounts of water. Second, the Program’s budget simply does not allow it to compete with municipalities for water supplies.

Comment 14252: *The DEIS does not analyze the administrative costs of Program implementation for state and local agencies in Nebraska. A considerable amount of time and money has already been spent by the State of Nebraska, public power and irrigation districts, irrigation districts, and natural resource districts in Nebraska since the initiation of the cooperative effort in 1994. Staff and volunteers from these entities have attended literally hundreds of meetings—meetings between the parties to the agreement, meetings with subcommittees working on specific issues, meetings between Nebraska entities, informational meetings, and others—to develop a Program. Staff and volunteers have participated in teleconference calls, researched issues, drafted position statements, reviewed material, formulated positions and undertaken thousands of other tasks related to the development of a Program. In total, the State of Nebraska, the power and irrigation districts, local governments, and others have dedicated a tremendous amount of staff-time, perhaps tens of thousands of hours per year, on the proposed Program and continue to do so.*

It is now estimated a Program will cost approximately $150-$200 million to the states and federal government for developing and implementing projects or means for providing water and habitat for the species and monitoring the species response. The state of Nebraska’s portion of the cost has yet to be determined. The states and local governments will also incur costs to enact regulations under the new depletion component of the program. Data gathering, research and projects to provide offset water will take money.

These costs combined—staff time developing a Program, Nebraska’s portion of the $150-200 million to implement the Program, and Nebraska’s costs to implement the new depletions component—reflect a substantial cost to the state of Nebraska and its citizens. These are a direct cost to Nebraska taxpayers, water users, electric users and citizens, and it represents an opportunity cost in the diverting of time and resources that might be used elsewhere. Yet these costs are not analyzed and the economic impact not considered in the DEIS.

Response: The EIS focuses on describing the environmental consequences of the Program alternatives. Also assessed are the economic consequences of the changes in water and land management created by the Program. Because the Federal Government provides at least half of the cost of the Program expenditures in the Basin, it is likely that the Program represents a net inflow of funds into the Basin. The EIS analysis does capture the economic consequences of the investment that each state and the Federal Government makes in the Program (see Regional Economics). The EIS does not attempt to forecast what time and staff resources might be contributed to the Program’s implementation by the various agencies or organizations that rely on the Program for ESA compliance, or other associated groups such as conservation organizations.

Comment 14253: *A review of the analysis in the DEIS is frustrating because it does not sum the economic impacts (agricultural, hydropower, recreation, etc.). Thus, it is difficult to get the entire picture of impacts to a region.*

Response: The total average annual impacts from a given alternative, which is the summation of all the elements including agriculture, recreation, etc., are presented in a chapter 5 table in the "Regional Economics", "Impacts Analysis" section. The output data files from the IMPLAN Model are available in the *Economics Appendix* in volume 3.

Comment 14255: *Is the Ultimate Goal of the DOI to Benefit Species or Design a River?*
The DEIS reinforces a NFBF concern that has existed throughout the development of a Program. Is DOI's ultimate goal with the implementation of a Program to benefit endangered species? Or is it really to design a river based on some utopian belief of how the river should look and is thought to have existed 100 years ago.

Response: All of the Program alternatives are formulated to increase the amount of suitable habitat for the target species, as defined in the Governance Committee's Land Plan, tables 1 and 2. These definitions of suitable habitat were reviewed by the National Research Council (National Research Council, 2004 (released draft May 2004)).

The Program is undertaken in order to enable current water use in the Platte River Basin to continue in compliance with the ESA.

Comment 14256: *The DEIS is filled with statements on the historical condition of the river, the current state of the river, and species' habitat needs. Little is offered to substantiate the statements. Many times, the information that is provided is dated, contradictory and sometimes appears to be little more than opinion. Particularly troubling is DOI's failure to link the appearance of endangered species on the river and the conditions of the river prior to development 100 years ago. The DEIS implies the river conditions that existed between 1895-1909 period were best because they were naturally occurring. But little documentation is provided regarding how many endangered species were using the river during this time. NFBF believes DOI must do more to substantiate its claims and the link between species and the river prior to development.*

Response: Unfortunately, there is little data or documentation available regarding endangered species on the river or conditions of the river from 100 years ago. The EIS describes the data showing historic use of the river by the species, but systematic surveys of the species were not generally undertaken until they were listed as endangered, or about to be listed. The EIS data on the historic river and species trends has been reviewed by the National Research Council (National Research Council, 2005)

Comment 14258: *Scope of Alternatives. The DEIS fails to provide a reasonable range of alternatives to meet the purpose and need of the proposed action. The DEIS identifies five purposes: (1) improving land and water habitat for the target species to assist in their conservation and recovery; (2) ensuring that the effects of future water development activities are offset so that they are not likely to jeopardize the continued existence of the species; (3) providing greater regulatory certainty for water users by providing Endangered Species Act ("ESA") compliance for existing and new water development projects; (4) helping prevent the need to list more species; and (5) accomplishing these objectives in a Basinwide, comprehensive, and collaborative fashion that will help ensure that the actions under the Platte River Recovery Implementation Program ("Program") are coordinated and effective. DEIS at 1-7. However, the range of alternatives identified in the DEIS does not adequately address these five purposes.*

Response: Comment noted.

Comment 14259: *The alternatives analyzed in the DEIS (the Governance Committee, Water Leasing, Wet Meadow, and Water Emphasis Alternatives) are focused on developing different methods of obtaining water for the Program. However, water from the Program will only be used to offset the depletions caused by existing water related activities. The proposed alternatives do not address the depletions associated with future water development despite the fact that replacement of these depletions is one of the primary purposes of the proposed action.*

Response: The Colorado depletion management plan (Tamarack Project, Phase II), described in the DEIS, is the proposed approach to offsetting the effects of changes in future water use in the South Platte River Basin on the achievement of target flows in the Central Platte Habitat Area.

Comment 14260: *The DEIS assumes that each state will develop its own depletion management plan to offset the effects of any depletions caused by new water development within that state. The DEIS at page 3-32 states that these depletion management plans will be implemented as part of the Program. However, these plans have not been described in the DEIS and no alternatives to these plans have been explored. The purpose of preparing an environmental impact statement is defeated if important aspects of the proposed action are excluded from the process. In this case, the DEIS is deficient because it includes offsetting future depletions in the purpose and need of the proposed action, but the alternatives developed to meet the purpose and need do not address this significant issue.*

Response: A summary description of the three state depletion management plans is included in the FEIS (see chapter 3). A basic description of the depletion management plans was included in the DEIS and additional details are provided in the FEIS. The EIS focus is on the net effect of the depletion management plans in achieving their objective of protecting Program target flows. Alternatives to the depletion management plans were not developed because it was assumed for the FEIS that any depletion management plan, regardless of its details, must achieve the same objective and have the same effect of protecting target flows in the habitat reach.

Comment 14262: *The DEIS fails to analyze and provide alternatives to the state depletion management plans. The DEIS at page 3-32 states that these depletion management plans will be implemented as part of the Program. However, these depletion management plans, including Colorado's Plan for Future Depletions ("Colorado's Plan") at Attachment 5, Section 9 of the "Draft Platte River Recovery Implementation Program", have not been included in any analysis in the DEIS. For example, Colorado's Plan sets forth a 121,000 acre-foot limitation on water related activities that have as a source "Wastewater Exchange/Reuse" and "Native South Platte Flows." Colorado's Plan at 5. The DEIS, however, fails to explain the basis of this limitation and fails to analyze the effects of the limitation on future transbasin diversions and the reuse obligations under federal and state law.*

Response: The effects of anticipated water development during the First Increment consistent with Colorado's Plan for Future Depletions (as well as the Federal Depletions Plan and the other two state depletion management plans) have been modeled for the FEIS as described in chapter 4. However, it should be noted that neither the Platte Program nor Colorado's Plan for Future Depletions restricts or regulates future water use in the Basin. Rather, Program Documents define the type and the scale of water-related activities for which the Colorado Future Depletions Plan can provide ESA regulatory compliance. Water-related activities that do not fall within these parameters may not have their effects on the target species offset through participation in this Program, and may need to pursue other means of ESA compliance.

Comment 14263: *Violation of the Reuse Principles of Federal and Colorado Law. Colorado's Plan does not follow the reuse principles established under federal and state law. Colorado law allows successive reuse, to extinction, of water that has been imported into a stream system. See City & County of Denver v. City of Englewood, 826 P.2d 1266, 1272 (Colo. 1992); § 37-82-106, 10 C.R.S. (2003). Once diverted, reusable water retains its reusable character until released from the dominion of the owner, at which time the water becomes tributary water. § 37-82-106(2), 10 C.R.S. Therefore, the right to reuse foreign water is perpetual "to the extent that its volume can be distinguished from the volume of the streams into which it is introduced." City of Thornton v. Bijou Irrigation Co., 926 P.2d 1, 70 (Colo. 1996). This requirement attaches to each importation of water; thus, a current failure to distinguish the volume of foreign water from the receiving stream does not preclude future distinction and reuse of that water. Id.*

Colorado's Plan is contrary to the reuse principles under Colorado law, which require transbasin diverters to maximize their reuse of foreign water in order to minimize the amount of water removed from the basin of origin. City & County of Denver v. Fulton Irrigating Ditch Co., 179 Colo. 47, 54, 506 P. 2d 144, 148 (1972). The plan is also contrary to federal law, as enunciated by Congress and the Court. The duty to maximize reuse has been explicitly set forth in the October 12, 1955, Decree in Consolidated Case Nos. 2782, 5016, and 5017, U.S. District Court for the District of Colorado ("Blue River Decree"). The Blue River Decree incorporates the terms of a Stipulation between the United States, Denver, Colorado Springs, the City of Englewood, the Northern Colorado Water Conservancy District, the Colorado River Water Conservation District, and several other west slope water entities, dated October 5, 1955, and amended on October 10, 1955 ("Stipulation"). The Blue River Decree and the Stipulation were ratified by Congress in the 1956 Colorado River Storage Project Act, 43 U.S.C. §620j, by reference in the 1968 Colorado River Basin Project Act, P.L. 90-537, 1968, U.S. Code Congressional and Administrative News at 1045-1046; and in Senate Document No. 80, 75th Congress, 1st Session (1937). Under the Blue River Decree, Denver and Colorado Springs must maximize the reuse of their transmountain diversions from the Blue River. Section 4(f) of the Stipulation provides that Denver and Colorado Springs must "undertake[] to exercise due diligence, within legal limitations and subject to economic feasibility," to "utilize such [transmountain] return flow by exchange or otherwise . . . so as to reduce or minimize the demands of [Denver and Colorado Springs] upon Blue River water."

Response: See response to Comment 14817.

Comment 14264: *Contrary to Colorado law, Colorado's Plan limits the amount of "reusable return flows" (that is, return flows associated with nontributary sources that remain to be used to full extinction, as allowed by law) that can be reused in the South Platte Basin. The Plan does not provide ESA compliance if the reuse activity would cause the 121,000 acre-foot limitation to be exceeded. Further, the DEIS does not provide a basis or justification for such a limitation. The limitation discourages reuse and will increase the amount of water diverted from other basins into the South Platte River Basin. Therefore, the reuse limitation in Colorado's Plan is contrary to Colorado law, and the mandate of the Blue River Decree, Stipulation, Senate Document No. 80, and 43 U.S.C. §620j.*

Response: See responses to Comments 14817 and 14265.

Comment 14265: *Cumulative Environmental Effects of the Proposed Action. The DEIS fails to address the cumulative environmental effects of the proposed action. Colorado's Plan at page 3 assumes that transbasin diversions will account for 20 percent to 40 percent of the water used to cover population growth in the South Platte Basin. Colorado's Plan also assumes that the water imported into the basin will accrete to the stream and will be available for the benefit of the target species. In fact, Colorado's Plan attempts to ensure this by limiting reuse of such imported water. However, the DEIS does not consider the effects of the transbasin diversions on the basin of origin. The DEIS should address the broader environmental impacts of the proposed action to both the receiving basin and the basin of origin.*

Response: Additional discussion has been added to the FEIS ("Water Resources," New Water Uses in Each State," chapter 5) to make clear that the proposed *Colorado's Plan for Future Depletions* does not affect water use in the Front Range of Colorado or manage that use. The Plan tracks changes in water use in the Front Range, calculates the effects of those changes on Platte River flows at Julesburg, and then adjusts operation of Colorado's depletion management plan to offset effects on achievement of target flows in the Central Platte. While the initial plan for the Tamarack Project, Phase II which offsets flow effects resulting from changing Front Range water use, is based on certain assumptions about the proportion of municipal supply provided by each water source, those proportions are not requirements of the Program. If the mixture of sources changes, Colorado will adjust operations of the Tamarack Project, Phase II to offset the resulting effects on target flows.

Hence the Program does not have impacts on Front Range water use, but merely is adjusted to match that use, and therefore does not cause or require any changes in transbasin diversions.

Comment 14266: *The Colorado River Basin, like the South Platte River Basin, has its own endangered and threatened species that rely on the water in the Colorado River for survival. Removing water from the Colorado River for the benefit of endangered species in Nebraska simply shifts the impact on endangered species from one river basin to another. Therefore, more analysis of the cumulative impacts on both the basin of origin and the receiving basin is required.*

Response: See response to Comment 14265.

Comment 14267: *Fish and Wildlife Coordination Act Report: We are unsure of the status of the Fish and Wildlife Coordination Act Report (CAR). Over the last several years, we have provided data and reviewed portions of the report. Originally it was expressed to our Department that the CAR would be written on the Program and be included in the PRDEIS. That apparently has changed, which we support. We have said all along a CAR should be prepared for any and all specific projects undertaken as part of the Program and not simply on a programmatic document.*

In addition, we strongly urge the U.S. Fish and Wildlife Service to develop a CAR 1) on specific actions/alternatives brought about by the Program, 2) which assesses impacts to all aquatic and terrestrial wildlife, 3) that proposes actions which, respectively, avoid, minimize, and properly mitigate potential impacts to fish and wildlife resources, and 4) which is developed in coordination with our Department. Only by fully addressing the above issues will we be able to concur with the CAR.

Response: Since the fall of 1998 the Service, under authority of the Fish and Wildlife Coordination Act (FWCA), has been coordinating with Wyoming Game and Fish Department (WG&F) the preparation of a Fish and Wildlife Coordination Act Report (CAR) for the Program. The purpose of this CAR is to assist lead Federal agencies, in coordination with respective state game and fish agencies, in the conservation of fish and wildlife resources in Nebraska, Wyoming, and Colorado. The CAR is to analyze the effects of the preferred alternative only. Because the DEIS did not select a preferred alternative, a decision was reached not to prepare and release a CAR at that time.

The FEIS analyzes the effects of the Program on all aquatic and terrestrial fish and wildlife resources for each state within the mainstem Platte River, North Platte River, and South Platte River. It also assesses the likely effects of the Program's land habitat restoration activities in the Central Platte Habitat Area. For some elements of the Program preferred alternative, such as the Water Action Plan, the exact location of elements is not known. The effect of these elements on the Platte mainstem river and reservoirs is evaluated in the FEIS; however it is not possible to evaluate site-specific, local impacts. These impacts will be evaluated under NEPA as feasibility evaluations of those elements are undertaken and specific locations are proposed. These impacts will also be addressed in a subsequent FWCA analysis and document.

Where adverse effects of the Program are identified, the CAR provides mitigation recommendations. Because the Program consists of many parts, including water management and conservation projects identified at a reconnaissance planning level by the Program, the Service also has the responsibility to provide site-specific comments under FWCA on all future activities carried out to further the objectives of the Program.

All future site-specific NEPA, FWCA, and ESA analyses required for implementation of the Program alternative will "tier" off of these programmatic documents. That is, for the purpose of meeting NEPA, FWCA, and ESA requirements, these programmatic documents will serve to describe and assess the broad, mainstem Platte River systemwide and habitat impacts of the alternatives and will be referenced in future documents prepared to assess the local and site-specific impacts of implementing or constructing individual elements of the selected alternative.

Comment 14269: *In addition, we are concerned that the Program appears not to consider the potential impacts to aquatic systems in Wyoming. We support the recovery of endangered species, but not at the unnecessary expense of resources in Wyoming, and certainly not with the possibility of Program actions resulting in the need to list additional species in Wyoming. Program actions must take into consideration all resources. We suggest elements be included to restore fish species which have disappeared from the North Platte River in Wyoming as a result of the construction of the Bureau of Reclamation facilities. These include shovelnose sturgeon (Scaphirhynchus platorynchus), goldeye (Hiodon alosoides), plains minnow (Hybognathus placitus), sturgeon chub (Macrhybopsis gelida), mountain sucker (Catostomus platyrhynchus), and sauger (Sander canadensis).*

Response: Restoration of these species is not a purpose of the proposed Program. Chapter 5 of the FEIS has been revised to include information on these species.

Comment 14273: *Canada geese should be added to the list of ground-nesting birds that nest on Bird Island in Pathfinder Reservoir. This species will also be impacted by increased predation during those years that Bird Island is a peninsula.*

Response: The FEIS has been revised to include Canada geese on Bird Island in Pathfinder Reservoir.

Comment 14277: *Hydrologic Analysis — Present Condition: We have continually questioned the validity of using the North Platte River Water Utilization Model to assess fishery impacts. Our concerns center around our belief that the model's "present condition" does not truly reflect actual conditions of the system. Two components at play here are the actual versus possible demands on the system, as well as the administrative flexibility available to operate the system.*

Response: Comment noted.

Comment 14280: *We support an incremental approach to the implementation as suggested in the information referenced below. A systematic program of monitoring and research used to track and evaluate the effects is also important to assess the value of the practices implemented. However, we find no mention of evaluating and monitoring the impacts to other species and habitats in the Platte River Basin resulting from the Program. As various Programs are implemented, in addition to monitoring the target species, assessments of impacts and the success of mitigation measures to reduce adverse impacts need to be monitored. We recommend the same Adaptive Management approach for improvements for the target species be employed to all habitats and species in the basin.*

Response: Comment noted.

Comment 14285: *Errors or Updates for Information Presented.*
Page 4-154, Paragraph 1. Channel catfish are native to the North Platte River, but are not present above Casper. Page 4-156 Paragraph 1. Turbidity can contribute to a decline in the trout fishery in Seminoe Reservoir when it occurs, but it is not a constant condition causing a continuing decline of the fishery. Page 4-157, Paragraph 2. We have modified our Stream Class System to ribbon categories of blue, red, yellow, green, orange, and clear. Blue is a trout fishery of national importance, red statewide importance, orange a stream supporting warm/cool sport fish, and clear supporting non-game fish species. Page 4-158, Gray Reef Outflows. The North Platte River from Gray Reef Dam to Dave Johnston Powerplant Dam (Glenrock) is a Blue Ribbon Stream. Management concepts offered for the reaches are correct for the 86 miles of Blue Ribbon stream. Page 4-158 Paragraph 8. Statements from 1998 are correct; however, flushing flows and improved habitat conditions have increased trout numbers and resulted in the Blue Ribbon designation to the dam at the Dave Johnston Powerplant. Impacts from drought conditions (low flows, higher water temperature, and increased sediment loading) will have greater adverse impacts in the lower reaches. Page 4-159, Paragraph 1. The reach below Glendo is a Green Ribbon stream. Page 4-159, Paragraph 4. The reach below Guernsey is an Orange Ribbon stream.

Response: Comment noted.

Comment 14287: *The Whooping Cranes, one of the target species, has been documented to use the North Platte River above McConaughy yet we can find no mention of this in the study and no consideration of the possible impact the plan would have on habitat in the upper region of the river.*

Response: Information has been added to chapters 4 and 5 to describe the effect of action alternatives on whooping cranes on the North Platte River and Platte River above Lexington, Nebraska.

Comment 14329: *The environmental assessment done in 1995 on Lake Minatare Unit of the North Platte National Wildlife Refuge estimated the direct value of Lake Minatare to be $2,422.000. This does not include all business directly associated with the recreation at Lake Minatare nor such businesses as grocery stores, gas stations, restaurants, motels, etc. (document attached) Yet we are to believe the calculations that Lake McConaughy generates only $13,000,000.00.*

Response: See responses to Comment 14335 and Summary Comment 18 (in the "Summary Comments and Responses" section of this document).

Comment 14331: *Missing entirely from this list of issues of concern is any consideration of concern for wildlife needs other than target species. Why this major omission?*

Response: The DEIS and FEIS both analyze impacts to wildlife other than the target species. This issue has been added to the list of key issues for the FEIS. Also see the *Fish and Wildlife Coordination Act Report: Platte River Recovery Implementation Program* in volume 2.

Comment 14334: *Water Leasing Alternative, (3-48). 68,000 acre-feet on an average annual basis is to be leased from willing sellers, but no indication of where this water would most likely be leased from is indicated so that a determination of the impact on that region could be explored. (Presumably the people most willing to lease would be those who hold surface water rights on the least productive lands.) Why not identify those water rights targeted for lease?*

How can you do an economic impact analysis if you don't identify the area where the water's to be leased? Why was no attempt made to determine the impact on wildlife other than the target species?

(3-50) Table 3-Il Nebraska water leasing (approximately 60,000 to 70,000 acre-feet per year leased). Once again no mention of how much of this is to come from above McConaughy and how much from below McConaughy. Why not identify regions targeted for water lease so that environmental and economic impact can be assessed in a reasonable manner?

Response: The DEIS "Water Resources," chapter 5 describes the distribution of water leasing in the Basin on a regional basis. See for example, table 5 "Amount of Program Water Leasing." Also, the agricultural economics analysis shows the change in irrigated acreage for each alternative, by economic region. See for example, table 5 "Predicted Changes in Irrigated Acres by Alternative." More detailed analysis is not possible until individual water leases are offered to the Program.

Comment 14335: *(3-72) Summary of impacts "Changes in Annual Consumptive Use of Irrigation Water (by economic Region) Scotts Bluff Area Agricultural Economic Impact—Water Leasing 18,400 acre-feet, Water Emphasis 19,100 acre-feet. No mention of economic impact on recreation or wildlife in the Scotts Bluff Area. Why are we ignoring these significant impacts? This is very vital to my business and to others who depend on wildlife in the North Platte Valley above the Lewellen bridge.*
Response: Additional discussion and analysis of recreation resources and impacts in the Nebraska Panhandle area has been added to the FEIS.

Of the alternatives, only the Full Water Leasing Alternative has the potential to result in substantial amounts of water leasing in the Panhandle area. Under this alternative, and with these assumptions, it would be possible that a significant amount of water might be leased from irrigation districts in the Scottsbluff area. This alternative is estimated to reduce irrigation deliveries through the Interstate Canal and the Inland Lakes to the nearby Reclamation project lands by up to 20 percent, which also may reduce somewhat the agricultural runoff and canal seepage entering the streams north of Scottsbluff.

If water is leased from lands near the coldwater streams in this area, there may be some reduction in irrigation runoff to the streams. The amount of reduction cannot be estimated absent a specific plan for water leasing, which would be based on voluntary participation from water users. The likely effect would

be some reduction in flow volume. However, this would not affect the baseflows in the stream, which originate from groundwater, nor the peak flows which result from local storm runoff. Stream temperatures would be reduced somewhat as warmer irrigation runoff was reduced.

Comment 14337: *No mention is made of the fact the Whooping Cranes have been documented to use the North Platte River above the Lewellen Bridge. In fact the consideration was limited to no further west than North Platte "Upper Platte River System". Why are we excluding this portion of the river from consideration?*

Response: See response to Comment 14287.

Comment 14342: *The Strain of Rainbow Trout which for many years migrated from Lake McConaughy to the cold water tributary streams of the North Platte in West Nebraska to spawn has been virtually destroyed by lowering water levels and stocking of stripers in Lake McConaughy. Lowering the water levels in McConaughy further would certainly be the end of this fishery. Why is no consideration given to this major loss of recreational value for the region. Is this area to be sacrificed on the alter of the Whooping Crane, Piping Plover and Least Tern?*

Response: Discussions with Nebraska Game and Parks Commission staff subsequent to release of the DEIS revealed that due to the severe drought and reservoir draw-downs in recent years combined with other existing reservoir conditions, the rainbow trout fishery in the reservoir has been functionally lost. Commission staff have further indicated that, due to a number of factors exclusive of the Platte River Recovery Implementation Program, introducing another trout fishery in Lake McConaughy is not planned at this time. For this reason, the analysis of effects on such a fishery in the reservoir has been removed from the FEIS.

Comment 14354: *". . .the actual effect on trout habitat and on the trout will depend . . .The results could be little to no effect in the case of 1978 conditions to a high probability of a severe fish kill in the case of the 1980 conditions." ". . .The smallest effect, which is still rather large, would be due to the Water Leasing and Water Emphasis Alternative." Are we sacrificing rainbow trout fishery in the North Platte Valley? It appears that we are. Why can't we just be honest and admit it?*

Response: See response to Comment 14342.

Comment 14357: *(5-247) & (5-249) "Employment is positive for Habitat and dryland substitution and Scotts Bluff with and without dry land substitution. How can employment be positive (increase by 17 when income is reduced by $452,087) when land is taken out of production and income and sales are decreased? This economic analysis is obviously flawed unless we expect people to accept a lower standard of living. As this area already has a very low economic base this analysis seems to be less than credible. Further no consideration is given to the loss in recreation dollars for the North Platte Valley above the Lewellen Bridge. This loss could be very substantial given the reduced river flows during the primary hunting seasons and the carrying capacity of the region for migrating waterfowl. Why were these factors not considered? What is the amount of loss that can be anticipated from these reduced flows in the river during critical seasons?*

Response: In certain situations in the FEIS, sales and/or income may be positive while employment is negative. This occurs in five cases in the impacts for the FEIS and the reason for these occurrences varies for each circumstance. The first is in the habitat region under the Water Emphasis Alternative. Among other positive economic flows into the region, there are construction projects, water lease payments, and land habitat restoration and management. These elements increase the four economic indicators including sales. Negative economic impacts result from reductions in agriculture production as some amount of farmland is converted to pasture or other habitat. These decreases in irrigated agriculture offset the increases brought about by the positive influences to employment for that region.

The next two cases both occur in the Lake McConaughy region under the Governance Committee and Wet Meadow Alternatives. Under these two alternatives, there is some construction taking place that would increase the four indicators. However, recreation losses at Lake McConaughy are great enough to offset income, indirect business taxes and employment in that region. The last two cases both occur in the Scotts Bluff region under the Wet Meadow Alternative for both with and without dryland substitution. Here, the only element that occurs is changes in agricultural production. If one looks closely, one will notice shifts in the cropping pattern for the region. That shift increases production of some crops and decreases the production of others. This shift causes irregularities in the indicators because some crops and their associated sectors (both direct and indirect) create more or less employment than others, are more or less expensive than others, and require different amounts of expenditures than others. For example, compare changes in sugar beets as opposed to alfalfa. Sugar beets have a relatively high processing/manufacturing component whereas alfalfa has very little processing. A small change in sugar beets may have large impacts in other sectors that are related to processing/manufacturing.

Also see response to Comment 13809.

Comment 14359: *Economic benefits to the area of the North Platte Valley come from many sources all of which are important including agriculture, tourism, industry, recreation and from wildlife that depend upon the valley's use of water. Economic benefits to the area accruing from wildlife which uses the water* *include but are not limited the following:*

- *Annual lease payments to landowners for waterfowl and other hunting in the NRD.*
- *Fees from commercial and guided hunts (waterfowl, upland birds, turkeys, and deer)*
- *Motel Room rental, restaurant meals, fuel, other purchases at local businesses made by people traveling to the area to hunt and fish.*
- *Sales of hunting equipment and related products to local sportsmen and women.*
- *Sales of fishing tackle, baits, boat fuels, water crafts for use on reservoirs and cold water streams of the North Platte Valley created by storage of irrigation water and return flows.*
- *Hunting, fishing, trapping, park permits, stamps and special use fees generated.*

Response: The regional expenditures associated with recreation are accounted for as shown in the *Economics Appendix*, tables 4.7-4.10. Those expenditures include many of those stated in your comment. The regional economic impacts include only those expenditures that are directly related to the trip. For example, watercraft would be used for multiple trips.

Comment 14365: *The report seems to be missing a description of how much acre-feet of water the other users of the Platte River are contributing to the recovery of the protected species (Nebraska, Industry, Agriculture, Municipalities). It seems that the sportsmen and women of Wyoming are being asked to make all the sacrifices. Why not require all users of the Platte River to reduce the amount of water usage equally? We all benefit from the river and should all contribute to its health. Finally it appears that all of the negative economic impacts along with the elimination of fishing and recreational opportunities will be born by Wyoming sportsmen and women.*

Response: Comment noted. The EIS describes that change in water use and the change in agricultural production in each region of the Basin. It also notes that the Governance Committee Alternative was negotiated among the states with the intent of matching the contributions of each state to its consumptive use of the Platte River.

Comment 14366: *I own property that abuts the Platte River in Butler County, Nebraska. Every year when the weather becomes habitable, the Platte River and for that matter every other stream that offers a sandbar, is driven upon by 4 wheel drive type vehicles. You will see the tracks of vehicles of many sizes that are from two and four wheel ATV's to the use of specially built "monster trucks"? The vehicles are operated by persons of all ages. It is common to have the vehicle enter the riverbeds and travel for several miles on every inch of area that is not covered with formidable vegetation such as a well-established toe head. This form of unregulated "recreation" destroys the ability of any nesting wildlife not limited to the least tern and piping plover. How can any bird or fish endangered or otherwise, endure having their environment torn up on a daily basis? The use of ATV's of any form on any riverbed should be limited to legitimate use by property owners such as the rounding up of stay cattle. If this suggestion appears to be too broad in scope, it should certainly apply in those areas having any of the four endangered species. Such two and four wheel vehicle usage has destroyed more eggs, nesting activities, and tranquility to hold any or all of the four of the species in question than the debatable question of "How much water needs to flow to protect the same"?*

Response: The Governance Committee land plan anticipates that species using Program lands may need protection from activities that would disturb birds or destroy nests. The needs for restriction of activities on Program lands will be determined on a site-specific basis.

Comment 14367: *Studies published in 2001 by Jane Austin and Amy Richert (A Comprehensive Review of Observational and Site Evaluation Data of Migrant Whooping Cranes in the United States, 1943-99) on wetland habitats used by whooping cranes in the Great Plains states help define the migration habitat needs of these birds. Migrating cranes roosting on rivers used those with mean widths of 750 ft (N = 44). River sites used for feeding and roosting averaged about 730 feet wide (N = 28). Of all roost sites, 53.1% were clear-water, 33.1% turbid and 13.8% saline. Most roosts had soft substrates (38.5% sand, 52.6%*

mud), and 78.7% had slight-slope shorelines. More than 58% were over 2500 ft. from utility poles, and nearly half had a visibility of 290-1300 ft.; the rest had greater visibility. Nearly 1/3rd of all roost sites found were classified as threatened. Certainly the Platte river qualifies highly as a threatened ecosystem, and is really the only wetland complex in Nebraska that closely meets these habitat preferences for whooping cranes.

Response: The data cited by the commenter are part of the information used to define the initial habitat objectives for the Program's habitat conservation activities, given in chapter 3 of the EIS. Concurrently, Platte River habitat use information will be expanded and refined through the monitoring and research component of the Program, also explained in chapter 3. Also see responses to Summary Comments 48, 48, and 49.

Comment 14370: *The river near Casper has gone from a muddy, unproductive irrigation sludge producer to a clean, clear productive fishery . . . This transformation has been accomplished through carefully timed "flushing lows designed to flush the river of the muddy sludge from the gravel beds crucial to the fish populations being able to successfully spawn and produce new generations of trout and other species No mention of continuing these "flushing flows" was made in the report.*

Response: See response to Comment 14403.

Comment 14374: *For years we have pushed hard for the Governance Committee of the Cooperative Agreement Program to consider truly reasonable alternatives that would provide substantial additional river flows while not adversely impacting irrigation practices here in the central Platte. Specifically, forest management in the Routt and Medicine Bow National Forests would allow significantly more snow pack melt to find its way down here. Also, the building of another dam downstream of the Kingsley Dam and dedicating a sufficient amount of stored water there for species needs would fit the bill at a fraction of the cost projected for the Cooperative Agreement Program. Unfortunately, the Governance Committee has given these options short shrift and instead locked onto options that target irrigated agriculture.*

Response: Comment noted. Also see responses to Comments 14105 and 14407.

Comment 14376: *Failure of the Environmental Impact statements to address the direct impact on the State of Nebraska and Nebraska pump irrigators.*

Response: The impact of the alternatives on water use in Nebraska and local economies are described in the DEIS. It does not appear that the alternatives have any impact on Nebraska groundwater pumpers, unless an individual groundwater pumper elects to lease water to the Program.

Comment 14378: *The fluctuation of flows from one month to the next happening at the time of spawning could seriously affect the quantity as well as the quality of fishing in Central Wyoming.*

Response: See response to Comment 14607.

Comment 14381: *The Platte River has not been documented as being part of the historic range of the Pallid Sturgeon. Referenced documents do not present evidence that the Platte River was ever historically used by the Pallid Sturgeon. The limited recent occurrence of Pallid Sturgeon in the Platte River is the result of expatriation of the species from the Missouri River which is its habitat. There is virtually nothing known about historic use of the Platte, the type of potential habitat that was/is available, the quantity and distribution of this potential habitat, or trends in this potential habitat. In various locations of the DEIS the Pallid Sturgeon is represented as requiring: sandy bottoms, gravel bottoms, and rocky bottoms. Supportive data is not referenced. There is no evidence in the literature that suggests that increased* *sediment transport in the lower Platte is needed for the Pallid. This fact has been confirmed by the National Academy of Science (NAS).*

Response: See response to Comment 14125.

Comment 14385: *The DEIS should be revised to remove internal inconsistencies. References and citations to literature should be provided throughout the document. These references and citations should be to the original literature, not other regulatory documents.*

Response: The EIS has been edited for inconsistencies and citations.

Comment 14389: *I am increasingly interested in the issue of impacts of water leasing, since the leases for the PRRP would be in competition with the other much-increased leasing activity for municipal supply. There is no apparent problem with the total volumes needed for municipal and PRRP needs, but the transfer from existing uses -- both direct for irrigation and indirect "uses" of seepage, return flow, and deep percolation are nearly unexamined -for environmental impacts of rapid change. Also, the transfer will be "lumpier" than may be expected, because of the way ditches work, both physically and as organizations. That may seriously increase the micro-scale or local economic impacts, which are literally invisible with tools such as IMPLAN.*

Response: The Colorado water leasing modeled for the EIS assumed that water leased to the Program would come from storage relatively distant from major metropolitan areas to avoid direct competition by the Program with municipal water providers. The scenario analyzed was also relatively "lumpy" in that it leased water from a relatively small number of reservoirs. Water leasing is a site-specific element of the alternatives which depends upon the voluntary participation of the public and, as such, would be analyzed more specifically when a Program is implemented and more detailed leasing plans are developed. Water leasing in Colorado is not part of the preferred alternative.

Comment 14391: *Let me give you some specific examples of factual omissions in science which have not been considered. First of all, there are credible biological experts - outside of USF&WS - that have stated the Plover is thriving on the banks of sand pits - developed by humans during constructive use of the Platte River. Another biologist counted 100 Plovers nesting on the beaches of Lake McConaughy. These supposedly "endangered" birds are thriving! But, it seems USF&WS is unwilling to admit it!*

Response: Please see revised "Piping Plovers and Interior Least Terns" sections in chapters 4 and 5 of the FEIS.

Comment 14392: *Another expert has testified that in the 60 years from 1942 to 2002 there were only 65 sightings of the Whooping Crane in the Platte Valley. I personally remember hearing in the 50's that there were reports that somebody actually saw a Whooper in the valley! It was a big deal, because frankly that is not their real habitat. It certainly is not "critical habitat". The Whooping Crane has NEVER really used the Platte River of Nebraska as "habitat". It simply goes elsewhere, as nature apparently intended. This uproar over the Whooping Crane is simply nonsense. It is just one of the many pure myths (even lies) that are being propagated on Platte River issues without the science to back up the claims! You can no longer easily find truth on these issues unless you go get them yourself. Then, those whose data you use to point out the truth refuse to believe the truth which is provided by their own data!*

Response: Various sources of scientific literature and whooping crane data, both historic and recent, on which the determinations of Platte River importance for whooping crane conservation are based are cited in the FEIS. This information was reviewed, and findings concurred, by the report of a scientific panel of the National Research Council (2005).

Comment 14393: *I see no difference in wildlife in the Platte Valley over the last 60 years of my life. If anything, it is thriving more. I see absolutely no difference on our land - including that which borders the Platte. "Old timers" I know - both family members and people I do business with - tell me that there is more and healthier wildlife in the central Platte Valley than there was before McConaughy was built. Data from USGS shows that the river used to go dry more often than it does today. So, how can wildlife be "threatened"? The answer is that it is not. And, if it becomes threatened, it will simply move to where the habitat is more suitable. That is why the creator gave birds wings!*

Response: At the request of the states, the National Academy of Sciences was asked to review the science and the need for the Program. The conclusions of the review panel (National Research Council, 2005) are in volume 2 of the FEIS.

Comment 14394: *The D.E.I.S. manual and the letter you sent me are meaningless. The manual I have and your letter explains nothing on the contamination and pollution by waterfowl in this Platte Basin on the spring migration north in this area.*

Response: See responses to Comments 14438 and 14439.

Comment 14399: *I would like to suggest that a water pipe line be constructed - even up to Canada (sometimes they have water in excess). I feel sure for instance that farmers would be willing to pay for water, etc. A water pipeline - ultimately connecting many states would eventually pay for itself and employ many thousands. They could run along state inter-states. Already we have gas pipelines, oil - pipelines, etc. Water is something everyone needs and cannot live without. Here in Maine at times we have flooding - times we would be more than willing to give other states in need.*

Response: Comment noted.

Comment 14400: *The whooping cranes are doing fine under the present situation as they only spend a few days or possibly weeks each fall and again in the spring along with one-half of one million sandhill cranes. The sandhills are expanding now which indicates the Nebraska habitat is fine for them and I would assume also for the whooping cranes.*

Response: Habitat has decreased for both sandhill cranes and whooping cranes. Scientific literature explaining riverine habitat losses, reduced length of river useable by sandhill cranes and whooping cranes, and the reduced physical condition of sandhill crane that stage on the Platte are cited in the FEIS. The National Research Council (2005) conducted a review of science on which the determination of the importance of the Platte to whooping crane conservation is based, and they concurred with that determination.

Comment 14401: *Why couldn't the government reimburse the farmers for their pivots and cap them! Have them go back to dry land farming which probably would still raise enough grain to meet the demands of this country. There wouldn't be a surplus supply that drives the prices down thus the farmers could make the same amount of money per acre without depleting the flow of the river! Or subsidize them so they make what they need to come out! Take a 10 year average on the farmer, say irrigated corn made 200 bushels/acre and dryland made 120 bu./acre and the government subsidizes 80 bu/acre, farmers happy and they are not depleting the water in the river which would have to have an impact on the river. There are thousands of pivots that draw billions of gallons of water and the canals rob a large percentage of water also! We don't need a surplus of grain, we need water.*

Response: Comment noted.

Comment 14402: *Nova and other Gov't and scientific agencies are saying magnetic fields are changing. As birds flight patterns are based on magnetic alignments, it seems we are spending a lot of money for short visions. How will you adapt habitat for these changes, how frequent? Since cranes feed on baby birds and the plover and tern (nest) lay on open sand bars, what number will be enough of terns and plovers? Seems we are spending large sums of money for min. returns.*

Response: The relationship between crane migration patterns and magnetic fields, if any, and how magnetic field changes would affect crane biology or use of the river is not known. Cranes do not eat least tern or piping plover chicks—the seasonal migration of cranes through the Platte River Habitat Area does not overlap with piping plover and least tern nesting season.

Comment 14403: *Flushing flows in the river has created improved gravel bars for spawning. This is important for maintaining a good fish population. Will we still have this?*

Response: The Program alternatives do not have any effect on flushing flows out of Gray Reef Reservoir.

Comment 14405: *Pg E-18. Reword the second listed purpose for greater forcefulness, thus: "Ensure that the effects of future water development activities are offset so that they will not jeopardize the continued existence of the species".*

Response: Comment noted.

Comment 14407: *We have a chance to actually create an alliance and cooperate together for species and habitat needs. You acknowledged that the construction of a dam down form Kingsley was an "attractive" option for all involved in the cooperative agreement program.*

We believe strongly that this option would be the most effective, efficient and wisest use of tax dollars. Furthermore, it would be far and away the least harmful to irrigators in the Platte Valley.

Response: The EIS Team considered the construction of a large new storage in the Central Platte area. However, this approach was eliminated as far exceeding the resources potentially available to the Program during the First Increment.

Comment 14408: *When My Grandfather came to this valley in 1881, at the age of eight, he said there was only one big Cottonwood tree on the river from Bridgeport to the Scottsbluff area. The high water in the spring kept the river washed of new trees and brush. The dams in Wyoming stopped the wash. Now we have so many trees in the river area that they use a big part of the river flow. If a big part of these trees could be removed, the length of the Platte, there would be plenty of water for all the needs.*

Response: See response to Comment 13760.

Comment 14409: *In securing land for habitat protection under the program, we would encourage the program to select those habitat areas which are currently used by target species, not to try to attempt to encourage the species to move into areas where they have not selected.*

Response: Comment noted. Program restoration of habitat will occur in areas previously used by the species.

Comment 14411: *The reason I'm talking about the unintended consequences and the sort of monstrosity of this program is because the governor of Nebraska through the Department of Natural Resources really screwed down on the Twin Plattes natural resource district and told us this spring that we had to have a moratorium on all new wells and that would include the well that we would have liked to have drilled in* *my area. And the reason that we were suppose to do that is because of this program, the cooperative agreement, the implementation and cooperative agreement.*

When I really examined the DEIS was that there wasn't--there isn't anything in the EIS that describes we irrigators giving up our groundwater potential for the whooping crane. When I'm reading various parts of the EIS, it describes, as Mr. Brown does, that there's only going to be willing sellers and willing buyers. It doesn't say that--and it says there's going to be no condemnation. But, essentially, the moratorium that was put on our property in our part of the county and in other counties is basically condemnation of our water rights. And, you know, nobody has--it's a temporary one for three years, but nobody's approached, nobody's whispered, nobody's said anything about compensation.

So basically--well, and also on the DElS, it says that there is going to be some water leasing for some people. But it says there's not going to be any that's basically above North Platte, Nebraska. And there's a large area of Nebraska--that's on Page 5-40. Anyway, there's a large area between there. And there's hundreds of farmers that are going to be affected. I mean, the area's probably is as big as, you know, a couple of the states that are in the eastern part of the United States. So it's a significant effect. And there's no mention of it. There's no budget for it, especially. You know, I'm sure there's, particularly in these times, there's plenty of people who would be interested in giving up their water rights, you know, for this effort. But there's no budget for it that's in the EIS.

The EIS does not have any economic evaluation basically west of North Platte, that huge area, which includes my home. It doesn't include the social impacts. It doesn't -- which can be, you know, continued depopulation because the economic impact. And, basically, it's inaccurate because it really doesn't describe this nonvoluntary surrendering of the water rights.

Response: It appears that someone has told the commenter that the moratorium on well drilling in the Twin Platte Natural Resources District is part of the Platte Recovery Implementation Program. This is not the case. The management of groundwater being undertaken by the Twin Platte Natural Resources District is directed by existing Nebraska state law and regulation, including regulations related to LB962.

In terms of water leasing by the Program, this activity has been budgeted. See the Governance Committee Program Document, attachment 1.

We are not clear exactly where the commenter farms, so it is not possible to judge whether the Program might seek to lease water in this area. The DEIS and FEIS have evaluated the economic consequences for each alternative for the areas where impacts are most likely to occur.

Comment 14412: *I realize that they're not going to be taking water from the cities, they're not going to be taking it from the power plants. So that means they're going to be taking it from the irrigators. And what are the best case/worst case percentages of water that we're going to lose? And are they going to take it from the river, or is it also going to include underground flow from the wells? I guess what's it costing us? All this other stuff is nice, but what are we losing, as farmers?*

Response: The DEIS and FEIS indicate for each alternative its effects on irrigation deliveries in each area, as well as the reduction in irrigated land due to voluntary water leasing.

Comment 14416: *A lot of folks like to talk about the economic loss to tourism. And I'm reminded of the non-Nebraska - - I'll emphasize non-Nebraska - - tourism magazine of a few years ago that ranked the late winter, early spring migration on the Big Bend stretch of the Platte River as the number one bird spectacle in the entire world, not the United States, but the entire world. So I really believe that future Nebraskans will not look kindly upon us if we allow this river to deteriorate any further.*

Response: Comment noted.

Comment 14419: *We're still running power plants, running the water off the clock in North Platte, in Lexington, in Brady, through these hydro plants. And we need the irrigation water for the farmers for about three months in the summer, and I never hear anything about the power, the water that's being used for power those other nine months of the year. And I think this should be put into the impact statement and how the water's been used and taken away and everything.*

Response: The EIS attempts to describe, for the Present Condition as well as the alternatives, the pattern of water releases, power generation, and irrigation deliveries through the Central Platte system.

Comment 14420: *Union Park's unique pumped-storage facilities and peaking power revenues can quickly solve the following major regional water problems, while reducing short and long-term costs for local, state, regional, federal, and environmental stakeholders:*
- *Platte River Recovery Program for Endangered Species;*
- *Colorado River Endangered Fish Recovery Program;*
- *Black Canyon of the Gunnison Optimal River Flow;*
- *Eastern and Western Slope drought, growth, and environmental needs;*
- *Excessive dewatering of Platte, Arkansas, and Colorado Main Stem Rivers;*
- *Continuing Colorado-Kansas dispute over Arkansas River quantity and quality;*
- *Rio Grande River drought flows for endangered species;*
- *Southwest's growing shortage of assured, safe, and flexible drought protection.*

EPA correctly vetoed Denver's Two Forks Dam proposal, during the previous Bush Administration, because the Gunnison's undeveloped water entitlements and superior Union Park alternative were "improperly screened from the environmental studies". The National Environmental Policy Act (NEPA) requires objective environmental and economic comparisons of <u>all reasonable alternatives</u>.

Union Park's flexible high storage can integrate and substantially increase the utility, quality, and drought protection capabilities of existing infrastructure and finite water supplies throughout five Southwestern river basins, while reducing costs. Conventional water supply wisdom says this is not possible. An emergency scoping evaluation wilt prove otherwise.

A Presidential Order, directing an ad-hoc group of motivated local, state, and federal natural resource engineers could complete an emergency scoping evaluation of Union Park within a few months, using existing studies and planning factors. When completed, this evaluation can serve as the pilot program needed to solve the exploding urban and rural water and power crisis throughout the West for the new millennium.

Response: Comment noted. See *Platte River EIS Screening Report* in volume 2 for discussion of why transbasin diversions were not included in the EIS Alternatives.

Comment 14430: *My name's Jim Henderson, I live northeast of Mitchell. I guess we've got irrigated farm, I've got some, I guess, problems with the study just kind of like Bruce said with the— some of the species that I think that are here that aren't mentioned that will be impacted.*

Response: See response to Comment 14331.

Comment 14432: *There's a lot of untruths in there [DEIS] and one of the main ones, and Bruce has already pointed out, that's the prairie dogs. I would love to show whoever wrote part of that I can take them to probably a thousand acres of prairie dogs within 20 miles of right here and they would be amazed.*

Response: The black-tailed prairie dog has been removed from the Federal candidate species list and is not included in the FEIS.

Comment 14433: *I have hunted extensively and fished as well on the north and south channels that form Jeffrey Island between Lexington and Overton, which is now leased by the Central Nebraska Public Power and Irrigation District. And today I continue to hunt ducks and geese in several places between Cozad and Elm Creek. Over the years, I watched this stretch of river change, and fish and wildlife use of this stretch change as well. Growing up in the 1970s, my family did its Sandhill Crane watching along the river and the fields along the river between Lexington and Overton. Today, the Cranes no longer utilize that stretch of river, as vegetation and lack of flow have choked off the river and forced Cranes further east towards Kearney and Grand Island. Over the past fifteen years, my dad and I maintained three different duck blinds on the river at Jeffrey Island, primarily on the main south channel. Duck hunting has always been premier in that area, and Canada goose hunting became exceptional about the mid 1980s. However, over the past few years, things have changed and that stretch of river has largely become unhuntable and unwadeable. The flow of water in the south channel of the Platte, along Jeffrey Island, has essentially turned that channel into a channelized ditch most of the way to the Overton Bridge. Return water from Central's canal system enters the river through a diversion dam after passing through the J-2 hydro system -- hydro plant and the Canaday steam plant. And that water is cold and devoid of sediment. That sediment hungry water has initiated a severe case of bed degradation, causing a once meandering and shallow channel to cut its bed so deep that the water is now contained -- contained in a channel that is too swift to hold decoys, too deep to wade, and dangerous for both people and hunting retrievers. As a result, water fowls, especially Canada Geese, have begun to follow the Cranes and are moving to locations on the river closer to Kearney and Grand Island. In addition, it has become common practice among waterfowl hunters, like ourselves, in the area to spend a considerable amount of time and money clearing vegetation from the - - and trees from the river banks, keeping mid-river sandbars clear, and trying to keep open shallow water around hunting locations.*

Response: Comment noted.

Comment 14434: *When I was working as a guide on Interstate 80, a man came up to me and he says, "give us our birds back". I said, "what are you talking about and where are you from?" Well, he was from the Mississippi River Valley. And he said, the Cranes, the Sandhill Cranes. And I said, well, what about -- what time did they leave the Mississippi Valley? And he said, well, it was a very gradual change. It began in about the 1970s. And at the time this happened was in 1993. He said, today it's a big impact.*

Response: Comment noted

Comment 14435: *There is a few things I would like to mention. I would like to see the committee look at the option of a federal wildlife refuge. And if that has been addressed, there would be some options and some land there.*

The Wyoming property near Kearney would be a good option. That would provide additional habitat. If that wouldn't be an option, there is some other lands that I think would be adequate where the mounding water is creating more of a gaining stream in the Platte.

Response: Comment noted

Comment 14436: *The mosquito allegations were proven to be bogus immediately since it takes six to seven days of stagnant water to breed mosquitoes. Our irrigation water does not stand for six or seven days, ladies and gentlemen. Still waters and lagoons and wetlands is where the West Nile Virus comes* *from, the very wetlands which they want 10 to 15,000 more acres in this Platte River Basin to extend the possibility of West Nile Virus.*

Response: The "allegations" referred to in this comment were statements made by the Nebraska State Epidemiologist who noted that the incidence of West Nile Virus was greatest in those Nebraska counties with the most surface water irrigation. These statements are not part of the EIS.

Regarding the comment that West Nile Virus comes from wetlands, the Program does not seek to increase areas of standing water or pools. The Program proposes to restore wet meadows, which have saturated soils in the spring, but do not have standing water or ponds in the summer. In fact, monitoring of existing wet meadows in the Central Platte Valley shows almost no surface water during the summer mosquito breeding season. Also, the Governance Committee Alternative, for example, is projected to increase wet meadows by roughly 4,300 acres, not 10,000 to 15,000 acres.

Comment 14438: *This is a growing concern today with large flocks of Canada Geese and so forth. Populations of up to 8 to 10,000,000 duck and geese concentrated in Nebraska is a real, real serious problem. The Fish and Wildlife haven't been doing anything about it, nobody else has done anything about it. They choose to ignore it.*

Response: The Platte River Basin is used briefly, usually between mid-February and mid-March, by large numbers of migratory geese and other waterfowl on their way to the Northern U.S. and Canada where they breed. A peak of about 750,000 waterfowl stopover in the Central Platte valley mid-February on their way to breeding grounds in the northern U.S. Previous research indicated that a complete turnover of migrant Canada geese can occur in 1 week; therefore, far fewer than the 750,000 stopover total inhabit the Central Platte at once. The Service issues permits for the take of migratory birds and provides states with the means to lengthen hunting seasons whenever there may be a threat to human health and safety, or if property damage is at issue. The Service has recently completed an EIS to address human conflicts with resident Canada geese which may allow additional means of take. The Program will not create habitat in the Central Platte Valley that would produce increases in either the resident or migratory population of waterfowl. Further discussion has been added to the FEIS in the "Social Environment", "Human Health Concerns" section in chapter 5 and to the same section in the *Social Environment Appendix* in volume 3[23] of the FEIS.

Comment 14439: *EPA requires double lagoons lined with plastic to present -- prevent seepage, on-site aeration and disposal, and levies heavy fines for any run-off during storms. This is because they have extensive documentation of fecal coliform bacteria, fecal streptococcus bacteria, nitrogen, potassium and so forth. This is a fact, it's a Federal regulation. EPA justifies the strict regulations to protect ground water, surface water, soil and human health.*

Response: The EPA requirement for lined lagoons is for large, confined duck rearing operations, not wild bird populations. For wild, migratory bird populations, research has indicated that the effects of geese was of little importance to nutrient dynamics of soils and does not greatly affect nutrient levels in water. Some urban water bodies have been closed due to high counts of coliform bacteria in areas where green lawn habitat supports large flocks of nonmigratory geese, but there are no known cases of such contamination in rural Nebraska. Further, none of the habitat restoration anticipated by the Program would create the type of irrigated urban habitat that encourages increases in nonmigratory goose populations.

Regarding migratory ducks and geese, the Habitat Area is not generally used as nesting grounds by these birds. Nor will the Program habitat restoration provide the type of habitat used by these birds on their

[23] Volume 3 is available upon request at <http://www.platteriver.org/>

northern nesting grounds. Therefore, this Program will not lead to any increase in migratory populations. The Program improvements in channel habitat may serve to spread out existing migration populations of waterfowl and thereby reduce the likelihood of waterfowl diseases. Additional discussion has been added to the FEIS in the "Social Environment", "Human Health Concerns" section in chapter 5 and to the same section in the *Social Environment Appendix* in volume 3 of the FEIS.

Comment 14440: *Some of the things that I've observed through my empirical studies from North Platte and my interest in water, in talking to people, is that the Whooping Cranes come through in February and March, and you're putting out water for them in May and June, that doesn't make sense to me. Some of this has to be common sense. That doesn't make sense to me.*

Response: Described in several places in chapters 4 and 5 of the FEIS are the various functions of May and June flows for habitat conservation and maintenance for the four target species (whooping cranes, least terns, piping plover, and pallid sturgeon).

Comment 14587: *The DEIS also establishes a present condition which does not reflect the environmental and ecological variability that has occurred over time. This is especially true in regard to climate changes. The mid-1800s were a period of extreme drought followed by a wet period in the early 1900s. The river channel configuration and land use cover used in the DEIS do not reflect a "baseline condition," as the geomorphology and land cover were reacting to dramatic climatic shifts and the impact of settlers moving west.*

Response: For all hydrologic analyses in the EIS, "Present Condition" was based on the 1947-1994 period of record, adjusted to reflect present (1997) conditions of water use in the Basin. (The discussion of historic conditions for the Platte River, prior to development, does not affect this Present Condition baseline.) This 48-year period thus includes a considerable range of climate conditions, including the drought years of the mid-1950s and the unusually wet years of the mid-1980s. It is true that the Basin has experienced more extreme climate conditions than those encompassed by the 1947-1994 record. In chapter 2 ("Effects of Climate on Flows and River Form"), the implications of this climate variability are discussed. It is also true that pre-1947 land use and land cover in the Basin included conditions that are not reflected in the Present Condition. Chapter 2 includes a discussion of the implications of land cover changes associated with urban, agricultural, and forest activities ("Changes in Runoff Pattern Due to Land Cover Change"). While Platte River geomorphology may be determined in part by long-term cycles in climate and land-cover changes, we believe the 48-year record provides an adequate baseline for evaluating likely effects over the Program's 13-year First Increment relative to today's river conditions, particularly in light of the National Research Council's conclusion that "direct human influences are likely to be much more important than climate in determining conditions for the threatened and endangered species of the central and Lower Platte River" (NRC, 2005).

Comment 14590: *Use of SEDVEG as the best available science is strictly contrary to ASCE's Task Force findings on width adjustment modeling, on which Dr. Walter Graf, who served as the Chairman of the NAS review committee, is listed as a member. The ASCE Committee's report is listed as a reference in Murphy et. al (2004), but its significance is not acknowledged in the DEIS. The Task Force concluded that width adjustment modeling has not advanced to the point presumed by the EIS Team. Based on conclusions of the ASCE Task Force, it cannot be concluded that using SEDVEG or any similar model for predicting future width adjustments, either for 13 and 61 years, is within the realm of available science or technology.*

Response: The article by the ASCE Task Committee on Hydraulics, Bank Mechanics and Modeling of River Width Adjustment[24] (Task Force Committee) warns that there are no simple standard approaches which can be uniformly applied to all situations. The Task Force Committee also identifies shortcomings in modeling river widths and advises, with these constraints understood, the application of numerical models to predict river width changes.

A quote from the abstract is "The hierarchical approach to analysis of width adjustment is based on field, analytical, and numerical modeling techniques. The principal limitations of existing field-based and numerical modeling approaches are listed."
The recommendation in Step 5, the Application of Numerical Models, is "Initially a 1-D Model should be applied to the study reach to provide the overall setting of any additional detailed modeling. . .Selection of numerical models appropriate for this purpose may be guided by the comments provided in this paper."

The first conclusion in the article is "1. Present knowledge of bank processes and flow modeling is sufficient to allow some tentative predictions of width adjustment to be made."

Dr. Murphy used the information presented in this article in 1998 to provide improved capabilities in the SEDVEG Gen1 code. One example is the subroutines included in SEDVEG to address the resistance aspects of vegetation which vary through space and time. As reported by the Task Force Committee (1998), "None of the reviewed models account for the effects of vegetation on flow".

Also in SEDVEG Gen1, sediment was distributed across the width of the channel based on grain size and flow velocities, rather than being uniformly distributed across a section. Uniform distribution was a shortcoming identified for 1D models in the Task Force Committee paper.

This paper also identifies several shortcomings associated with the mechanics of cohesive bank failure. Because the Platte River has predominantly non-cohesive banks (sand), these shortcomings have less relevance. The Platte River also has low sinuosity reducing the complexity of river geometry which allows more utility from a 1D model and from the river widening analysis by the model. However, as the Program advances towards more detailed studies of specific short reaches of river, including restoration sites on Program lands, the need for 2-D models is anticipated to increase. This would be consistent with the hierarchal approach of predicting river width changes as recommended in this paper by the Task Force Committee.

Finally, it should be noted that Dr. Graf is not listed as one of the members of the ASCE Task Force Committee on Hydraulics, Bank Mechanics and Modeling of River Width Adjustment (1998, page 916).

Comment 14591: *The capabilities of SEDVEG are listed on p. 4-30. No citation is made to literature that the profession accepts that any model of hydraulic, sediment transport and vegetation expansion processes can provide all of these outputs.*

Response: See response to Comment 14590.

Comment 14592: *The SEDVEG model was used for evaluating the EIS alternatives. Yet, as shown in the supporting documentation,"Application of the Sediment and Vegetation Model to EIS Alternatives," (DOI 2003), the model could not be calibrated using the long-standing, but refuted, definition of active channel width as the unvegetated channel width. In order to calibrate SEDVEG to measured data, the EIS Team made a late change in the definition of active channel, increasing it to include vegetation*

[24] ASCE Task Committee on Hydraulics, Bank Mechanics and Modeling of River Width Adjustment (1998). "River width adjustment. II: Modeling," Journal of Hydraulic Engineering, ASCE, v. 124, n. 9, pp. 903-917.

younger than three years. No scientific or other basis for this late change is provided, and the revised definition is no better than the previous definition for use as a geomorphologically-relevant term.

Response: We are unable to locate any text in the DEIS appendix which gave rise to this comment, however the appendix has been updated and descriptions of the sensitivity and calibration testing are provided in the final report *Platte River Sediment Transport and Riparian Vegetation Model* (Murphy et al., 2006) in volume 3 of the FEIS.

Comment 14594: *The B3 chapter of Parsons' report proves that the algorithms selected in SEDVEG are predisposed to degradation. Even DOI acknowledges this on p. 12 of their report, "Application of the Sediment and Vegetation Model to EIS Alternatives," (DOI 2003) where triple calibration was required to "prevent any integration of bias in the model towards a narrowing channel.*

Response: This conclusion from the B3 chapter of Parsons[25] (2003) pertained to SEDVEG Gen1. There is debate as to whether the original code (SEDVEG Gen1) was predisposed to degradation, however the second calibration eliminated any possibility of bias prior to the DEIS. The full context of the excerpt describing the purpose of the calibrations is:

"Prior to modeling the alternatives, three calibration procedures were carried out with the SEDVEG numerical model. The first two calibration procedures were designed to prevent any integration of bias in the model towards a narrowing channel. The first calibration procedure addressed model sediment coefficients, the second calibration procedure focused on the conveyance of flow and sediment at each cross section, and the third calibration procedure tested vegetation coefficients."

"The purpose for this conveyance calibration [second calibration] was to eliminate any pattern in the order or shape of selected cross sections, which would bias the model towards an aggrading or degrading condition. The same cross sections, section locations, and point elevations, which produced this stable condition of sediment transport, were then used to compare the alternatives for the PEIS [DEIS].

Predictions of aggrading or degrading conditions by the model for the PEIS [DEIS] Present Condition and alternatives, should be due to discontinuities in the riverflow and sediment transport of each alternative, rather than an inherent bias in the model."

Comment 14595: *Calibration of SEDVEG was described by the DEIS as a process of adjusting the slope of the channel to get an "equilibrium" river (no widening). River slope is measurable and need not be estimated. Because it provides the energy for water and sediment transport and for shaping of the stream, it cannot be arbitrarily altered. Precise measurements of the highly variable slopes of the Platte are provided by the USGS (1983), but were not incorporated in the DEIS.*

Response: In the Central Platte River it is estimated that the pool-riffle geometry of a channel can introduce at least plus or minus one foot of variation into the average profile of the river at a surveyed cross section. This was the general range assumed for one of the calibrations on the DEIS SEDVEG Gen2 Model. However no slope adjustments were made in the FEIS SEDVEG Gen3 Model and the thalweg elevations, as surveyed, define the profile of the river.

Comment 14597: *The unvegetated width is an acceptable parameter relative to species needs, but is not a geomorphic term. The error of assigning morphologic attributes to the unvegetated width continues to*

[25] Parsons (2003). "Platte River Channel Dynamics Investigation," prepared for States of Wyoming, Colorado and Nebraska.

mislead the EIS Team and could be detrimental to the species. The use of unvegetated width as a geomorphologic indicator is unprecedented and misleading. No citations to literature describing this as a valid geomorphic term are provided. The unvegetated width of a river is not a measure of its equilibrium width, effective discharge width, or "active" channel width, all of which are described in geomorphologic literature. Changes in the unvegetated width should not be correlated with anything except vegetative expansion. Far more relevant measures of active channel width are available in the literature, but were not applied.

On p. 2-35, the term "active channel width" is used in the DEIS in the same context as unvegetated width. This failure to use a geomorphic term in defining channel width is one of the primary concerns by the states' representatives. The two are demonstrably not the same. Even the most recent release of the White Paper (Murphy et. Al 2004) uses the term "active" channel width in the first sentence of Section 1.2 describing "The Concern," yet the figure being referenced (Fig. 1.3) has as its title, "Reductions in unvegetated channel width…" Figure 4.1 of the same report is a plot of the same data as Fig. 1.3, but the title has been changed to "Comparisons of active channel width…" The two are not synonymous yet have been repeatedly used synonymously by the EIS Team over the years. An appropriate definition of active channel width is missing in the entire development of the DEIS.

The USGS and others established that there is a direct correlation of effective discharge and associated active channel width. This relationship is acknowledged in the EIS Team's 2003 report on Platte River Flow and Sediment Transport Between North Platte and Grand Island (pp. 38-55), yet the DEIS does not rely on this relationship. Instead, the unvegetated width (which in no way reflects a geomorphologic measure) is correlated with annual peak flows.

Response: Unvegetated width of the river is a reflection of the flow regime as pointed out by Johnson (1994) and National Research Council (2005), and flow regime is a critical geomorphic parameter. Flow regime encompasses both mean and high flow events. Reclamation continues to recognize the utility of the unvegetated width measure as did Platte River researchers such as Williams (1978), Eschner (1983), and Peak et. al (1985), as a general indicator of channel change. Repeat cross section surveys provide more detailed information on channel stability and change and, more recently, plan form is used since it allows a more comprehensive and process-based approach to understanding channel change.

Comment 14598: *The DEIS' claim that climate is not significantly instrumental in shaping today's river morphology is inconsistent with the data, literature, and scientific understanding.*

1. The DEIS and supporting documents discredit climate as a significant factor in 20th century morphology, which overlooks a significant body of scientific truth. Climatic factors adequately and accurately explain the forces shaping channel morphology and vegetation leading to and during the 20th Century, especially when basin wide precipitation is compared with streamflow volumes (see the A3 chapter in Parsons 2003a). This cause-effect correlation is unquestionably strong, yet it is not acknowledged nor adequately discussed in the DEIS.

2. The preponderance of scientific literature documents the existence of geomorphic thresholds (borders between different planforms and profiles) and of dramatic geomorphic changes known to be singly associated with climate changes in Great Plains rivers. These processes did not magically cease to function at the turn of the century as alleged in the EIS Team's 2004 White Paper.

3. Strong evidence exists showing that climate cycles have raised and lowered the Platte by tens of feet over time and shifted it through numerous thresholds, and are recognized by the majority of experts as the primary factor affecting morphology of Great Plains Rivers throughout history and to the present.

4. The literature cited and analysis in the A1 and D1/D2 chapters of the Parsons report prove that only climate swings can produce the kind of far-reaching changes in planform and vegetation expansion that *have occurred in the Platte over the past 150 years, whereas storage and diversion projects do not, and cannot, produce the same far-reaching morphologic changes alleged in the DEIS.*

Response: Chapter 2 of the EIS notes that "some have suggested that a drier climate, rather than upstream water use, diversion, and storage, may be the primary reason much of the Central Platte River has changed from a braided to an anabranched channel form", and goes on to describe various reasons why "the available climate record does not support this interpretation." Chapter 2 also cites the National Research Council (2005) review of Platte River issues, including the Council's conclusion that "direct human influences are likely to be much more important than climate in determining conditions for the threatened and endangered species of the central and Lower Platte River" (although, as noted in the FEIS, the Council also stated that "longer-term background effects of climate are worthy of further investigation"). The Council reached these conclusions after reviewing the Parsons report cited in the comment.

Comment 14599: *The EIS Teams' long-standing allegation that the river narrowed first, followed by expansion of vegetation is clearly reiterated in the DEIS on p. 4-31. This greatly-debated interpretation has not been proven or documented, and any action plans based on unproven hypotheses regarding historical trends or other processes are not justified in light of the significant uncertainty of interpretation of historical data. The Parsons' analysis of 120 years of records at Fort Kearney, documented in the A3 and A4 chapters, vigorously disproves this claim at that segment of the river, and there is no reason that the findings of Parsons do not apply to the rest of the river.*

Response: See responses to Comments 14979, 14980, and 14981.

Comment 14600: *Scientific evidence strongly refutes the DEIS' claims regarding causes of, and remedies for, the reduction in North Platte channel capacity. Statements on p. 2-40 and elsewhere in the DEIS contend that the North Platte River at North Platte is aggrading. The only known scientific analysis of this was conducted by Parsons (2003b) for CNPPID, which did not support this hypothesis. Proof of this claim should be provided in the DEIS.*

Remedies for the reduction in capacity at North Platte were developed by Parsons for CNPPID, which appears to be the basis for Fig. E-12 of the DEIS even though the Parsons study is not credited with having published the list. However, the DEIS only recommends one option, dredging, which was the only remedy not recommended in the CNPPID study. Dredging was not recommended due to the fact that several independent studies reveal that this reach has reached a state of equilibrium and that significant bed material transport passes through this location on a daily basis. The transported sediment (currently estimated as about 400,000 tons per year) would quickly fill the void caused by dredging, restoring the quasi-equilibrium state that now exists (several publications that document this transport rate and equilibrium are cited in Parsons 2003a).

Dredging was discounted in the CNPPID study as not being commensurate with the causative processes. The North Platte River's average transport of 1100 tons per day of sediment through this location by far exceeds any opportunity to successfully or economically dredge a four to six mile segment of the river. Instead, means of reversing the causes of the capacity reduction were described in the attached Parsons CNPPID study, and some combination of them should have been recommended in the DEIS action plans.

Response: See JF Sato & Associates (2005) for the latest work on this concern. Note their conclusion that, "The decrease in the channel conveyance is due to aggradation." (page 2).

Comment 14601: *As noted earlier, the DEIS alleges that reductions in unvegetated channel width "mirror" increases in sediment size, and that this "coarsening" of sediment results in channel deepening* *and narrowing. The Parsons report (2003a) proves that there is more-than-sufficient uncertainty in the limited data on sediment sizes to preclude formulation of management actions based on the "coarsening" theory. Among other examples given in the B1 chapter of the Parsons report, the variability in sediment gradations independently measured by the COHYST/USGS scientists across single cross-sections in the summer of 2001 is greater than the variability being used in the DEIS to allege that coarsening is occurring in the downstream direction.*

A 1983 federal government assessment of sediment sizes in the Platte (USGS 1983) reveals that the median bed material size decreases from Central City downstream, and no such theory of coarsening is described in their report.

It is counter-intuitive, and scientifically incorrect, to state that a river with a coarse-grained bed would only deepen itself. Several sections of the DEIS make this claim. Coarse sediments increase the resistance to deepening, and any competent energy for sediment removal would apply itself to the banks, most likely resulting in widening of the channel. Even if the river has insufficient energy to transport the coarser bed materials, it would still seek out the finer-grained bank materials to satisfy its transport capacity.

Response: The FEIS notes that the coarsening of grain sizes coincides with degrading reaches (see "River Geomorphology" sections of chapters 2 and 4). Bed erosion and the coarsening of grain sizes is a commonly recognized sediment transport process. Parsons (2003) found the grain size changes to be statistically significant.

Comment 14602: *The DEIS' theory of sand bar dynamics is refuted by actual Platte River data collected and described by the USGS and University of Illinois. A key inaccuracy in the DEIS is that "high" sand bars can only be created by sufficient flow in the river to cause a "high" water surface that occupies the full width of the river between banks. This is one-dimensional thinking that disregards the complexity of localized perturbations in the bed and bars and of the flow and sediment processes disclosed by Smith. Smith (1971) describes transverse bar formation and dissection of the bars by moderately low flows, far below those needed to occupy the entire bank-to-bank complex. The explanation for this is that even moderately low flows approaching these transverse bars in the shallow channel segments will result in local rises in water levels as high as levels achieved by full horizontal occupation of the river. Smith confirmed this by concluding that "at low and intermediate discharges, transverse bars form" creating characteristic "variations in depth and velocity over short distances." Energy gradients at these obstructions are sufficient to raise levels locally, transporting water and sediment over some of the dissected bars. A braided river does not require complete inundation of the bed and bars to experience change. The DEIS claim that the high elevation sandbars "were most likely formed during the large spring floods" is not of sufficient scientific certainty to institute a regimen of high flows, especially in light of Smith's findings. Smith's reports are not referenced in the DEIS.*

A continuing problem with the DEIS sand bar theory is that if it is true, the high flow each year would need to exceed last years' high flow. Otherwise the new vegetation on last years' sand bars could not be removed. Unless each years' flow is higher than the previous, under the DEIS assumptions the river would soon be filled with vegetated bars.

Response: Smith (1971) discusses the evolving form of bars in the Lower Platte as discharge decreases. He describes how bars enlarge laterally and in the downstream direction, and describes aggradation on top of the bars as flows and sediment transport decrease over the top of the bar. No statements could be found to support a hypothesis that secondary flow currents during low and intermediate flows, through the conversion of velocity head to static head, raised water surface elevations to exceed elevations at high flow events. And converse to this hypothesis, Smith (1971) states in his summary "Bars formed during the high annual spring discharges are the first to become exposed. Those that escape complete erosion by waning currents are soon overgrown by vegetation to become semipermanent features until destroyed by next year's spring flows."

Comment 14604: *New theories are presented in the DEIS that have not been revealed in earlier work products. For example, the new assertion is made that changes in sediment load "mirror" changes in flow. This is not particularly controversial because flows transport sediment. The new allegation that reductions in unvegetated channel width mirror increases in sediment size is disputed here as being spurious and not indicative of cause-effect. Scientifically-sound reasons for challenging this include the huge uncertainty that exists in the limited data on sediment size (documented in the B1 chapter of Parsons 2003a), the unscientific use of unvegetated width as a geomorphic indicator, and the fact that such flawed cause-effect correlations can be and have been misleading, not only here, but in other instances. Many other scientifically-sound correlations exist such as the significant-but-overlooked correlations of streamflow with precipitation, morphologic change with climate, and vegetation expansion with elimination of no-flow sequences in the affected reaches of the river.*

Response: See response to Comment 14601 and the National Research Council (2005) publication regarding Interior's analysis of Platte River geomorphology.

Comment 14605: *The DEIS continues to present the "flow record" from 1895 to 1909 as comparable in quality and significance with later periods when continuous observations were made. This has serious consequences because the DEIS contains numerous statements of reliance on the "record" during this period. If nothing else, the claims made about, and action plans based upon, the "record" from 1895 to 1909 should be classified as highly uncertain due to sporadic timing of measurements, indirect methods used in estimating flows, and the practice by the EIS Team of adding annual, non-concurrent peak flows in the North and South Platte to synthesize annual peak flows in the Platte River. It is noteworthy that the NAS committee came to the same conclusions regarding these data.*

Response: See response to Comment 13853.

Comment 14607: *Fluctuation of flows: The implication I received from the report indicated a possibility of major flow changes from one month to the next. This would be extremely damaging to the spawn (mid-March to June 1) and could result in year classes of fish being absent from the fishery. If this occurred a number of years in a row, the fish population could be decimated. It would result in destroying much of what we have worked hard for over the past 20 years.*

Response: We addressed the impact to rainbow trout spawning below Gray Reef Dam when monthly flows dropped below 400 cfs (see "North Platte River Basin Fisheries," chapter 5). However, since the hydrology model only provided monthly flows, information was not available on whether rapid, major ramping changes would occur. The purpose of Gray Reef Dam is to ameliorate rapid changes in flow due to peaking operations at Alcova Dam and Powerplant.

Comment 14612 *The DEIS bases the success of its alternatives on using excess flows in the North and South Platte Rivers to repair and sustain the habitat of the target species downstream in the Central Platte River. However, climate variability and long-term trends in climate potentially affect Platte River streamflows, and thus hinder the potential to meet the goals of the Recovery Program. The Recovery Program should monitor flows to determine their adequacy and determine if climate variability or climate change causes decreased streamflows to the detriment of the target species and their habitats The EIS should also assess the implications of climate variability and the observed long-term trends in climate on meeting the streamflow goals of the Recovery Program. These considerations include:*

- *The affect of multi-year droughts, e.g., periods of 3-7 years of below average snowfall and streamfiows for the North Platte and South Platte Rivers.*

- *The affect of decadal-scale periods in which average streamflows are below-normal, although there may be wet years interspersed.*
- *The potential impact of projected earlier runoff and an earlier spring streamflow peak due to increased minimum temperatures.*
- *The affect of an intensified hydrologic cycle, including increased frequency of extreme precipitation events.*
- *The EIS should allow for adaptive management with respect to the effects of climate on water resources and the target streamflows on the Central Platte River, just as it plans to monitor the effects of the recovery program on endangered species and their habitats.*

Response: The Programs impacts and benefits have been analyzed against a hydrologic record including severe multi-year droughts. The Program will monitor riverflows and has the ability, under its Adaptive Management Plan, to adjust water operations to adapt to varying hydrologic conditions.

Comment 14613: *Feeding by whooping cranes was done on palustrine (marshy) sites in 49% of all the Nebraska sightings analyzed by Austin and Richert. In spring, foraging in Nebraska was seen on the Middle Loup & Niobrara rivers as well as the Platte, possibly because the Platte has become so seriously dewatered in recent years. This was not always the case. The Platte is historically the most important spring staging area for whooping cranes between Texas and their breeding grounds at Wood Buffalo Park. In studying Nebraska migration records covering nearly 50 years from the 1930's to the 1970's, I found (Nebraska Bird Review, 35(4): 1977) that of 162 county sightings, 58 percent were from Buffalo and Kearney counties, and nearly 90 percent of all sightings occurred within 30 miles of the Platte River, mainly between Lexington and Grand Island. By comparison, the more recent records summarized by Austin and Richert showed a much broader geographic range, with only about 30 percent occurring close to the Platte River within the corresponding reach of the river. Nevertheless, Nebraska still remains the single most important state for spring stopovers of whooping cranes; Austin and Richert noted that 33 percent of 1.014 total spring sightings in the Great Plains states during the 56 years between 1943 and 1999 occurred within Nebraska.*

Response: Comment noted. The perceived importance of the Platte as whooping crane migrational habitat, and the shift in whooping crane observations along the Platte over time is noted in the FEIS, chapters 2 and 4 respectively.

Comment 14621: *The DEIS does not analyze the conflicting flow management objectives established by the Services flow recommendations. Establishing tern and plover nesting in April- June and at the same time establishing flow goals for whooping cranes and pulse and peak flows which would result in the potential take of terns and plovers needs to be analyzed, discussed and resolved.*

Response: See response to Comment 14730.

Comment 14633: *Black-Tailed Prairie Dog Nebraska Distribution (4-116). "The black-tailed prairie dog occurs in Hall, Buffalo, Dawson, Garden, Keith, Deuel, (Duvall) Cheyenne, and Kimball Counties in Nebraska and is considered a candidate for Federal listing" What about the black-tailed prairie dogs in Morrill, Scotts Bluff, Sioux, Box Butte, and Banner Counties? There are more black-tailed prairie dogs in the counties above McConaughy than there are blow by 10 times. Why were these counties left off the list?*

Response: See response to Comment 14432.

Comment 14634: *Preble's Meadow Jumping Mouse; Designated Critical Habitat, Wyoming (4-112). This I believe has been proven to be a species not different than other species of Jumping Mouse.*

Response: See response to Comment 14245.

Comment 14635: *River Otter (4-146 and 147. The primary population of River Otter above McConaughy since stocked by Nebraska Game & Parks Commission are in Scotts Bluff and Morrill Counties. Why was this omitted?*

Response: Chapters 4 and 5 of the FEIS include more details on river otters in Nebraska.

Comment 14639: *Page 4-66. It would appear that species such as bald eagles, yellow-billed cuckoos, Bell's vireos and red-headed woodpeckers all species of concern did not make the list of birds found in the riparian woodlands even though these areas are some of their last remaining habitat.*

Response: The paragraph referred to in this comment discusses common species found in woodland habitats. In the FEIS, the bald eagle, a federally listed species, is covered in the "Other Federally Listed Species and Designated Critical Habitat" section in chapters 4 and 5. In addition, yellow-billed cuckoos, Bell's vireo, and red-headed woodpeckers, all species of special concern, are covered in the *Fish and Wildlife Coordination Act Report* in volume 2. Also see responses to Comment 13811 and Summary Comment 19.

Comment 14645: *Another method the DEIS uses depicts change is by comparing Plat Maps from 1860 to present however a Plat Map obtained from the Dawson County Surveyor in 2004 shows a Platte River not much different than those depicted on page 2-38 of the DEIS.*

Response: Comment noted. The EIS analysis looks for consistency of information from all available types of maps, surveys, photos and descriptions, all of which are utilized.

Comment 14646: *Page 2-13. The DEIS use of this picture as being representative of the pre-European Platte River is misleading. In the 20 years prior to this picture 350,000 immigrant and over a million livestock had effectively removed all forage for bison on either side of the river (Isenberg 2000, page 109). Emigrants and their livestock had also gone along the river eating all the vegetation and setting fires (Great Platte River Road Pages 245,246). In addition this is before the bison started to decline and during the times of tree cutting for railroad ties, added all together this picture is probably taken at a time when the basin had some of the least amount of vegetative cover it has ever had. "For the last 15 miles our route rises rapidly, and the approach the river denuded even of the scant herbage with which they are clothed near Fort Kearney, arid and broken into separate and rugged peaks and elevations, like some gigantic ocean breaker dashing its immense volume into a hundred different waves" (James Meline 1866 Great Platte River Road page 242). Not conditions the species could have evolved with.*

Response: The photograph of the Central Platte River in 1866 (DEIS figure 2-4) is used to illustrate the nature and scale of the Platte River channel, which is a key part of the habitat used by the target bird species. The key characteristics of this habitat are open expanses of unvegetated sandy riverbed with views unblocked by vegetation. This is what is seen in the photograph, and is what is described in the National Research Council review of the Platte River endangered species issues, in which they indicate "The active channel of the river was generally without vegetation except during summer low-flow conditions, when annual plants colonized portions of the exposed bed. Although the stream was not normally more than a foot deep (except during floods), its current was swift, and the unstable sandy sediments were not a suitable substrate for vegetation. (National Research Council, 2005, page 64)

The EIS team has not found any scientific studies indicating that the Platte River channel was not generally as shown in the 1866 photograph, that is, providing very extensive areas of unvegetated sandbed, in very much greater proportion than islands with vegetation, and in very much greater quantities than is found today.

Various authors have a number of views about how extensively wooded the riverbanks and larger islands were, prior to western settlers moving into this area. The consensus seems to be that cottonwoods, and some other species, were sparsely distributed along the riverbanks, with fewer trees in the western part of the Habitat Area (for example, where the DEIS figure 2-4 photograph was taken). Larger islands were wooded, with more of these large islands to the eastern part of the Habitat Area. However, discussions about the extent of trees on banks and islands are largely irrelevant to the question of the extent of unvegetated active river channel, which is the key habitat requirement for the target species.

Comment 14651: *Please provide a citation or data showing that sandpits are more susceptible to blowing sand, predation, or human disturbance.*

Response: The referenced section has been modified in the FEIS. Lingle (1993 [nest]) cites predation as the greatest cause of nest failure on sandpits, followed by human disturbance and weather. The author goes on to say "Weather took a larger toll of sandpit nests, since the uniform substrate on the spoil piles was more susceptible to wind and water erosion than riverine substrates."

Comment 14653: *Reference page 4-89. I am confused; nests did not flood nests until 1990? Please read the DEIS reference (two paragraphs down) Faanes (1983) states that all nests were flooded in 1979. From 1985 to 1990 Lingle (1993) shows that 37% of least tern nests and 61% of piping plover's nests flooded. Most nests that did not flood were on artificially cleared islands. The whole theory of being able to predict whether or not an island will get flooded based upon surface water elevation can quickly be disproved by looking at the reports cited. Flows in 1979 got higher than any of the previous 3 years so Faanes 1983 would tend to support that theory. However, all the nests in the Lingle 1988 came after the high flow events of 1983 and 1984. Max flow at Kearney 1983 was 23,700 cfs (stage 7.42 ft), 1984 was 16,100 cfs (stage 6.64 ft), 1985 2,110 cfs, 1896 6,700 cfs (4.85 ft), 1987 6,960 cfs (4.95 ft), 1988 4,900 cfs (4.5 ft). So nesting is not safe even if subsequent flows are 1 to 4 feet lower that the flows that built the bar. This same scenario was observed in 1996 for 5 plover nests at the Rowe Sanctuary. In 1995, the max flow at Kearney was 19,200 cfs (7.43 ft) the nest were flooded by a max flow of 2,300 cfs in 1996. The DEIS needs to better address the relationship of stage and island development and how this relates to use by least terns and piping plovers.*

Response: We agree that the river's capability to build sandbars that would support successful nesting by plovers and terns is currently very limited due to substantial reductions in peak flow and sediment load. Sandbars require sediment and the energy to move sediment. The above studies and flows cited occurred during a period of reduced sediment supply (see "River Geomorphology" section in chapter 5 of the FEIS). Interior believes that the proposed mechanical clearing and leveling of wooded islands and the subsequent release of sediment stored within islands has the potential to increase sediment supply. Increased sediment supply and increase in peak flows are designed to improve channel conditions to the point of supporting nesting by plovers and terns. Any increase in channel nesting success would supplement nesting that currently occurs at Lake McConaughy, on sandpits, and in the lower river channel.

Comment 14655: *How high should a sandbar be to provide successful nesting?*

Response: The bar should be high enough to provide safety from flooding during nest initiation, incubation, hatching, and brooding until young successfully fledged. Elevations would vary depending on recent flow history. Conditions suitable for successful channel nesting would not likely occur every year.

Comment 14657: *Please relate fish kills to tern reproductive out puts.*

Response: The topic of fishkills has been modified and moved to the "Central Platte River Fisheries"sections in chapters 4 and 5 of the FEIS. We have no data that relate fishkills to tern reproductive success. Forage fish are treated in detail in the FEIS, chapters 4 and 5, "Piping Plovers and Interior Least Terns," subsection "Forage Fish".

Comment 14658: *Page 5-102. This table does not match with the one on Page 4-80. If this table assumes a half mile buffer around bridges not being suitable then we are looking at this Program or some organizations that manages the river for cranes as owning at least one bank on 67% to 85% of the remaining 78 miles.*

Response: No correction is needed. The length of protected riverbank (33.5 miles) shown in the table on page 5-102 of the DEIS for Present Condition corresponds with the summed bank lengths given on page 4-80 of the DEIS in chapter 4 (Present Condition).

Comment 14660: *Pages 5-116 to 5-119. These figures indicated the Proposed Program is worse than existing conditions for nesting terns and plovers.*

Response: See response to Comment 14716.

Comment 14663: *Page 2-35. Doesn't having wider channels (historically) in upstream sections of a river indicate some kind of unnatural influence on the channel?*

Response: These were the conditions that existed prior to water resources development, perhaps reflecting fewer topographic constraints on the upstream river width. The exact reason is not determined at this time.

Comment 14664: *Page 2-38. Plat maps were obviously hand drawn and the 1991 Phelps County Plat Maps still look like that. Middle maps shows water was probably a small part of the area. 1938 photos show that 1904 map did not take into account accretion land and trees that must have been there in 1904. What caused the wide areas in the 1938 photos? Please discuss the problems with comparing different mapping techniques.*

Response: The level of accuracy of the hand drawn maps at this location appears consistent with the other maps. The stipled or tan shaded area of the middle map (USGS topographic map) designates the area of bare sand—that is the area periodically inundated by flow that prevents the growth of vegetation. Although the blue lines give an indication of perennial flow, the stipled area designates the width of the braided river. The river width in the USGS topographic map is similar to the hand drawn maps that come before and after (1860 and 1904). Aerial photos from 1938 indicate this area near Overton was the first reach between Overton and the islands downstream of Kearney to transition from braided to anastomosed.

A note was added to the figure caption in the FEIS to explain that red and yellow bars represent the same distance and location in each photo to aid the comparison.

Comment 14665: *Page 3-47 and Figure 3-10. Some simple questions that need to be addressed in the sediment discussion where did the removed material go? What is the sediment deficit at these locations where sediment is being added? At what rate do you add the sediment? At Cottonwood Ranch most islands are wider than the channels, which means we have enough material to fill the channel, there by stopping all erosion (i.e. flow). The channel does not have the capability to accept all the sediment as portrayed. The DEIS team is proposing to augment approximately 300,000 cubic yards (tons) of sediment on average per year of the Program. How will this not cause a localized deposition and thus* *potential changes in flow splits? Which has been speculated as causing channel narrowing in downstream areas (Johnson 1997).*

Response: See responses to Comments 13705 and 13706.

Comment 14667: *Page 4-42. Please provide the correlations of use by the species to changes in the channel width. Other than the stretch 247 to 234 none of these changes would appear to have any biological significance to the species based on data presented in the DEIS.*

Response: There is a substantial body of literature documenting that use of the Platte River in Nebraska by the target bird species is correlated with greater channel width, as well as other habitat characteristics. Loss of channel width has been associated with abandonment of those reaches of the river by the target bird species and similar species such as sandhill cranes. Much of this literature is described in the FEIS and in the National Research Council review (National Research Council, 2005).

Comment 14676: *IMPLAN Model – The analysis utilizes the IMPLAN model to evaluate the secondary effects associated with the direct economic effects of the alternative scenarios. In this regard, a question arises regarding the use of the 1995 IMPLAN data. Surely more recent data were available at the time the analysis was being done. A second concern relates to a point raised in Item 1 of these comments. There is inadequate documentation of the direct effects used to compute the secondary and total regional impacts. Moreover, it would be beneficial if the direct and secondary economic impacts associated with each element (recreation, land acquisition, water leasing, changes in agricultural production, etc.) were identified for each program alternative.*

Response: IMPLAN data have been updated for the FEIS to 2002, which is the most recent available as of the EIS analysis. The direct impacts attributable to the Program that were input into the IMPLAN Model are contained in a table in the "Regional Economics" section of chapter 5 of the FEIS. A more detailed description of the direct costs is provided in the *Economics Appendix* in volume 2.

All of the elements for each alternative (e.g., land purchases, construction, payments for water leasing, changes in reservoir operations) are evaluated together to determine the total impact of the alternative on the regional economy, therefore impacts from individual elements are not analyzed. However, considerable detail regarding the impacts of alternatives on various sectors can be found in the output data files from the IMPLAN Model runs in the *Economics Appendix* in volume 3 of the FEIS.

Comment 14677: *The thickness of the active riverbed layer was not properly computed in the version of the model that I reviewed. It was assumed that the active riverbed layer was a constant thickness throughout the hydrograph routing, and therefore, differential bed scour for different flow magnitudes was not considered. This simplification causes errors in the sediment transport capacity determination and in the overall results of the model.*

Response: In the current version of the model (SEDVEG Gen3) active layer thickness is computed as a function of the sediment transport rate. The active layer thickness can be limited to the thickness of the armor layer.

Comment 14678: *An acceptable and established method for modeling bank erosion or river lateral migration has not been developed. The methodology used in the model is conceptual and it was not possible to calibrate for a lack of suitable data.*

Response: The method used for bank erosion in SEDVEG is described by the ASCE Task Committee on Hydraulics, Bank Mechanics and Modeling of River Width Adjustment (1998) as one of two methods used in the 12 models evaluated. As recommended in this paper, bank erosion for the Platte River

SEDVEG Gen3 Model was calibrated using data from 6 repeat cross sections from a habitat study site near RM 226 and RM 227 (Murphy et al., 2006).

Comment 14679: *The lateral distribution of sediment along a transverse cross section is not based on any proven theory. To be acceptable, this routine should be improved and thoroughly verified.*

Response: After 5 years of testing, Reclamation is very satisfied with the results of Dr. Murphy's innovative use of the Rouse parameter first applied in SEDVEG Gen1. Reclamation has concluded that this feature, which allows a 1D model to distribute finer grain sizes to the overbank area (across the second dimension), could be incorporated into a second Reclamation sediment transport model, GSTAR-1D.

Comment 14680: *The model does not compute both degradation and aggradation on the same cross section at the same time step. Under natural conditions, a riverbed can both scour and aggrade at the same time along a cross section. This limitation of the model is important because changes in riverbed contours affect vegetation establishment or mortality, and cause a change in response throughout the hydrograph routing.*

Response: The model computes aggradation and degradation for 10 different grain sizes at each point in the cross section. Fine material can be eroding while, at the same time, coarse material can be depositing. Also scour can occur in the thalweg while deposition occurs in the overbank area. Erosion can also occur during the rising limb of a hydrograph and deposition in overbank areas during the falling limb of a hydrograph. All of these processes introduce changes in riverbed contours which affect vegetation establishment, growth and mortality.

Comment 14681: *The form of sediment transport is not properly addressed in the model. Transport by macro-forms, or even as dunes, is not considered. This over-simplification has the potential to misrepresent any extrapolation of sediment transport. The miscalculation of bed erosion transfers the errors to the vegetation erosion routine, and consequently causes a chain reaction of imprecision though the entire model routing process.*

Response: Dunes (macroforms) which are large enough to be significant in sediment transport volume calculations, yet small enough to escape detection in cross section spacings of 1.45 miles (see response to Summary Comment 25) have not been detected or measured in the critical habitat reach of the Platte River. JF Sato and Associates (2005) reported that the loss of conveyance at the city of North Platte was due to aggradation with additional factors such as Phragmites, growth of a sandbar, and drainage issues in the overbank area. No large macroforms were detected.

Comment 14682: *The model was incapable of predicting the formation or erosion of sandbars. The dynamics of sandbars along a river channel is an important characteristic for vegetation mortality rate.*

Response: The model does allow some evolution of irregularities in the bed of the modeled cross section. These irregularities and the sideslopes of banks and islands can support vegetation growth and mortality depending on the flow regime. The vegetation then affects sediment transport as intended through bank resistance.

Comment 14683: *The hydraulic routing algorithm uses a simplified method to compute the hydraulic variables. State-of-the-art algorithms available in other models simulate flow routing with better precision. The procedure utilized in the SEDVEG model is based on normal water depth. Although backwater or 2-D models or methods are widely available, they were not used.*

Response: The incorporation of a step-backwater computation of water surface elevation is one of the improvements proposed by Reclamation for the next revision of the SEDVEG code (SEDVEG Gen4). However, the current assumption of normal depth is relatively accurate in most reaches of the Platte River. The water surface varies from normal depth at more locations when the river has: high gradients; large woody debris loads or immoveable boulders; structures that influence flow; and, high sinuosity and sharp bends. Since the Platte River has very few locations with these conditions, there appears to be few locations where an assumption of normal depth hinders the model. The one notable exception is the reach immediately upstream of the Kearney Diversion.

2-D models provide information on secondary flow currents that 1-D models like SEDVEG can not provide. Secondary currents contribute to sandbar formation and contribute to channel widening and deposition. However the computational demand of a 2-D model, and the data required to construct the model, far exceeds computational demand and data requirements of a 1-D model. For these reasons a 2-D model can not be used to analyze the entire 90 miles of the critical habitat reach as a single system. As recommended in the ASCE Task Committee's hierachel approach (1998), a 1-D model (SEDVEG Gen3) is being used for the initial assessment. A 2-D model is recommended for the analysis of specific sites that may be needed after this Programmatic FEIS.

Comment 14684: *The review of the vegetation parameters available in the Geomorphic Appendix issued November 12, 2003, shows that some of the values are unrealistic. For example, the root growth rate for March to October is set at 0.50 ft/mo for cottonwood, and 0.375 ft/mo for willows. In the model, a positive value means upwards, and a negative value is downwards. These values and sign conventions for the coefficients mean that the roots can grow upwards, out of the ground. The magnitude of root growth with respect to the water table is set to –99 feet for willow. The high band limit for cord grass was set as 99 feet. Both values seem to be outside a reasonable range.*

Response: This typographic error has been corrected in the report *Platte River Sediment Transport and Riparian Vegetation Model* (Murphy et al., 2006). An examination of the input files for the DEIS and the FEIS shows both sets of runs used the correct negative values for root growth rates: -0.50 ft/mo for cottonwood, and -0.375 ft/mo for willows.

The "magnitude of root growth rate" is actually the limit of root growth with respect to the water table or capillary fringe. Willows are highly tolerant of having wet roots so the limit was set by Simons and Associates presumably to avoid limiting growth based on saturated soils. Cord grass is not tolerant of having saturated roots and the limit shown in Murphy et al. (2006) in the input files of the DEIS runs and in the input files of the FEIS runs, is +1 feet.

Comment 14685: *The same Geomorphic Appendix also states that the VEGICE routine was activated to obtain the calibration. The VEGICE routine simulates the removal of vegetation due to the ice dragging effect. The ice routine of the model was very active in removing vegetation, and therefore was a major factor in the dynamic of the model. However, the data used to calibrate the parameters for this routine were very limited. Only one event was used to determine by regression the pertinent coefficients. Unless more data have been used to calibrate these parameters, in my opinion, the results of the VEGICE routine are not reliable and this routine should not be used.*

Response: Under Present Condition, the VEGICE routine in SEDVEG Gen3 accounts for 9 percent of the vegetation mortality which appears reasonable. It is the 4th ranked cause of vegetation mortality out of the 5 causes modeled. Velocity scour, bank failure, and dessication remove more plants, inundation removes less plants. However a second calibration of the VEGICE subroutine has been added to the list of proposed improvements for the next revision to SEDVEG code.

Comment 14686: *Pg 4-41, Figure 4-8 caption should read 61, not 16.*

Response: The referenced figure has been re-configured in the FEIS.

Comment 14687: *Figure 2-13 does not show any small, in-channel islands. These are also missing from the plat maps because they were not surveyed. The caption for this figure should make the point that such islands probably existed but were not shown.*

Response: Figure 2-13 was removed in the FEIS. The extent of channel islands receives more discussion in chapter 2.

Comment 14688: *Page 2-37. The DEIS emphasizes narrowing of a small portion of the river in recent decades (that may actually have been caused by upstream clearing operations) while not reporting other reaches that have consistently widened during the same period (Johnson 1997). Also, the South Platte River narrowed earlier than the Platte nearly a century ago; more recently channel widths have increased or remained stable, contrary to that stated on 2-37, 38.*

Response: Figure 2-14 on page 2-37 of the DEIS shows measures of width from North Platte to Chapman, so the reader can observe trends. This figure shows very substantial narrowing throughout this lengthy river reach. This is the major focus of the analysis. References to river narrowing have been revised to reflect that most narrowing had occurred by the 1960s. Discussion of width changes on the South Platte River have been removed since the information was no longer pertinent.

Comment 14697: *There is very little documentation to support the Central Platte OPSTUDY model referenced in either the DEIS for the Platte River Recovery Implementation Program or supporting technical appendices. One document that is referenced, the 1999 USBR "Review of Present-Conditions Stream Reach Flow Gains for the Central Platte River OPSTUDY Model, Platte River EIS" reportedly contained data errors which resulted in calculation erroneous reach gains. The USBR corrected these data errors but failed to revise suggested flow adjustments identified for the North Platte to Brady and Cozad to Overton reaches to account for present-conditions.*

Response: Additional documentation has been prepared for the FEIS; see *Central Platte River Model (OPSTUDY8) Technical Documentation and Users Guide* in volume 3. The errors referred to in the Central Platte River OPSTUDY Model were corrected prior to the analyses for the DEIS. These errors are not in the report referenced in the comment.

Comment 14698: *Corrected reach gains used in the Central Platte OPSTUDY model were modified to included the gain adjustments. These adjustments overstate the availability of water in these sections of the Platte River by literally adding 2,274,200 AF of erroneous gains to the reaches from North Platte to Overton. For the 1947 through 1994 study period presented these adjustments averages 56,750 AF per year, approaching the water values of some of the alternatives evaluated. In addition, the impact of altered flow regime to reach gain was not conducted, also resulting in the use of erroneous reach gains used in the Central Platte OPSTUDY model.*

The Central Platte OPSTUDY model is an accounting of reservoir operations and resulting flow and use information. The amount of water in storage in Lake McConaughy for a given time period is equal to the difference between inflows and releases adjusted for losses such as evaporation and seepage. Three primary components are critical in the Central Platte OPTUDY model. These are system inflow, both from the North Platte River above Lake McConaughy, the South Platte River at Julesburg, downstream demands, and reservoir operating rules. Downstream demands are first met based on available or usable reach gain and the remainder of the demand must be satisfied from releases from Lake McConaughy. By increasing gains in the North Platte to Overton reaches the amount of water to be released from Lake

McConaughy is reduced, resulting in increased water in storage. In the case of Lake McConaughy changes in storage have other ramifications such as altered lake evaporation and bank seepage.

Comparison of alternatives, as presented in the DEIS, based on these erroneous reach gains are invalid and foster a false expectation of the availability of certain flow conditions in the future.

Response: The gains and losses used in the Central Platte River OPSTUDY Model were originally updated by Fred Otradovsky (Bureau of Reclamation) in the early 1980s. The gains and losses used in the Central Platte River OPSTUDY Model were updated by the Great Plains Region of Reclamation in 1999. This was done in response to comments made by several people in Nebraska who are knowledgeable of the hydrology of the Platte River. The report on how the gains were adjusted is available from the Platte River EIS office and was part of the documentation provided with the DEIS *(Review of present-conditions stream reach flow gains for the Central Platte River OPSTUDY Model,* 1999).

Gains have increased in the Platte River as a result of higher groundwater and it is common practice to bring everything up to date when developing a model. The Department of the Interior is interested in refining reach gains during the First Increment of the Program.

For the FEIS, gains for the action alternatives were reduced by amounts estimated by Nebraska to account for increased groundwater usage in the Platte River Basin in Nebraska. The gains have also been reduced to account for estimated Federal depletions. The adjustments sum to 21,400 acre-feet per year, which equals 1,025,280 acre-feet for the entire period.

The FEIS uses the Central Platter River OPSTUDY Model as a comparative tool. The FEIS quantifies improvements compared to Present Condition, not compared to historic. Because the FEIS includes gain reductions due to increase groundwater pumping and Federal depletions for the action alternatives, gains are actually reduced compared to Present Condition.

Comment 14699: *A great deal of discussion and presentation is placed on daily flow comparisons in the DEIS and supporting hydrology presentations. There is absolutely no documentation provided as to HOW the USBR transformed monthly flow data to daily flow data. It was a fairly easy process to determine how Present-Condition daily flow values were obtained from historic data because the pattern or sequence of daily was not disrupted and a relatively simple approach of either adding a constant value for each day or subtracting a constant or percentage difference was applied. The adjusted pattern of daily flows for Present-Conditions follows historic values.*

This is not the case for alternatives that are intended to deviate from historic pattern of flow. There appears to be a hodge-podge of methodology applied to obtain a desired sequence of daily flows for the Water Emphasis alternative that was evaluated. Whether this can truly be realized in the operating world it is anybody's guess and that should not be left to reviewer's of a document that is dealing with such high stakes. No valid comparison of alternatives can be made when the scoring of these alternatives is based on so little foundation. An objective review can not be completed until documentation and justification of the manner of adjustments to arrive at daily flow values is provided.

Response: Documentation has been prepared for the *Water Resources Appendix,* volume 3 of the FEIS. Most of the flow management for the alternatives involves flows quite similar to Present Condition. The flow management that departs significantly from the Present Condition envelope of operations is the short-duration high flows. Accomplishment of these flows rests on the commitment of the Governance Committee to create the Program capacity to move 5,000 cfs of Program water to the habitat. FEIS modeling of these flows is based on best available tools, but further investigation of options for creating these flows is part of the Program's activities.

Comment 14701: *A review of historic short-duration high flow releases during the months of April and May indicate that the section between Keystone and North Platte results in a change in gain regime going from gaining section to losing section. Review of data from 2002 and 2003 indicate that the threshold for this change occurs near the 1,000 cfs flow rate. Losses increase with flows greater than 1,000 cfs. The expectation that short-duration high flow releases will be transferred to North Platte to include a section gain is incorrect and the comparison of this alternative to one without short-duration high flow releases is invalid.*

Response: A working group continues collaborative work on predicting and managing pulse flows through the Central Platte River system. Also see response to Comment 14699.

Comment 14704: *Page 2-14. The "Water Diversions and Storage" section focuses almost exclusively on impacts and affects related to agricultural water use. This DOI bias appears to imply agricultural impacts are the sole source of water impacts and in the process fail to address a broader perspective of multiple water use. Such beneficial uses as domestic, municipal, industrial, hydroelectric, recreational, flood control and associated wildlife benefits are conveniently ignored in this write up.*

Response: The DEIS describes the many beneficial uses of the Platte River water in the Introduction. However, in terms of the activities that have the greatest effect on riverflows, consumptive use of the Platte River for agricultural production is 10 to 15 times greater than for all other uses combined, as stated in chapter 2.

Comment 14705: *Page 2-21. The second paragraph on the page describes the Platte basin as "one of the most highly developed river basins in the U.S." However, when it conveniently suits the needs of the DOI, they describe it very differently. On page 4-96 the DOI note that the lower Platte exhibits some facsimile of the predevelopment seasonal hydrograph. The Pallid Sturgeon recovery plan describes the recovery-priority management areas (including an area at the mouth of the Platte as "typically the least degraded and have the highest habitat diversity, and in some reaches still exhibit a natural channel configuration of sandbars, side channels and varied depths."*

Response: The text of chapter 2 in the FEIS has been expanded to indicate that while the Platte River above the confluence of the Loup River is one of the most highly developed river basins in the U.S., the input from the Loup River and especially the Elkhorn River, which is largely unregulated, makes the hydrologic conditions of the Lower Platte more similar to pre-development conditions.

Comment 14706: *Page 2-23. The DEIS contradicts itself regarding historical records of Platte flows. The final paragraph on the page notes that historic "low summer flows in the Platte River (are) hard to quantify, given the lack of gauge records from the early development period (pre-1900)" and "little is known about the low-flow behavior of the river above the confluence with the Loup River prior to irrigation." The DEIS fails to explain then, how these same historic records allow such extensive DOI analysis of historic peak flows and annual flows.*

Response: See response to Comment 14137.

Comment 14712: *Page 4-56. If high water temperatures are a problem in the current central Platte River, how much more deleterious to fish and other life forms that constitute forage for least terns and piping plovers, will the situation be after more trees shading Platte waters are felled as part of a Program? How will island squishing further affect summer temperatures?*

Response: The shading effect is only applicable to the shallow water near the shoreline. The temperature analysis was based on data that were not collected in the shade of trees and would still apply whether the trees are removed or not.

Comment 14715: *Page 5-90- The invasive species section fails to address such plants as phragmites and salt cedar.*

Response: The FEIS has been revised and now includes a discussion of phragmites and saltcedar. Saltcedar was added to Nebraska's noxious plant list in January 2005, after the DEIS was written. Phragmites was also added to Nebraska's noxious weed Watch List in 2005.

Comment 14716: *(reference pages 5-116 to 5-119 and 5-125 to 5-134) These data essentially indicate the Program would perform worse that existing conditions for nesting least terns and piping plovers, if any would nest on the river.*

Response: "Piping Plover and Interior Least Tern" sections in chapters 4 and 5 have been modified for the FEIS. Many of the graphics from the DEIS have been replaced with tabular data. It is likely that the proposed alternatives would not provide ideal nesting conditions for plovers and terns on an annual basis. However, with sediment augmentation and some re-distribution of flows, conditions may improve to the point that successful channel nesting can occur in some years. This would be an improvement over Present Condition, but is limited by the amount of flow management that can be accomplished by the Program.

Comment 14719: *The DEIS provides no estimates or measurements of habitat quantity and quality. No estimates of populations or reproductive trends are provided. No estimates of duration of habitat use or the function of habitat elements is provided.*

Response: The DEIS and FEIS provide extensive data on the extent of habitat meeting the criteria established by the Governance Committee as suitable for the target species. See especially chapters 2 and 4.

Comment 14720: *P. 2-49. The DEIS makes selective use of statistics and is misleading. Data from angler accounts cannot be regarded as confirmed sighting due to the similarity in appearance with the shovelnose sturgeon (even experts have difficulty distinguishing the two species). In addition, less than 2 percent of possible Pallid use data is from the Platte when considering a more complete data set.*

Response: See response to Comment 13920.

Comment 14722: *P. 5-142. The Program has absolutely no responsibility to "buffer" activities on the Loup River and the reference should be removed.*

Response: While the Program does not have a responsibility to buffer the results in the Lower Platte River of activities originating in the Loup River, this is simply one way that the Program, as defined, might provide benefits to the species. In the interest of identifying the widest possible list of opportunities to benefit the target species, this section has been retained.

Comment 14723: *P. 5-143. The DEIS states there is insufficient information on fall and winter. In fact, the DEIS must recognize that there is insufficient information for all periods. Where there is insufficient information on flow and benefits, we question how one can correlate cause and effect.*

Response: Comment noted.

Comment 14724: *P. 5-144. One of the principal objectives of monitoring and research for the Pallid is to determine if and when it uses the Platte, not simply to define benefits.*

Response: Comment noted. See response to Comment 14850.

Comment 14725: *The DEIS indicates that Buffalo and fire kept the banks with few trees. It should be recognized that water development did not directly affect these processes.*

Response: Comment noted, but see response to Comment 14646 indicating that the river channel, rather than banks, are the key habitat for the target bird species.

Comment 14726: *The DEIS estimates that bridges and bank stabilization have affected 28.5 percent of the channel. It should be recognized that these "impacts" are not the attributable to water development.*

Response: Comment noted.

Comment 14727: *P. 2-7. Whooping Cranes do not roost on sandbars. In addition, no fluvial geomorphic data has been presented indicating that sandbars are formed by overtopping with water.*

Response: The wording of roost habitat descriptions and crane behavior in chapters 4 and 5 has been clarified. Also see responses to Comments 14184, 14602, 14171.

Comment 14728: *P. 2-8. The DEIS states that Whooping Cranes prefer channels with widths of 200 yards (600 feet or more) and the data substantiates this. Yet the DEIS incorrectly performs its analysis and contains conclusions suggesting that much wider channels are needed.*

Response: The text of FEIS is clarified to state that channels where whooping cranes have been observed range from 172 feet to well over 1,000 feet. The frequency of use is most concentrated at the wider channels of this range; and increases disproportionately to availability as channel width increases (see figure in "Habitat Features Historically Used by the Target Species", FEIS chapter 2). Biologists interpret this type of data as increased preference for widest channels. An interagency biological technical committee (Biology Workgroup, Platte River Management Joints Study, 1990) considered channels 1,150 feet (and wider) to be most suitable. The Program also provides for systematic monitoring to refine and apply crane roost site preferences using adaptive management.

Also see the response to Summary Comment 49 in the "Summary Comments and Responses" section of this document.

Comment 14729: *P. 2-9. No data is presented substantiating the need for wet meadows and the relationship to flow during migration.*

Response: Available investigations of groundwater and groundwater-surface water relationships are cited in the FEIS. No alternate data analysis are known to exist, however, further investigations under adaptive management are one Program purpose (chapter 3). Also see response to Summary Comment 49.

Comment 14730: *P. 2-9. The DEIS must analyze the impact of flows receding early in the nesting season and the Service's whooping crane roosting flows and peak and pulse flow recommendations.*

Response: No conflict exists between base flows for whooping crane roosting (which ends on May 10) and the base flows for tern and plover nest season (which begins May 11). In circumstances where overlap occurs between pulse flows (which will vary to a degree in timing, duration, and magnitude year-by-year) and the species base flows, the higher priority pulse flows supersede base flows.

Comment 14731: *P. 2-9. The referenced flow values for forage fish are based on a minor component to the fish assemblage. No data is presented showing the size and distribution of the forage fish community and historical trends. No analysis of forage fish availability is provided historically or presently.*

Response: Please see the revised "Piping Plovers and Interior Least Terns" section in chapter 4.

Comment 14733: *P. 2-28. The reference to Tamarack in the context of the Gothenburg and Dawson canal projects is misleading in regard to the timing of yield from the Tamarack project versus the Nebraska project and should be clarified. The Tamarack projects benefits are not a 9 year lag and benefits would be realized earlier in the Program.*

Response: The reference to the Tamarack Project is made in relation to the process of diverting water from the river so that it will return to the river through the ground at a later time in order to improve the timing of flows in the Habitat Area.

Comment 14734: *P. 4-40. The opinions on vegetation are not supported. Is this process of vegetation mortality supported by observations in river miles 206-160? How much burial must occur in depth of sand and for how long? What is the critical period of inundation? Figure 4-8 shows that sufficient channel widths exist under present conditions and will persist after 61 years.*
Response: *This section has been revised to address these questions. Also see Murphy et al. (2006) in volume 3 of the FEIS.*

Comment 14739: *P. 4-88-89. The DEIS does not analyze the conflicting flow management objectives established by the Services flow recommendations. Establishing tern and plover nesting in April- June and at the same time establishing flow goals for whooping cranes and pulse and peak flows which would result in the potential take of terns and plovers needs to be analyzed, discussed and resolved. The DEIS does not analyze the conflicting flow management objectives established by the Services flow recommendations. Establishing tern and plover nesting in April- June and at the same time establishing flow goals for whooping cranes and pulse and peak flows which would result in the potential take of terns and plovers needs to be analyzed, discussed and resolved.*

Response: See response to Comment 14621.

Comment 14740: *P. 4-91. In the previous discussion nest inundation is cited without any nest elevation data. Here the DEIS cites Ducey (1982) as reporting that higher river flows in spring made a Lower Platte River sandbar longer and reduced the elevated area. Then, referring to another riverine location, Ducey is quoted as stating that the sand bar had been cut by the river. It appears that Ducey's observations are not consistent with the opinions and predictions of the Sed Veg model.*

Response: This section of the FEIS has been revised. The SEDVEG Model does not model at a scale of individual sandbars.

Comment 14741: *P. 4-91 Please remove the speculation regarding suitable elevations of sand bars, which is not defined, and the conjecture that flood flow quite likely created new habitat.*

Response: See responses to Comment 14655 and Summary Comment 35 in the "Summary Comments and Responses" section of this document.

Comment 14742: *P. 4-80 This table needs to be revised to include lands under ownership and lease of Nebraska Public Power District and Central Nebraska Public Power and Irrigation District. It is* *astonishing to note that a majority of the Central Platte River is currently under management for the conservation and protection of the species.*

Response: See response to Comment 13892.

Comment 14743: *P. 5-47-48 The DEIS is inconsistent in its handling of issues which can be addressed by monitoring and research and adaptive management. In this example, the authors have interpreted the North Platte and Cozad conveyance issues differently. In the former case the DEIS suggests the issue is a limitation of the program; and in the latter case they correctly reference the need to monitor, determine issues, and develop responsive actions.*

Response: The Governance Committee has proposed measures to restore channel capacity at North Platte, and these measures have been incorporated into the FEIS analysis. While recent data and events have made clear the restricted capacity at North Platte, the question about the capacity of the river channel at Cozad is not clear. As described in the DEIS, not all of the river channels in this location are gauged, so there is not a comprehensive measure of channel capacity. Based on past flood events and opinions of local water managers, the capacity appears to be close to 10,000 cfs. However, given the lack of complete gauging, the EIS recommends that monitoring of this location be undertaken before the Program initiates any flow near this magnitude.

Comment 14747: *P.5-53 The DEIS does not describe the limitations/offsetting impacts of channel widening. For example, as the channel is widened the stage change from increased flow is reduced. Yet increased stage change is stated as a desired outcome. The DEIS must specify the critical widths and tradeoffs and how they were developed. In addition, it must analyze how well the wider channel can be maintained as velocities will also be reduced.*

Response: The sediment transport model, SEDVEG Gen3, is used to provide these types of analysis. Please see indicators in the "River Geomorphology" section of FEIS chapter 5 such as sandbar height potential, width to depth ratio, and length of braided or wide river resulting from mechanical plans.

Comment 14749: *P. 5-90 The DEIS accepts mechanical and chemical means for controlling vegetation that may be an adverse impact of the action (i.e., purple loosestrife), but is not supportive of using these mechanisms for habitat management. These contrasting views should be explained.*

Response: Chapter 3 of the FEIS includes descriptions of both mechanical and chemical means of removing trees and shrubs for habitat management.

Comment 14753: *DEIS does not provide data to support opinion that the river is stagnant in terms of sandbar formation.*

Response: Discussions of sandbar formation and transformation rates can be found in the "River Geomorphology" section in chapter 4 of the FEIS.

Comment 14754: *The DEIS should provide the data supporting the opinion that plovers "select" for wide channels. What is the definition of wide and how was it developed? The commenter is unaware of any such data.*

Response: The referenced section (page 5-131) has been modified in the FEIS. There is no reference to "selection" by plovers in the FEIS. Ziewitz et al., (1992) combined data for both plovers and terns and found "nest sites" occurred at significantly wider channel locations than non-nest sites. Kirsch's (1996) analysis of channel widths' indicated terns "prefer" wide channels. Both studies were conducted in the lower river.

Comment 14755: *The DEIS inappropriately elevates the importance of, and impacts to, wet meadow habitat. There is uncertainty regarding nutritional needs and food types ingested during crane migration. Whooping crane foraging data suggest extensive use of other land covers for foraging (i.e., irrigated fields). The DEIS describes a 31% increase in lowland grass from 1982-1998. This increase adds approximately 7,000 acres of lowland grass, for a total of 28,000-30,000 acres of this land use type. Yet the DEIS directs its analysis toward projecting hypothetical processes relating to "impacts" to wet meadows, rather than acknowledging and emphasizing the positive trends in lowland grass resources. The DEIS also discusses impacts to wet meadow hydrology and river stage without presenting any data for present conditions or historic trends. This misportrays the nature and magnitude of projected environmental consequences to the species.*

Response: The potential impacts of the Program on wetland functioning are incorporated in the Environmental Impact Statement for several reasons. Wetlands are widely reported in scientific literature as a component of the species life history, and the aquatic and semi-aquatic habitats constituting whooping crane feeding habitat under whooping crane critical habitat designation. Wet meadows are a component of the Recovery Program recommended by an interagency biological technical committee (Biology Workgroup, Platte River Management Joint Study; FWS 1990), and wetlands are a recognized national interest for environmental protection and conservation.

See the response to Summary Comment 49 (in the "Summary Comments and Responses" section of this document), for a description of the best available information of whooping crane food materials.

Further examination of the land cover data indicates several reasons for the apparent increase in lowland grasslands between 1982 and 1998. The primary reason is clearing of wooded parcels on the Whooping Crane Trust properties as well as private lands through Partners for Wildlife. However, the increase is also related to differences between the 1982 and 1998 GIS land cover/land use databases and differences in photo interpretation and flood plain boundary definitions. Apart from these actions, there does not appear to be a general increase in lowland grasslands.

Comment 14756: *The DEIS disproportionately focuses on riverine processes and underestimates the value of land management in the securing of habitat. For example, the DEIS team offers the false opinion that "over the long-term. . . habitat is more strongly influenced by the water plan." The period at issue for the DEIS, however, is 13 years; the land management methods under the Action Alternatives will result in the most immediate and dramatic changes in habitat, removing in many cases land covers that are over 40 years old and that have been subject to and not altered by flows far in excess of flow recommendations.*

Response: Comment noted. The long-term analysis in the DEIS has been dropped. The FEIS analysis focuses on the 13-year First Increment of the Program.

Comment 14757: *The DEIS team has a clear bias toward "wider is better" habitat, yet does not discuss the consequences and trade offs involved with such an approach. An example is in the discussion of open areas for terns, where the authors state the need for wide channels "presumably for early predator protection." This is speculation; the authors do not have data on predation and the relationship between sight distance and predator success. Wider channels may in fact be more difficult to manage and river stage changes will be reduced. This is not analyzed in the DEIS.*

Response: Minimum widths are needed for certain of the target species to use areas of river channel for nest or roost. Kirsch's (1996) analysis of channel widths' indicated terns "prefer" wide channels.

Ziewitz et al., (1992) combined data for both plovers and terns and found “nest sites” occurred at significantly wider channel locations than non-nest sites. So, restoration of channel areas where historically wide channels have been replaced with multiple narrow channels must necessarily involve widening the channel and increasing the open view.

Increasing a channel’s width does reduce the stage change associated with a given change in flow volume. This may mean that the maximum absolute elevation of sandbars in the widened channel will be lower than could be produced in the narrower channel. However, the frequency of overtopping of those sandbars will not change. In other words, nest security remains the same for given changes in flow because a given change in flow produces a smaller rise in water elevation. We note that most of the successful tern and plover nesting occurs in the Lower Platte where sand supply is abundant and where the river channel is very wide. Nest loss to predation can be quite high especially on unprotected sandpits (Lingle, 1993).

The relationships between channel width, flow, and sediment transport are discussed in the “River Geomorphology” sections of the FEIS.

Comment 14758: *The Sed Veg model should not be used to describe impacts, set performance standards or impact thresholds, or to make comparisons among alternatives. Given the uncertainties in the knowledge, a more qualitative assessment is needed with the understanding that the final Program would be structured to monitor actual effects and make adjustments through Program Adaptive Management to offset negative impacts as appropriate using proven habitat management methods.*

Response: Comment noted. The preferred alternative proposes that the methods for restoring channel habitat be tested and monitored over a 3-year period at a small scale and, if successful, increased in scale with continuous monitoring. Also see response to Summary Comment 23.

Comment 14762: *Page 4-101, Top of the page - Please provide a better description than “Upper Platte Basins.” Are you trying to describe the entire Platte River basin above the confluence of the Loop River?*

Response: The text has been changed to indicate that this applies to the Platte River Basin above the Loup River.

Comment 14763: *Page 5-15, Figure 5-2-Environmental Deliveries - Wyoming officials have repeatedly advised that delivering EA water in September would allow more efficient administration and protection of the releases for the following reasons:*

a. *It is not realistic to suggest environmental deliveries in April. The reservoirs are still accruing storage water. In some years, the gates at Guernsey Reservoir may be closed in April and it is very unlikely they would be opened to just accommodate environmental deliveries.*
b. *Protecting environmental deliveries in Wyoming and Nebraska in May, June, July and August would be very difficult for state water officials due to the demand for irrigation water. In addition, the conveyance losses on deliveries would be considerably higher in these months than they would be in September.*

Response: All releases of environmental water from Reclamation’s reservoirs in Wyoming are simulated as occurring in September in the FEIS.

Comment 14764: *Page 5-231 - Last sentence continuing to page 5-232-Change “Changing the timing and amount of releases….” to “Changing storage patterns…..”*

Response: Comment noted.

Comment 14765: *Page 5-88 - A reference is made to Table 5-11 regarding flows at Julesburg. Table 5-11 depicts average end of month reservoir levels.*

Response: This inconsistency has been corrected in the FEIS.

Comment 14766: *On page 5-148, Indicators, Table 4-38 is an incorrect reference. Change the reference to Table 4-40.*

Response: This has been corrected in the FEIS.

Comment 14767: *Pg 5-166, first line - Should the Governance Committee Alternative be changed to the Water Emphasis Alternative?*

Response: The identified section has been corrected in the FEIS.

Comment 14768: *Pgs 5-202 - Lake McConaughy White Bass Reproduction - The text on page 5-201 does not appear to correlate with Figure 5-34.*

Response: The scale on the graphic makes it difficult to perceive the differences between alternatives. This text has been clarified in the FEIS.

Comment 14775: *Alcova Reservoir may be an adequate buffer for the poor water quality (low dissolved oxygen and high BOD) when Pathfinder Reservoir is drained, but in the situation when both Seminoe and Pathfinder have been drained, we expect poor water quality in Alcova. Assuming poor water quality will*

be present during the periods of low discharge (releases below Gray Reef Dam cannot exceed the cumulative flows into Seminoe and Pathfinder) we expect extremely adverse impacts to the North Platte River fishery below Gray Reef Reservoir.

Response: See response to Summary Comment 13. Under the most recent update of the operations hydrology, Seminoe Reservoir is not drained as much as it was in the operations used in the DEIS. However, Pathfinder would be. These effects are analyzed in the FEIS.

Comment 14777: *While information is presented on the North Platte River and reservoirs, the Adaptive Management approach does not allow an analysis of other potential impacts. As an example, water may be leased in La Prele Reservoir. We certainly cannot attempt to address potential aquatic impacts with this information. However, we find no description of the proposed process to evaluate potential impacts if water is leased for the project.*

Response: The current NEPA analysis of the Program alternatives focuses on the effects on the Platte mainstem reservoirs and river and the consequences to habitat and local economies of those aspects of the Program which are known at this time. As described in the DEIS and clarified in the FEIS, all elements of the Water Action Plan, including leasing from La Prele Reservoir, are subject to further feasibility analysis prior to implementation, including NEPA analysis of their local impacts and effects.

Comment 14785: *Page 4-157, Paragraph 2. Channel catfish were last stocked in 1998.*

Response: This correction has been made in the FEIS.

Comment 14791: *Page 4-164, Paragraph 3. The fishery downstream of Guernsey Reservoir is marginal because there is no established maintenance flow.*

Response: This correction has been made in the “North Platte River Basin Fisheries” section of chapter 5 in the FEIS.

Comment 14792: *North Platte River Basin Fisheries Page 4. The author suggests that large changes in water level that occur every 3-4 years may be beneficial to the fishery by allowing terrestrial vegetation to become established, then re-flood. Recommendations by Ploskey (1986) are offered for late summer drawdowns to allow terrestrial vegetation to establish and then be flooded in the spring. Ploskey conducted a sound review, but these recommendations were drawn from a fairly limited geographic range (temperate/southern reservoirs). Ploskey’s recommendations should not be extrapolated to Seminoe and Pathfinder reservoirs that are at high elevation with short growing season and low soil productivity. No significant amount of terrestrial vegetation has ever established below the high water marks of Seminoe and Pathfinder reservoirs with the various drawn downs that have occurred since they were constructed.*

Response: The language has been deleted in the FEIS.

Comment 14803: *The DEIS states that the Federal Government will pay 50 percent of the program costs and the States will pay the other half. We hope that the Federal Government share will be classified as non-reimbursable and not considered as reimbursable multipurpose costs, which then would have to be repaid in part by power customers. We hope that the work at Pathfinder Reservoir, for example, be classed as non-reimbursable.*

Response: See response to Comment 14798 under Western Area Power Administration in the “Responses to Comments from Cooperating Agencies” section in this document.

Comment 14805: *There is another financial aspect to this DEIS that is troublesome. In the water-leasing element, water districts or individuals are to be compensated at market rates for irrigation water. That irrigation water is part of the Pick-Sloan Missouri Basin Program, and as such, not paid for entirely by the entities that would receive market rates. Under the Aid-To-Irrigation in Pick-Sloan, federal power customers pay a substantial portion of irrigation costs. Where the water being leased is Pick-Sloan Missouri Basin Program project water, the rate of compensation must be reduced to reflect the Aid-To-Irrigation payments and obligations of federal power customers.*

Response: Comment noted.

Comment 14806: *Mid-West would like confirmation on how Primary Program costs will be paid for. It is our understanding that the affected states are bearing 50 percent of the costs, and the U.S. Treasury the other 50 percent. Mid-West assumes that the Primary Program costs will be non-reimbursable, i.e. they will not be made an obligation of the power function in the Pick-Sloan Missouri Basin Program. If assigned for repayment by the power function, and when combined with impacts on power generation and availability, the rate impacts would be unacceptable.*

Response: See response to Comment 14798 under Western Area Power Administration in the “Responses to Comments from Cooperating Agencies” section in this document.

Comment 14811: *Effect II. Any Pathfinder Enlargement, 54,000 AF, will require water flow from the Upper North Platte drainage in Wyoming. Walden and Colorado area will not be effected.*

Response: We concur.

Comment 14812: *Having looked at some of the material in the EIS, particularly the technical appendices that cover those models, I would say that the level of impact -- or the precision with which the EIS reports levels of impact exceed the precision of the models that are employed to do that. And, in the Final EIS, I hope that the EIS team can make that clear, can help the public interpret that kind of information.*

I think it may also be true for some of the other features of impact, whether it's on recreation, or fisheries, or what have you. We all know, when we deal with computer models, there is a lot -- there's a substantial range of error, and I think that needs to be reflected in the Final EIS, and in a way that will help the public understand what's being done.

Response: Where possible, the technical analyses have included assessment of statistical significance of the difference among alternatives.

Comment 14816: *The present condition set forth in the DEIS is not adequate to serve as the reference point against which alternatives are compared. The present condition is based on the hydrologic conditions from the period between 1947-1994 and adopts 1997 levels of water resource development, operating procedures for all projects, irrigation demand levels, and population. DEIS at 4-8. The specific statistics provided as representing the present condition for the South Platte Basin are incomplete and unrepresentative of the actual condition of the Basin. For example, the DEIS at page 4-16 provides that "100,000 acre-feet of groundwater is used to meet municipal, domestic, livestock, industrial, and commercial needs," but the DEIS fails to mention the amount of surface water used for those same purposes.*

The Council on Environmental Quality's regulations, at 40 C.F.R. §1502.22 (2003), require information that is "essential to a reasoned choice among alternatives" and "relevant to reasonably foreseeable significant adverse impacts" to be included in an environmental impact statement. The MWSI provides data on the current amount of transbasin diversions and the current level of reuse by metro area water suppliers. In addition, the MWSI estimates the expected increase in transbasin diversions and level of reuse by metro area water suppliers over the next 30-years. However, the DEIS does not consider this information in establishing the present condition. The present condition is inadequate to serve as a baseline against which the alternatives are compared and is relevant to estimating any reasonably foreseeable impacts of the Program. Therefore, the MWSI must be incorporated into the DEIS.

Response: The DEIS focuses upon the flows in the South Platte River in those areas which are affected by the Program alternatives, which is the reach below Greeley to the state line. Although some information is provided about transbasin diversions into the South Platte in the DEIS, this is provided primarily as historical context relating to development in the South Platte Basin. As described in the responses to Comments 14817 and 14265, the Program does not affect water use in the South Platte Basin.

Regarding the baseline for the EIS, as with the rest of the Platte Basin, the baseline used to assess impacts on South Platte flows below Greeley is the hydrologic period of 1947 to 1994, adjusted to current levels of water development and demand. This hydrologic record includes very wet and very dry periods, with associated variation in transbasin diversions.

Comment 14817: *Colorado's Plan is Inconsistent with the DEIS Screening Report. The DEIS fails to adhere to the conclusions made in the DEIS Screening Report (the "Screening Report"), which considered increasing transbasin diversions from the Colorado River Basin for the benefit of the target species. The purpose of the Screening Report was to analyze the potential alternatives and to screen out any options that were not feasible under the Program. The Screening Report found that Colorado River water could not be used for the Program because of potential violations of the Colorado River Compact, Colorado's statutes governing exports of water outside the State, competing needs and uses for Colorado*

River water, and existing endangered Colorado fish issues that would be exacerbated by additional diversions. DEIS Attachment at 29. The Screening Report concluded that "[t]aken together, these issues make it highly unlikely that new Colorado River water can be used in the next thirteen years for Platte River endangered species purposes." DEIS Attachment at 29.

Despite the conclusion in the DEIS Screening Report, Colorado's Plan contemplates restrictions on water related activities that have as a source "Wastewater Exchange/Reuse" and "Native South Platte Flows." Colorado's Plan at 5. These restrictions will increase the need to import Colorado River water into the South Platte basin. The MWSI at page 78 concludes that reuse accounts for 6% of the basin's existing municipal water supply (53,000 acre feet per year). The MWSI at page 133 also projects that reuse will account for approximately 20% of the region's water supply in the future. Therefore, if reuse is not an option available to metro area water providers, those water providers would have to obtain their water supply via other means, including additional transbasin diversions. MWSI at 133. This will have the same impact on the Colorado River Recovery Program and the satisfaction of Colorado Compact obligations as the alternative that was specifically rejected in the Screening Report.

Response: Colorado's Plan for Future Depletions (Plan) does not place restrictions on water related activities that have as a source "Wastewater Exchange/Reuse" and "Native South Platte Flows". The Plan explains what new water related activities will and will not be covered for ESA purposes by the Plan. The Plan will cover (provide ESA compliance) new water related activities of up to 98,010 acre-feet from "Wastewater Exchange/Reuse" and "Native South Platte Flows". The 98,010 acre-foot figure represents gross water deliveries (supplies to meet new demands for an average hydrologic year), and is not a consumptive use or diversion limitation. The Plan does not limit reuse as an available option. The Plan states that in the event that a new water related activity is not covered by Colorado's plan, Colorado and the activity's proponent may propose amendments that will allow Colorado's Plan to provide ESA compliance for that new water related activity.

Comment 14824: *On page 5-18, the DEIS attempts to interpret Appendix E of the Final Settlement Stipulation entitled "Stipulation Among the State of Wyoming, the State of Nebraska, and the United States Relating to the Allocation of Water during Periods of Shortage" (referred to as Nebraska v. Wyoming, No. 108 Original, Final Settlement Stipulation, Appendix E). For example, the first sentence states: "Water right administration occurs when the forecasted supply available to the North Platte Project is less than 1,100,000 acre-feet." This statement ignores the role of the Wyoming State Engineer in the process. The USBR annually forecasts the supply to the North Platte Project in February, March and April. If these forecasts project a supply of less than 1.1 MAF, the USBR is deemed to have placed a priority call until May 1st for Pathfinder Reservoir excluding the Pathfinder Modification Project, the Inland Lakes (April only), Guernsey Reservoir and Glendo Reservoir. The Wyoming State Engineer retains the authority to determine if the call is valid. If, and only if, the State Engineer deems that the call is valid, regulation occurs above Pathfinder Reservoir for the benefit of Pathfinder Reservoir and regulation occurs between Pathfinder Dam and Glendo Reservoir for the benefit of the Inland Lakes, Guernsey Reservoir, and Glendo Reservoir.*

Response: The FEIS has been revised to make clear the authority and role of the State Engineer.

Comment 14825: *The DEIS suggests there would have been calls in October in 1961, 1962, and 1965. We cannot envision a scenario in which there would be water rights administration in October. We understand that the presentation is Table 5-10 is wrong and will be corrected in the final EIS.*

Response: Corrections have been made in the FEIS.

Comment 14828: *On page 2-20, the second to the last paragraph on the page describes groundwater withdrawn for agricultural use in the Basin. This description is confusing. How did the hydrologic analyses in the DEIS address the consumptive use of groundwater? Please clarify the assumptions that were used.*

Response: We have modified the cited paragraph in an effort to clarify this discussion. Our intent was to emphasize that depletions associated with groundwater use in the Platte River Basin are substantial, but that widely-varying well characteristics (e.g., proximity to river channels, hydrologic connectivity, and lagged flow effects) make it extremely difficult to quantify their total depletive impact on the Platte River. Therefore, for purposes of developing a simplified and very conservative estimate of total depletions to Platte River flows for this chapter 2 discussion, both the depletive effects of alluvial groundwater use in the Basin (relatively large) and the accretive effects of nontributary groundwater return flows (relatively small) were ignored. Ignoring these factors in the table "Estimated Consumptive Use of Water in the Platte River Basin After Accounting for Offsetting Imports" (in "Consumptive Water Use and Streamflow Depletions in the Platte River Basin" section in chapter 2) tends to produce an underestimate of total system water depletions but it does not alter the FEIS analysis of alternatives. This is because all depletions currently occurring in the Basin (including all net depletions resulting from groundwater use, whatever their magnitude) are included in the "Present Condition" hydrologic baseline against which the alternatives were evaluated. In other words, all historic depletions and accretions from all Basin water uses are reflected in the Present Condition riverflows that were used for EIS modeling, even if their precise origin or quantity is unknown.

Comment 14829: *The Central Platte Hydropower re-regulation is described on page 3-57. A diagram showing the time of year and how often this occurs would be helpful.*

Response: This information is contained in table 3.3.3-20 of the *Water Resources Appendix* in volume 3[26] of the FEIS for the Governance Committee Alternative and in table 3.6.3-20 for the Water Emphasis Alternative.

Comment 14832: *RMFU encourages a new projection of water availability based on current storage and 2004 season ending carryovers to establish a baseline.*

Response: The EIS uses the hydrologic period 1947 to 1994 because information is available to update historic data during this period to current levels of development and water use. This period provides substantial wet periods as well as the longest period of drought since complete hydrologic data were available.

Comment 14833: *South Platte River Basin fisheries in Colorado. There is little or no discussion in the Chapter 4 regarding fisheries in the South Platte Basin in Colorado. The water leasing and water emphasis alternatives could have significant impacts on these fisheries. These impacts need to be further analyzed.*

Response: See the *Fish and Wildlife Coordination Act Report* in volume 2 of the FEIS.

Comment 14834: *The following descriptions are recommended: Page 4-185 Prewitt Reservoir. CDOW manages recreation at this 3,000 acre property. A user fee is required. Uses include fishing, hunting, wildlife viewing, boating, and camping. This property is heavily utilized by waterfowl, shorebirds, raptors (including bald eagles), and migratory neo-tropical birds. Some small game, upland game, and deer are also present.*

Response: Descriptions have been clarified in the FEIS.

[26] Volume 3 is available upon request at <http://www.platteriver.org/>

Comment 14837: *The range of the Black-Tailed Prairie Dog as listed for Nebraska is certainly not accurate. The range of this species which was a candidate for listing as endangered extends much further west than is listed in the EIS. The bulk of the Black-Tailed Prairie Dogs in Nebraska can be found west of the counties listed. If this is a species of concern then its distribution in the North Platte Valley should be studied more carefully. Most pastures along the North Platte River in Western Nebraska have populations of this species.*

Response: See response to Comments 14165 and 14432.

Comment 14845: *The DEIS should also discuss the timing of the actions. How long does it take to create a wider channel via land management verses the hypothetical processes which are set forth in the DEIS.*

Response: To clarify, channel widening on Program lands is accomplished via land management. As described in the DEIS and the FEIS, widening of the river channel can no longer be accomplished through high flows because of the encroachment of mature woods and other vegetation into the historic river channel. It is notable that even the very large floods of the early 1980s did not significantly widen the existing river channel. Therefore, widening must be accomplished through mechanical means, that is, using heavy equipment to remove mature vegetation from islands and banks, lowering these islands and moving river sand back into the river channel. This would be accomplished over several years during the First Increment of the Program.

Subsequent to this mechanical widening, management of flows will be undertaken to help prevent permanent vegetation from becoming re-established. Mechanical or other methods to remove vegetation will be used to supplement flow management as necessary.

Comment 14859: *And although more than 90 percent of the Platte River water is used for irrigation, the lower Platte is an important source of water for municipalities in eastern Nebraska. Well fields near Ashland are the only sources of water for Lincoln and Ashland. Omaha's Metropolitan Utilities District, fondly known as M.U.D., already has a well field on the Platte in south Sarpy County. And M.U.D. is building a much larger well field just north of Ashland. When that well field is fully operational, about half of Omaha's water will come from the Platte River. And this is the Omaha metro area in Nebraska, not on the Iowa part, but includes Sarpy County, part of the metro area. M.U.D.'s environmental impact statement states that during unusually dry periods -- and we're seing a lot of these unusually dry periods these days -- the pumping at its new well field could result in zero water flow downstream, downstream from the two rivers area north of Ashland. The lower Platte already has a serious problem with agricultural chemicals, such as atrazine, and bacterial pollution. M.U.D. must often shut down shallow wells on the Platte to avoid overly high concentrations of atrazine and other chemicals in drinking water. The Sierra Club is very concerned about the declining flows in the lower Platte, combined with increased pollution and consumption for municipal purposes. For example, the drawdown of the water table by the well fields in the Ashland area will likely, over time, draw polluted water from the Mead superfund site located a few miles northwest of Ashland into this well field area, which will require very expensive mitigation because of this pollution hazard. We believe maintaining minimum flows in the central Platte will help lessen some of the problems wildlife and residents are facing along the lower Platte.*

Response: Although we have not included the Lower Platte in any model for the Program, adding water in the Central Platte should, or at least could, provide some added flow to the Lower Platte. We agree that the Central Platte flow augmentation could help ameliorate some of the problems in the Lower Platte also.

Comment 14861: *The IMRP describes an adaptive approach to pallid sturgeon needs, focused on better understanding on what they might be, and does not appear to be consistent with the DEIS' description of Program pallid sturgeon measures. Of the eight studies listed in the DEIS on pages 3-32 to -33, only four will be necessarily carried out. Others will be done only if certain data and results are obtained in Program and/or Dr. Peter's studies. The FEIS should clearly identify and accommodate this adaptive approach to information gathering.*

Response: The Governance Committee has committed to provide funding sufficient to complete the entire pallid sturgeon research plan. While positive agreement currently only exists to carry out part of the list identified, should the others not be selected, it can be anticipated that the items listed in the plan will be sufficiently similar to the replacements to be sufficient for analytical purposes.

Comment 14866: *Pg 2-49 For the cited period, what is the observation effort and the area of study? The DEIS should state how much of the range is being referenced and how much of the range is inundated by reservoirs on the Missouri River.*

Response: See response to Comment 13878.

Comment 14873: *In addition, DEIS conclusions of increased roosting habitat at the target flows under the action alternatives is dictated by assumptions in modeling Program lands rather than evaluation of what channel contours may ...realistically exist under a Program.*

Response: In chapters 4 and 5, the PHABSIM Modeling analysis (which was modified in the FEIS) explains that Program description and habitat objectives given in chapter 3 are assumed to be implemented. The logical basis of the comment that some other alternative would "…realistically exist under a Program," is not clear.

Comment 14879: *The note erroneously states that the Central Platte Power interference component, would retime of 33,000 acre-feet per year; the figure in the Program Document is 3,300 acre-feet per year. Water Action Plan at 60.*

Response: This error has been corrected in the FEIS.

Comment 14881: *P. 5-139. The references to habitat and habitat forming processes have not been documented in the Platte. Using data from the Yellowstone or other tributaries to try and correlate is of some value for designing monitoring and research. To try and draw definitive statements and flow/habitat relationships is simply not scientifically defensible for a species that has had little to no use of the Platte. That is why the Program is designed to look at these monitoring and research issues.*

Response: Comment noted.

Comment 14887: *(reference page 2-48) Table 2-12, gives data collected 1987-1998 yet the text in that section selectively discusses population data from 2001.*

Response: Comment noted.

Comment 14888: *On page 4-95, the data on plover nesting at Lake McConaughy references incomplete data. It should indicate 111 pair of plovers, 118 nests, and 205 fledged chicks.*

Response: The section in the DEIS chapter 4 dealing with plovers and terns has been modified in the FEIS. In chapter 4, the FEIS includes a new table "Piping plover and least tern nest data from selected sites in central Nebraska, 1992-2004"which displays nest data from several sites within the study area. The referenced data (118 nests and 205 fledged) are included.

Comment 14890: *Most peaks in the pre-development river occurred in June and stage didn't return to pre-peak levels until late June or even early July (see Figure 2-9).*

Response: The referenced figure (in the "Peak flows" section of the FEIS, chapter 2) also contains and contrasts the current hydrograph of the post-development river which bears little resemblance to pre-development conditions. The historic channel conditions that existed within the study area are of interest in that they provide some insight into the development of current conditions. However, conditions that currently support channel nesting by plovers and terns on other river systems and the Lower Platte River have certain similarities to those that previously existed in the Central Platte River.

The Service believes that ecosystem processes (e.g., timing and magnitude of peak flows, and sediment supply and transport) within the Central Platte River likely can be improved to the point where channel conditions once again support plover and tern nesting.

Comment 14891: *"flows must recede….." goes against nature. Pushing peaks to May to favor tern and plover nesting runs counter to the natural flow regime.*

Response: See responses to Comments 13795, 14890 and 14895 in this section and Summary Comment 35 in the "Summary Comments and Responses" section of this document.

Comment 14892: *The DEIS (Figure 2-5) shows that timing of historical peak flows in the central Platte would have been detrimental to nesting least terns and piping plovers in the majority of years.*

Response: See responses to Comments 13795, 14890 and 14895 in this section and Summary Comment 35 in the "Summary Comments and Responses" section of this document.

Comment 14895: *The DEIS asserts without support at page 4-89 that historically the stimulus to nest was a receding river but that the "stimulus for nest initiation has changed over time". Neither of these assertions appears likely. First, extensive nesting occurs at Lake McConaughy and on sandpits regardless of increasing or receding river stage, suggesting that a nearby receding river is not a nesting stimulus in the central Platte River region. Second, nesting stimuli do not change in short periods of time such as the past century of water development. These species evolved over thousands of years in a system with ephemeral habitats that were and are subject to many external factors that may or may not make for suitable nesting conditions in any one year. Central is not aware of any literature that suggests a known stimulus for nesting by these species in the central Platte River area, but it is likely tied to migrational stimuli, perhaps photoperiod and or angle of sunlight or some other natural phenomenon that is much more consistent that a receding river.*

Response: Haig and Elliott-Smith (2004) identify the following breeding sites and estimated proportional use from the Northern Great Plains and Prairie Canada 2001 piping plover census: alkali lakes (34.3 percent), reservoirs (31.3 percent), rivers (19.7 percent), freshwater lakes (7.6 percent), dry alkali lakes (2.4 percent), sandpits (2.3 percent) industrial ponds (0.4 percent) and gravel mines (0.1 percent). We have identified the importance of various breeding sites within the study area—including Lake McConaughy, sandpits, and the lower river (see the new table in the FEIS, chapter 4, "Piping plover and least tern nest data from selected sites in central Nebraska, 1992-2004"). However, the focus of this analysis is potential nest sites within the river channel. Interior believes that certain habitat components—such as river discharge and its timing, and elevations of ephemeral sandbars—currently do not provide conditions that support successful channel nesting for plovers and terns. This study attempts to identify mechanisms that may improve those conditions.

The section in question has been modified and the discussion of "nesting stimuli" has been removed. However, the concept that receding flows are important at potential channel nest sites has been retained.

Comment 14899: *The Figures 2-9 and 2-10 would indicate that historic flows in the central Platte were not conducive to nesting by piping plovers and least terns based upon information on nest timing presented Johnsgard (1979).*

Response: See responses to Comments 13795, 14890 and 14895 in this section and Summary Comment 35 in the "Summary Comments and Responses" section of this document.

Comment 14903: *NRC 2004 analysis (based on fledge ratios) indicates lower Platte is sink for Terns and Plovers.*

Response: The National Research Council reviewed existing information for plovers and terns both on a regional and Platte River Basin scale. The committee of scientists serving on the Council referenced Kirsch (1996), who concluded that the Lower Platte River (both channel sandbars and sandpits) production was insufficient to maintain plover and tern populations. In terms of the Central Platte River—the focus of this FEIS—the committee concluded for both plovers and terns that current Central Platte River habitat conditions adversely affect the likelihood of survival for these species.

Comment 14906: *Even if these flows do produce sandbars will they stay free of vegetation long enough to be used for nesting?*

Response: The aim is for annual pulse flows to remove annual vegetation, supplemented by other methods.

Comment 14910: *The DEIS should also describe any evidence to distinguish how the pre-water development forested islands (previously described in the DEIS) differ from forested islands post water development.*

Response: The primary difference is the extent of wooded islands today. See discussion in chapter 2. The current study focuses on the management of currently forested islands (i.e., post development). The Service believes that the removal of some forested islands would increase the channel's wetted width, increase unobstructed channel width, and serve as a source of badly needed sediment for the river at managed sites, and perhaps some distance downstream. These results from the management of forested islands are believed to provide benefits to both plovers and terns, and other target species.

Comment 14913: *Predators control is no more an issue on pits than it is on islands (Lingle 1994, Jenniges personal observations).*

Response: See response to Comment 14651.

Comment 14914: *The DEIS fails to accurately reflect the direct benefits provided by land and habitat management and over emphasizes the river channel. The plover nesting and fledging data for Lake McConaughy (2003 nesting season-94 plover pairs and 194 fledged chicks) and nesting and fledging success on sandpit habitats (for both terns and plovers) provide significant benefits, which have been completely undervalued by the authors.*

Response: Lake McConaughy provides valuable nesting resources, and production of fledged young during the drought of the last 4-5 years has been exceptional. (See data in the "Piping Plovers and Interior Least Terns" sections of the FEIS.) However, the area of sandpits along the Central Platte River is declining and thus too the area available for nesting by plovers and terns. Kirsch (1996) believes that tern numbers produced below Columbus—from both sandpits and sandbars—are inadequate to maintain local populations in the lower river. Finally, declines in peak flows and sediment supply and the resulting deterioration of channel habitat have required mechanical improvements to riverine nesting habitat in the Central Platte River. Although terns or plovers continued to nest on constructed islands or mechanically maintained sandbars in the channel until 2000, records of nesting on naturally formed and maintained sandbar habitat since 1990 are rare. For example, one piping plover nest was recorded on unmanaged river habitat at RM 162 in 1992 (NPPD, from tern and plover nesting database maintained by the Nebraska Game and Parks Commission; unpublished data on file at Service offices in Grand Island, Nebraska), and one brood of piping plover chicks was also observed on natural habitat at RM 205 at least as recently as 1996 (pers. comm. Mark Humpert, Wildlife Diversity Program Manager, Nebraska Game and Parks Commission, Lincoln, Nebraska (2006)).

This study focuses on actions that may potentially improve conditions in the Central Platte River channel to the point where successful nesting by plovers and terns may again occur. All nesting locations—Lake McConaughy, the river channel, and sandpits (in the short term), are important to Platte River Basin plover and tern populations. However, the National Research Council (National Research Council, 2005, page 198) concluded that artificial habitats, including sandpits, ". . . cannot provide the full complement of essential habitat requirements for piping plovers over the long term and therefore cannot substitute for riverine habitat. . . ." At this time, the river channel, with no documented nesting activity on naturally maintained sandbars during the last 10 years, is the most deserving of restoration.

Comment 14915: *Please compare current numbers of nesting birds with any historic information you have.*

Response: The first attempts at systematic surveys of plovers and terns in and along the Central Platte River began in 1985. Until recently, surveys have been conducted by a variety of entities, using varying methods, with variable funding, and varying interests. A standardized monitoring approach and cooperative database are needed for successful management of plover and tern populations within the Platte River Basin.

Comment 14920: *In Sustainability of the Channel Habitat the DEIS states that the computations conducted assume that "…the river channel geometry—in those sections not managed by the Action Alternative—either do not change, or they fluctuate in a dynamic equilibrium." (DEIS, p. 4-75) In our view, this assumption may be unrealistic in that unmanaged sections of the river are likely to change and that without greater flows there is really no dynamic equilibrium to speak off. It is unclear whether this assumption is "conservative" or expedient, but we think the DEIS should explain the consequences, from the SEDVEG modeling perspective, of this assumption on modeling results. The second and third paragraphs acknowledge the continued or accelerated nature of channel degradation and the critical limitation of the analytical methods. We think it is quite important that the DEIS explain the relationship between the modeling results and the use of PHABSIM, with all of its recognized limitations.*

Response: The EIS identifies limitations of PHABSIM and GIS concerning channel sustainability, and these are reiterated at several places in chapters 4 and 5. The potential severe consequences of the lack of channel sustainability are discussed wherever interpretations of PHABSIM roosting habitat results or hydrologic relationship between the river and wet meadows are made.

Comment 14924: *Page 4-81. If the acres owned/leased by NPPD, CNPPID and NGPC are added to the values in table 4-37, the total acres controlled comes to around 19,000 acres.*

Response: See response to Comment 13892.

Comment 14925: *Why didn't DOI disclose the tern and plover model?*

Response: The sections in chapter 4 and 5 of the DEIS that referred to a "Tern and Plover Model" have been modified for the FEIS. The sections now describe the analysis processes—which used output from both the OPSTUDYModel and SEDVEG Gen3—to provide the impact assessment information presented in the FEIS.

Comment 14926: *The occurrence of the China Syndrome was frequent during SED model development, testing, and calibration, and I am not aware that it has been resolved. Establishing an arbitrary depth limit for the scour of the riverbed to control the China Syndrome is not a scientifically valid procedure and cannot be acceptable in any sediment model. This actually negates the usefulness of the model.*

Response: In the earliest versions of the program there was a code error referred to as China Syndrome, but this error was corrected prior to the Parsons review in 2003, and prior to addition of the transverse slope parameter. As stated by Parsons (2003), "Discussions with the USBR indicated that this approach may not be needed in the future as a result of other changes that have been made in other portions of the model." No arbitrary depth limit for scour of the riverbed is incorporated into the SEDVEG Gen3 Model.

Comment 14927: *There is not data substantiating the opinions that short duration, high flows would sustain open view widths. This is a theory for managing habitat that needs to be tested in comparison to other methods. An equally valid theory is that the higher spring flows will more effectively distribute seeds, followed by the Service's desire for higher late summer flows, which will irrigate the seedling thereby ensuring survival and further narrowing of the channel.*

Response: See response to Comment 13778.

Comment 14933: *No data is provided in the DEIS showing that the prescribed flow relationships and the magnitude and duration of flow recommendation and Sed Veg modeling will result in the scouring of vegetation. It is equally likely that the hypothesized processes for vegetation removal will have the opposite effect by in fact distributing seedlings with a short term pulse and growth (and narrowing of the channel) through late summer irrigation via release of so called forage fish flows.*

Response: See Summary Comment 28 (in the "Summary Comments and Responses" section of this document) with respect to the magnitude and duration of flow recommendations. Based on recommendations from Dr. Hsieh Shen during the National Research Council's review of SEDVEG, vegetation removal by scour in the FEIS SEDVEG Gen3 Model is dependent on flow velocity rather than shear or active layer scour. The velocity at which vegetation scour occurs are specified parameters input to the model as reported in Murphy et al., (2006). Flow velocities are computed at each point in the section, at each time step, based on an assumption of normal depth and the geometry of the area at the point. The velocity parameters were initially set by the contractors Simons and Associates who wrote and calibrated the vegetation subroutines, and the parameters are within reasonable ranges. Also see response to Comment 13778.

Comment 14935: *The SEDVEG team has my plant demography data base, but there is no indication from the DEIS that it was used in the testing of SEDVEG. Aspects of SEDVEG are not satisfying to a wetland plant ecologist. For SEDVEG to ultimately be useful as a management tool, the model team needs to be broadened to include a riparian plant ecologist and to be more thoroughly tested under field conditions. The DEIS provides no corroboration from disinterested scientists that the SEDVEG model ""is successful at predicting general spatial and temporal trends in channel width…."*

Response: Although there are always improvements that can be made, SEDVEG Gen3 currently reflects dynamic bank resistance effects resulting from vegetation establishment and growth. This is a capability not found in most sediment transport models (see response to Comment 14590). And, the EIS team includes a wetland plant ecologist.

Comment 14936: *The statement on page 2-43 "...sufficiently raised above the annual floods to support vegetation and trees" suggests naivete regarding vegetation-sediment relationships. Tree seedlings and other perennial vegetation establish first on low sandbars in the river (see Johnson 2000). If they survive the next few years, they provide the surface roughness to capture sediment when overtopped, thus aggrading the sandbar surface and burying portions of the plants (see attached photo showing root development from a buried cottonwood trunk that initiated on a low sandbar). These bars continue to aggrade over time until they reach a height just below the highest floods. Vegetation does not establish well on high sandbars as is stated in the DEIS.*

Response: See response to Comment 13865.

Comment 14937: *The DEIS alleges that high flows transport the majority of sediment in the Platte. This incorrect hypothesis has prevailed from DOI's 2001 DRAFT White Paper to the present. Several investigators including the USGS (1983) assessed the frequency and duration of transport by these high flow events and contrasted them with the frequency, duration and transport capacity of all other flow rates. Even the USBR's analysis of the full range of flows disproves this hypothesis. The question of which flows transport the most sediment cannot be resolved by looking only at the sediment amount transported by short-duration, high flow rates. The agreement of scientific literature on this point is undeniable. Though much has been learned about the effective flow rates in the river (the rates that shape the channel), the DEIS disregards significantly-relevant work by the USGS (1983), Smith (1970 and 1971), and Parsons (2003a) in assessing the role of frequent flows in the channel-formative and maintenance processes.*

The DEIS assumes that the Platte is geomorphologically "episodic," which in simple terms is a theory that its channel is shaped and maintained by infrequent, high flows. No other publication uses this term to describe this river, and the USGS study (1983), Smith (1970, 1971) and Parsons' A3 and A4 reports (2003a) prove that the flows that are effective in shaping and maintaining the river's form are the daily "workhorse" flows.

Response: One advantage to sediment transport models is that they have large computational capabilities, eliminating the need to select or focus on a specific flow rate for sediment transport estimates. SEDVEG Gen3 computes sediment transport every day throughout the hydrologic record, ensuring consideration of the entire range of flow events.

Comment 14938: *The erroneous DEIS comparison of one 10,000 cfs event with ten 1,000 cfs events is used to illustrate their assumption that the instantaneous flow rate which moves sediment at the highest rate must logically move the most sediment. No scientific writing allows such a conclusion. All studies and references on this subject acknowledge the physical work that can be done in moving sediment with a range of lower flows having longer durations than the rare, short-duration high flows.*

Response: The commenter's example derives from a commonly noted relation that sand transport is often a function of flow to the second power, $Q_s = f(Q^2)$ (Julien, 1995). The DEIS example should read "three 1,000 cfs events," rather than ten. That error has been corrected in the FEIS. Also see response to Comment 14937.

Comment 14939: *The claim that historical "high" flows transported the "large sediment excesses" arriving in the South Platte to the Central Platte habitat reach has never been substantiated. Even a conservative estimate of events having a ten-day duration would not move sediment more than a few dozen miles. If the sediment was eventually getting to the habitat area in the past, these high flows* *couldn't have been delivering it, and it was most likely being transported in the form of macroforms by daily "workhorse" flows that had sufficient duration and frequency to carry the sediment that far.*

Response: Regardless of rate of delivery, the habitat reach received substantial bedload (sand) from upstream reaches in a sustainable cycle that produced a relatively stable (in dynamic equilibrium) river.

Comment 14940: *Smith's studies of bar morphology confirmed this point* [made by Comment 14939] *by concluding that "at low and intermediate discharges, transverse bars form" and that "at high stream discharges, the mechanism of bar origin is less clear" (Smith 1971).*

Response: See response to Comment 14602.

Comment 14941: *Murphy et. Al (2004) state that the stabilizing effects of vegetation prevented the high flood flows of 1973, 1983, and 1984 from widening the channel. Some of the bars must have had new vegetation, which evidently was not impacted by these floods, refuting the allegation that pulse flows (at rates lower than these floods) will provide a means of widening or maintaining the width of the river.*

Response: The authors do not agree with this interpretation of Murphy et al., (2004). As made clear in the DEIS and FEIS, the Program relies on mechanical means to widen the river, not high flows.

Comment 14942: *The hydrologic analysis of how 9,000-cfs magnitudes can be generated at Grand Island has not been adequately presented in the DEIS or any document reviewed to date. Attenuation of peak flow rates is significant in the Platte, and release rates from all the distant upstream sources identified cannot simply be added to produce a hydrologically valid estimate of the flow rate that might arrive at Grand Island.*

Several scientists have pointed out that the only way to artificially achieve flow rates this high at any location in the habitat reach is by controlled release from storage in the immediate vicinity of the reach. None of the storage and release scenarios described in the DEIS provide the capacity to safely release flows that would result in 9,000 cfs at Grand Island.

Response: See response to Comment 13713.

Comment 14943: *The Platte River, in both its present and former (pre-development) states, has a narrow vertical range of deviation of stage with flow rate (it is currently only 2.8 ft between drought level and flood level and was probably less for the braided stream). As a result, and assuming the DEIS theories are true, then high, dry, and unvegetated sandbars could not have been a characteristic feature of the Central Platte's channel.*

Response: See response to Comment 14602 in this section and Summary Comment 30 in the "Summary Comments and Responses" section of this document. What the DEIS and FEIS describe as historical conditions are numerous sandbars, reworked on a nearly annual basis and so remaining free of vegetation, and built high enough by annual peak flows so as to remain free of inundation after tern and plover nesting has occurred.

Comment 14978: *The latest White Paper (Murphy et. Al 2004) does not explain or document the presumed relationship between active channel width and unvegetated width, but instead uses them interchangeably throughout. It has been established by all investigations that the unvegetated widths have decreased, but no report by the EIS Team or others has proven that the active channels have narrowed. Active channels are known to pass through vegetated areas, and their widths cannot be established by examining aerial photos or GLO maps.*

An analysis of effective discharge proves that active channel widths would return at least to their 1938 widths if vegetation could be mechanically removed or if the expansion process could be reversed. This means that the Present Condition alternative will be effective to the extent that vegetation can be eradicated.

Response: See National Research Council (2005) for a historical discussion of the inter-related effects of changes in flow on sediment transport, vegetation and channel morphology, which espouses reductions in active channel width in response to flow reductions. See chapters 2 and 4 of the FEIS for a view of historical channel changes, through consideration of plan form that includes, in addition to factors of flow and sediment, aspects of topography in the historic flood plain. This process based approach also recognizes the reductions in active channel width resulting from reductions in flow and the changing plan form.

Comment 14979: *The long-standing assumption regarding the between-banks precision of the original 1860's GLO surveys is disproved by Parsons (A3 chapter). The GLO maps were surveys of property outside the meander lines or of high-value islands inside the lines, and did not record the numerous other islands and bars or the extent of vegetative growth between the meander lines.*

Response: Even accepting these opinions does not eliminate the substantive reductions of "between bank" widths of the river over time. The National Research Council (2005) discussion focuses on woodland expansion since 1938 (excludes GLO plat maps from 1860s and USGS topographic maps from 1896 to 1902) and arrives at similar conclusions of substantive width reductions by the 1960s.

Comment 14980: *Detailed data discovered by Parsons at Kearney (A3 chapter) support the hypothesis that, other than some vegetation expansion, there has been no morphologic change at Kearney. Islands, bars, and other features in 1870 and 1998 at Kearney are exceptionally similar. Substantial vegetation existed in 1870, and changes over time in the width of the corridor occupied by the effective discharge are minor.*

Response: Reclamation could not reach the same conclusions. Also, see the National Research Council (2005) report.

Comment 14981: *The data presented in several chapters of the Parsons report disproves the long-standing hypothesis that there has been a significant loss of morphologically-relevant channel width. The only scientific conclusions that can be made from the 1860's General Land Office surveys and aerial photographs is that vegetation has expanded into greater areas between the original meander lines (although the meander lines have not significantly changed), and that some reaches have converted to an anabranched form. The channels are still there, and have been encroached but not eliminated by vegetation expansion. They are still active in conveying both sediment and water.*

Response: See responses to Comments 14978, 14979, and 14980. The comment seems to dismiss the importance of vegetation expansion into the formerly unvegetated river channel. This expansion results in the loss of more than 90 percent of the channel habitat. Perhaps this suggests that "morphologically – relevant channel width," as defined by the commenter, is not particularly relevant to the habitat used by the species.

Comment 14982: *Changes in the unvegetated portions between the original meander lines of the 1860's GLO maps or from aerial photos cannot be used to measure morphologic change. One cannot determine geomorphologically-defined "active channel width" from these. These only give the amount of open versus vegetated areas. All one can ascertain is the amount of vegetation expansion but not the amount of "channel" narrowing in a geomorphologic context.*

Response: See responses to Comments 14978, 14979, and 14981.

Comment 14985: *The DEIS continues to perpetrate an error in using bank-to-bank widths from the 1860's GLO maps as representative of the "active channel width." The maps are clearly property surveys (even the DEIS calls one of them by this name), which means that any high ground in the river that was considered too small to be developed was not surveyed. The scientific at-a-station rebuttal of this hypothesis at Fort Kearny, reported by Parsons in the A3 chapter, disproves the hypothesis that the GLO maps can be used in the inappropriate manner adopted in the DEIS.*

Response: See responses to Comments 14979 and 14980.

Comment 14986: *If the expansion of vegetation is regarded as a geomorphic effect, as alleged in the DEIS (this is strongly disputed by the Parsons study), then the scientific method requires that it must also be concluded that it is driven by climate. If it is not geomorphic, (as strongly proven) then the unvegetated width cannot be equated with "active" channel or any other morphologic measure. This is because the preponderance of literature shows that the primary geomorphic driving force in the Platte is climate.*

The far-ranging vegetation expansion in the river that has taken place in the past 100 years is best explained, scientifically, as a response to climate changes. Spatially-limited effects of storage and diversion have been documented, but the extent of impacts of these facilities does not allow inference that the far-reaching expansion of vegetation is the result of these projects.

Response: See Murphy et. al., (2004) in volume 3 of the FEIS and the National Research Council report (2005) for the roles of climate and anthropogenic influences on Platte River morphology, historically and in the present. Also see response to Comment 14598.

Comment 14987: *The vegetation expansion process is entirely too complex to be attributed to any single cause, particularly reductions in peak annual flows. Numerous other credible causes have been suggested but were disregarded. Carter Johnson concludes (Parsons 2003a) that the scouring theory fails as a single factor to explain vegetation expansion, and is in direct contradiction of demographic studies.*

Response: See response to Comment 14597.

Comment 15014: *SEDVEG is alleged to be able to predict that Kingsley Dam can affect river morphology throughout over 150 miles of river. No precedent for a single dam of this size having geomorphic impacts this far downstream is cited in the DEIS, and for that matter, none exists. The limited downstream degradation effects of Kingsley have been studied, documented and published in peer-reviewed journals, and cannot possibly extend this far downstream.*

Response: Data in the form of repeat surveyed cross sections (Holburn et al., 2006), basic geomorphic theory, and SEDVEG Gen3, predict (and quantify) that the volume of Johnson-2 clear water return flows from the Tri-County Canal causes degradation for at least 15 miles directly downstream of the canal return. Basic geomorphic theory and the SEDVEG Model also predict that a continuation of this imposed sediment imbalance will impact river reaches further downstream in the future. The most direct impact of Kingsley Dam on channel morphology in the critical Habitat Area is the altered flow regime imposed by the reservoir. The altered flow regime is an input to the SEDVEG Gen3 Model so that flow effects can be incorporated into the analysis of channel morphology in the critical Habitat Area.

Comment 15015: *Many of the SEDVEG algorithms in the model reviewed by Simons and Associates (Parsons 2003a) were found to be hard-wired to incorporate constraints that were apparently imposed* *when the processes being modeled resulted in a "China Syndrome," which is a case where degradation or other outputs greatly exceeded reasonable bounds. Documentation demonstrating that this deficiency was repaired in subsequent versions, especially those used in the DEIS, has not been provided.*

Response: See response to Comment 14926.

Comment 15016: *The Parsons report (2003a) proved that elevations of the base channel calculated in SEDVEG simulations of time periods between available sets of transect measurements are in very poor agreement with elevations of the actual channel base surveyed along the actual transects.*

Response: The evaluation by Parsons (2003), *Results of Investigation B3 – Evaluation of Predictive Capabilities of SEDVEG Model*, was of little value since it assessed 2-D modeling capabilities of a 1-D model. The evaluation is also not applicable to SEDVEG Gen3 due to two revisions to the original code and two revisions to the structure of the Platte River SEDVEG Model since the original review. Also see response to Comment 14926.

Comment 15017: *Variation in channel shape and incision depths at a single cross-section during several months of measurements at different flow rates was shown in the Parsons report (2003a) to be greater than the variation in long-term bed elevation predicted in the DEIS.*

Response: This is consistent with the differences in short-term and long-term variations to be measured in the field. This speaks to the importance of the repeated surveys of numerous river cross sections carried out by Reclamation over the last 25 years.

Comment 15018: *The discussion on p. 4-40 implies that aggradation kills vegetation. If so, why isn't the Present Condition aggradation that's occurring in 109 of 150 miles of the habitat being effective, or why wouldn't the vegetation be destroyed if the Present Condition option is implemented for the next 13 or 61 years.*

Response: See Parsons (2003) for descriptions of work by W.C. Johnson on vegetation mortality resulting from sediment burial.

Comment 15019: *Nebraska Farm Bureau Federation wonder why the affects of highway bridges on channel width are not considered.*

Response: See response to Comment 14231.

Comment 15020: *The DIES does not address the adverse channel capacity effects of, and remedies for, the recent expansion of Phragmites in this reach. This is an invasive, 10- to 12-ft tall reed that over the past 15 years has covered the river banks and bars for several miles upstream and downstream of North Platte, and has now extended to virtually every square foot of sand as far as can be seen in both directions from the Highway 30 and Highway 81 bridges. Some observers report that it is appearing at many locations downstream to and beyond Grand Island.*

Response: See the "Land Use Types", "Invasive Plant Species" section of chapter 5 of the FEIS.

Comment 15021: *A foundational assumption of the DEIS and supporting documents is that "a larger grain size is generally associated with a more deep and narrow channel section" (DEIS 2004). The scientific resource used to make this generalization is not provided. Proportional relationships as straightforward as Yang's equation (see p. 94 in the 2004 White Paper) prove that when all other factors are constant, an increase in grain size results in a decrease (not an increase) in the product of the* *channel width and depth. Alleging that an increase in depth and decrease in width will occur is speculative and not consistent with these fundamental proportional relationships that are well-documented in scientific literature.*

Response: The process of degradation and erosion of finer materials from the bed creates an association between larger grain size and smaller width to depth ratio in the Central Platte River, but this is not "a foundational assumption" of the FEIS.

Comment 15022: *The repeated allegations in the DEIS that the bed material classifies as "coarse sand" is disproved by Parsons (2003a) and not consistent with published classifications of sand sizes. The bed sediment gradations of the 1930's and earlier classify the bed as a medium sand, and subsequent gradations still classify by all standard classification methods as a medium sand. The DEIS should not consider any change from one type of medium sand to another medium sand as a basis for developing a new, controversial theory about coarsening, and then treating the hypothesis as a fact in developing conclusions and action plans.*

Response: The median grain size in the river reach between Overton and Grand Island was approximately 0.35 to 0.40 millimeter in 1931 (USACE, 1935), and 0.60 to 1.05 millimeter in 1989 (Murphy, et. al, 2004). Rouse (1950) lists coarse sand as 0.5 to 1.0 millimeter, Perloff and Baron (1976) list coarse sand as 2.0 to 0.42 millimeter; Julian (1995) lists coarse sand as 0.5 millimeter to 1.0 millimeter. These three examples all encompass the median grain sizes measured in 1989. However descriptions in the FEIS of "coarser sand" are intended to imply a change in size rather than a sediment classification.

INDIVIDUALS AND ORGANIZATIONS SUBMITTING COMMENTS

The following individuals and organizations submitted comments on the DEIS. Next to each name are the numbers corresponding to individual comments (e.g., 14001) and summary comments (e.g., 01) or that are listed and addressed in the corresponding sections above.

Cooperating Agencies

Agency	Name	Individual Comment No.
Carbon County, Wyoming	Bucholz, Kurt	14421
Environmental Protection Agency	Hutton, U. Gale	14083-14089
Natural Resources Conservation Service	Chick, Stephen	14066-14080, 14793-14797
U.S. Corps of Engineers	Bedey, Jeffrey	14848-14858
U.S. Forest Service	Griffith, Greg	14051-14056, 14058-14060, 14062, 14064-14065, 14640-14643
Western Area Power Administration	Steinbach, Ron	14038-14039, 14798-14799, 14800-14801

Other Federal Agencies

Agency	Name	Individual Comment No.
National Oceanic and Atmospheric Administration	Ray, Andrea PhD	14612
National Park Service	Quintana, Earnest	14082

State Agencies

Agency/Organization	Name	Individual Comment No.	Summary Comment No.
Colorado Department of Transportation	Geddy, Robin	13815	
Colorado Division of Wildlife	Claasen, Jerry	13973, 13975-13979, 13982-13984, 13986, 14833-14834	
State Engineer's Office, Wyoming	Tyrrell, Pat	13998, 14000, 14002-14005, 14763, 14824-14825, 14828-14829	10, 12
Wyoming Department of Agriculture	Christianson, Don	13968-13971	12

Agency/Organization	Name	Individual Comment No.	Summary Comment No.
Wyoming Game and Fish Department	Wichers, Bill	14267, 14269, 14273, 14277, 14280, 14285, 14775, 14777, 14785, 14791-14792	08, 13, 14, 16, 15
Wyoming Water Development Commission	Besson, Lawrence	14000, 14008, 14010, 14013-14015, 14018-14020, 14022-14025, 14027, 14029, 14030-14037, 14762-14768	05, 07, 09, 10, 12, 17

City/County Agencies

Agency/Organization	Name	Individual Comment No.	Summary Comment No.
City of Aurora	Binney, Peter		05
Town of Saratoga	Jewell, Hank		12
Summit County represented by Petros & White	Soice, Jennifer	14258-14260, 14262-14266, 14816-14817	

Irrigation, Power and Conservation Districts

Agency/Organization	Name	Individual Comment No.	Summary Comment No.
Central Nebraska Public Power and Irrigation District	Kraus, Don	13696, 13701, 13704-13713, 13717, 13719, 13721, 13726, 13728-13729, 13732-13734, 13736, 13740-13742, 13746, 13748-13751, 13767, 13770-13771, 13773-13776, 13778-13790, 13792-13798, 13800-13801, 13803-13804, 13823-13824, 14590-14592, 14594-14595, 14597-14602, 14604-14605, 14677-14688, 14697-14699, 14701, 14861, 14873, 14879, 14887-14888, 14890-14891, 14895, 14926, 14935-14943, 14978-14982, 14985-14987, 15014-15018, 15020-15022	04, 05, 08, 18, 19, 20, 21, 22, 23, 24, 25, 27, 28, 29, 32, 35, 36, 37, 39, 41, 47, 49, 51
Central Platte Natural Resources District	Woodward, Duane	13898-13900, 13902-13903, 13905, 13910, 13913, 13916-13918, 13920-13921, 13923, 13926, 13928, 13933-13934, 13936, 13938, 13943, 14704-14706, 14712, 14715-14716, 14756, 14924-14925	05, 18, 19, 22, 23, 26, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 43, 44, 45, 49, 50, 51
Colorado River Water Conservation District	Kuhn, Richard	13678	
Jackson Co. Water Conservancy District	Burr, Bob	14100, 14115-14116, 14587, 14755, 14757-14758, 14933	11, 05, 06, 23, 26, 30
Laramie Rivers Conservation District	Hoch, Anthony	13947	12
Lower South Platte Water Conservancy District	Hoppe, Diane		03

Agency/Organization	Name	Individual Comment No.	Summary Comment No.
Medicine Bow Conservation District	Frank Law Offices, P.C.	13755, 13757, 13759-13760, 13762-13763	12
Nebraska Public Power District	Barels, Brian	13652, 13654, 13656, 13659-13662, 13665, 13667, 13669-13670, 13672, 13674-13677, 13829-13831, 13834, 13836-13838, 13842, 13844, 13850-13851, 13853-13854, 13856-13859, 13862-13866, 13868-13869, 13871, 13875-13876, 13878, 13880, 13882-13883, 13885-13886, 13888, 13890, 13892, 13894, 13896, 13989-13990, 13992, 14639, 14645-14646, 14651, 14653, 14655, 14657-14658, 14660, 14663-14665, 14667, 14676, 14892, 14899, 14903, 14906, 14913, 14915	04, 05, 08, 18, 19, 21, 22, 23, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 43, 45, 47, 48, 49, 50, 51
North Platte Natural Resources District	Dutton, Harvey	14408	
Riverside Irrigation District	Chapman, Don	13819	
Saratoga-Encampment-Rawlins Conservation District	Kerbs, Scott	13951-13952	12

Environmental and Conservation Groups

Agency/Organization	Name	Individual Comment No.	Summary Comment No.
American Rivers	Smith, Chad	14433	
National Wildlife Federation, Nebraska Wildlife Federation, Audubon Nebraska, Platte River Whooping Crane Maintenance Trust, Colorado Wildlife Federation, Wyoming Wildlife Federation, American Rivers, Colorado Environmental Coalition, Audubon Colorado and Western Resources Advocates	Greene, Carolyn	14195-14196, 14198-14203, 14205-14206, 14209, 14213, 14215, 14219, 14222, 14225, 14229,14231, 14920	51
Nebraska Wildlife Federation	Hovorka, Duane	14106-14107, 14109, 14112, 14122	
North Platte Walleyes Unlimited	Ewart, Howard	14400	
Oregon Trail Chapter Pheasants Forever	Green, Jerry	14144, 14151, 14154, 14164-14165, 14178	16, 17, 18, 42
Panhandle RC&D	Klemke, Ron	13809, 13811, 13813	17
Sierra Club, Missouri Valley Group	Anderson, Clyde	14859	
Water Resources & Environmental Consulting	Luecke, Daniel	14812	

Agency/Organization	Name	Individual Comment No.	Summary Comment No.
Wyoming Flycasters	Waterman, Herb		13, 48

Water User Organizations

Agency/Organization	Name	Individual Comment No.	Summary Comment No.
Colorado Water Conservation Board	Brown, Rick	14125, 14127-14128, 14130, 14134, 14137, 14139-14141, 14143, 14146, 14148, 14152-14153, 14157, 14160, 14162, 14169, 14171-14173, 14175-14177, 14179-14180, 14182-14184, 14189, 14192, 14197, 14207, 14210, 14212, 14217, 14223-14224, 14227-14228, 14230, 14385,14719-14720, 14722-14731, 14733-14734, 14740-14743, 14747, 14749, 14753-14754, 14866, 14881, 14910, 14914, 14927	02, 05, 11, 19, 20, 21, 23, 26, 32, 33, 34, 35, 40, 44, 45, 46, 47, 49, 50, 51
Colorado Water Conservation Board	Kuharich, Rod	14115-14116, 14755-14758, 14933, 14100, 14587	05, 06, 11, 23, 26, 30
Denver Water Department	Little, Dave	14095, 14100, 14104-14105, 14116, 14587, 14755-14758, 14933	05, 06, 09, 11, 20, 21, 22, 25, 26, 30
Nebraska Farm Bureau Federation	Edson, Dean	14250-14253, 14255-14256, 15019	07, 21, 22, 23, 39
Platte River Basin Environments, Inc		14287, 14837	13, 16, 15, 17, 42
Wyoming Farm Bureau Federation	Hamilton, Ken	14232-14234, 14238, 14240-14246	05, 06, 09

Electric Power Organizations

Agency/Organization	Name	Individual Comment No.	Summary Comment No.
Kansas Electric Power Cooperative, Inc	Benoit, Edgar	13948, 14803	
Mid-West Electric Consumers Association	Graves, Thomas	13993-13995, 14805-14806	
Tri-State Generation and Transmission Association, Inc	Mazour, David	13987	
Wyoming Municipal Power Agency	LaMaack, Larry	13945	

Miscellaneous Organizations

Agency/Organization	Name	Individual Comment No.	Summary Comment No.
Coalition for Sustainable Resources, Inc.	Crowder, W. Kent	14381, 14385, 14621, 14845	05, 33, 34, 35, 44, 46, 49
E J Foral Construction	Foral, E.J.	14401	
Grey Reef Outfitters, Inc.	Van Rensselaer, Art	14040-14041, 14607	13, 15
Natural Energy Resources Company	Miller, Dave	14420	
Nebraskans First	Adams, Don	14374, 14407	
Nebraskans First	Sheldon, Carroll	14394, 14436, 14438-14439	
Rocky Mountain Farmers Union	Dean, Jimmie	14045-14049, 14832	09
University of Colorado	Wiener, John	14389	
University of Nebraska	Johnsgard, Paul	14367, 14613	
Wyoming Stock Grower's Association	Berger, Jim & Marian	14811	09, 12

Private Citizens

Name	Individual Comment No.	Summary Comment No.
Accord, Larry	14412	
Carey, Pat		17
Dicke, Scott	14435	
Eggleston, Rex	14370	13, 15
Fanto, John		13
Ferguson, Lloyd	14403	13
Funk, Wendell	14405	
Giedy, GJ	14399	
Henderson, Jim	14430, 14432	17
Klein, Ronald	14391-14393	
LeBeau, Gerald		12
Lipscomb, Jim	14409	
Miller, Ron	14402	
Mitera, J.C.	14366	
Rate, Edward	14378	13, 15
Reitan, Arlys and Ken	14416	
Robinson, Gene	14365	13, 15
Robinson, Martha		13, 15
Rolls, Bruce	14329, 14331, 14334-14335, 14337, 14342,14354, 14357, 14359, 14633-14635	09, 13, 15, 16, 17, 18, 29, 42
Shaffer, Carl		12
Svoboda, Frank	14376	
Svoboda, Amy	14411	
Sybrant, Arnie and Nancy		13, 15
Thomsen, Cynthia	14434	
Tierney, Jim	14419, 14440	

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This document is contained in the CD attached to Volume 1 of FEIS.

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    b. Water Conservation/Supply Activities
    c. Operation of Program Water Conservation/Supply Projects
    d. Delivery of Program Water
3. Depletions Plans to Mitigate the Impacts of New Water Related Activities
4. Institutional Protections

F. Evaluation of First Increment and Development of Subsequent Increments
1. Evaluation of Effectiveness of the First Increment and Review of Goals, Objectives, Activities and Criteria
2. Definition of Second Increment Components and Term
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IV. REGULATORY CERTAINTY
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Attachment 2, Milestones Document

Attachment 3, Draft Adaptive Management Plan
- Appendix A – Process for Developing AMP
- Appendix B – Peer Review Guidelines
- Appendix C – Models
- Appendix D – Protocol

Attachment 4, Land Plan
- Appendix A – Platte River Program Land Evaluation Worksheet
- Appendix B – Examples of Federal, State, and Local Programs that may contribute protected land or funds toward habitat restoration during the Program
- Appendix C – Compatible Use of Program Lands
- Appendix D – Species of Concern – initial list
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THE ESA SECTION 7 CONSULTATION PROCESS WITH AND WITHOUT A COOPERATIVE PROGRAM

PURPOSE

The Present Condition (No Action Alternative) presents a likely future in the project area if the proposed federal action is not undertaken. The No Action Alternative typically serves as the reference point against which the proposed action and other alternatives are compared in an EIS. In the No Action Alternative, ESA compliance for federal projects in the basin would not be achieved through a cooperative basin-wide effort, but instead achieved through separate offsetting measures developed for individual water-related projects and activities subject to section 7 of the ESA during consultation with the Service.

This document summarizes the important differences between complying with ESA without relying on a Program and complying with ESA through participation in a Program. To help illustrate the No Action Alternative, relevant aspects of the section 7 consultation process are compared and contrasted for the No Action Alternative and the Proposed Program.

The proposed Federal action is the continued operation of a number of water activities in the basin, insofar as they affect river flows and habitat in the Central and Lower Platte River, together with funding and implementation of the preferred alternative for a recovery implementation program. These water activities include the Reclamation projects in the North Platte and the South Platte River basins, and the Fish and Wildlife Service projects throughout the basin (See *Description of the Major Water Facilities Likely to be Affected by the Proposed Program* in Volume 2 for project descriptions). Also included are numerous Federal and private water projects which have already completed Section 7 consultation for impacts to one or more of the target species in the Central and Lower Platte River and have a biological opinion dependent upon implementing a Platte River Recovery Program and certain future Federal water activities covered by the Federal Depletions Plan. The beneficial actions of the Program are intended to help protect and restore the target species' habitats while providing ESA compliance for existing uses and certain new water depletions for effects to the target species in the Platte River basin[1].

The last section of this attachment describes the ESA section 7 consultation process where a Program provides ESA compliance for existing and certain new water-related activities. Future section 7 consultations would proceed in a streamlined fashion for effects to the target species and "tier" off the programmatic FEIS and programmatic biological opinion.

EIS Baseline

In an EIS, the proposed action and alternatives are all compared to the same baseline condition, usually the No Action alternative. In order for the No Action condition to serve as a quantitative baseline for this EIS, it would be necessary to project the conditions that would result without a cooperative recovery implementation program. This would require estimating, at a minimum, basin wide river flows and reservoir levels and associated agricultural and economic conditions resulting from ESA consultations on

[1] The Platte River basin includes the basins of the South, North, and Platte Rivers

every existing and future federal action relating to water and associated land activities in the basin which may affect the target species or designated critical habitat during the next 13 years. Such estimates would be too highly speculative.

While it may be possible to judge the aggregate water and land contributions that might be obtained from all projects, allocating those contributions to individual projects prior to actual ESA consultation is not possible. Further, predicting the ultimate environmental effect of individual offsetting measures absent cooperation among the states and water management entities is also highly speculative. Therefore, only a qualitative discussion of the largest Platte River basin projects is presented to illustrate the potential results of separate ESA consultations without a Program. However, experience has shown that individual ESA consultations for large and significant projects can take many years to complete. For example, the Federal Energy Regulatory Commission's (FERC) relicensing of projects owned by Central Nebraska Public Power and Irrigation District and the Nebraska Public Power District took approximately 15 years to complete. Given the historic complexity and contentiousness of past ESA Section 7 consultations related to these species and the length of time required to develop and implement Reasonable and Prudent Alternatives or offsetting measures as required under the ESA, it seems most likely that habitat conditions over the next decade will remain largely unchanged unless a Basinwide, Cooperative Program is implemented. Thus, for the purpose of this NEPA analysis, the Present Condition is the quantification of the No Action Alternative.

Summary

The primary differences between conducting ESA compliance consultations "with-a-Program" and "without-a-Program" are in (1) the scope and scale of measures which a project must individually undertake to offset its effects on the target species and designated critical habitat, and (2) which entities or individuals would be responsible for providing those offsetting measures. "Without-a-Program", projects subject to section 7 of the ESA would be individually responsible for offsetting adverse effects on the target species and critical habitat using a combination of water, land, and financial measures[2]. "With-a-Program" in place, the Program's actions would provide the offsetting measures which projects can rely upon in order for the project to continue its operations in compliance with the ESA. In other words, a viable Program would provide ESA "regulatory certainty" to those projects electing to participate and subject to ESA compliance. Project owners and operators who chose to rely on the Program would also know their obligations, if any, prior to ESA consultation.

There are numerous and substantial differences between the No Action Alternative and the Proposed Federal Action, and these are summarized in Table 3-1 below. Because a number of defined terms and concepts are necessary to adequately understand the No Action Alternative, the reader is encouraged to review the following background information on Section 7 ESA consultations in the Platte River basin and then re-examine Table 3-1 to better understand the differences.

[2] When consultation is on a federal action relating to a non-federal project, the federal action agency is responsible for avoiding jeopardy. However, the federal action agency typically requires the private parties to provide and fund the offsetting measures.

Table 3-1.—Summary of Differences Between Providing ESA Compliance by Separate ESA Consultations (No Action Alternative) and Providing ESA Compliance by Implementing a Program (Proposed Federal Action)

Element	Proposed Federal Action, ("With a Program")	No Action Alternative, ("Without a Program")
Responsible Party for complying with Section 7 and Section 9 of the Endangered Species Act (ESA).	The signatory States, participating water users, and the Federal government assume responsibility to comply with Program commitments to assure regulatory certainty with respects to Sections 7 and 9 of the ESA for existing and new projects within the three basin states participating in the Program.	Water Projects with a federal nexus will be subject to Section 7 consultation (including potential reinitiation of past consultations) and for compliance with any ESA-related conditions in their federal license or permits. Whether or not there is a federal nexus, all water projects are responsible for complying with Section 9 of the ESA.
Cost/Value Sharing* of Habitat, Water, and Financial ESA compliance measures ***See PRRIP Attachment 1, Finance Document Crediting and Exit Principles and Program Budget	State of Wyoming .... State of Nebraska .... <u>State of Colorado ....</u> Sub-Total .... 50% <u>Federal Government...................... 50%</u> **Total 100%**	Individual Water Projects with a federal nexus, 100%
Adaptive Management	Program participants, including FWS, review and assess information from the Adaptive Management Plan, Integrated Monitoring and Research Plan, Peer Review, and experience, to direct Program habitat restoration and flow improvement activities (Adaptive Management).	FWS determines what constitutes "best available scientific and commercial information" and makes all decisions regarding listed species and designated critical habitats.
Long Term Goals:		
Water	Long Term Water Goal is "Sufficient water to and through the habitat" subject to change based on Adaptive Management.	Long Term Water Goals are the same as the Water Goals for target species without a Program (see below) using what FWS determines is the best available information.
Habitat	Long Term Habitat Goal: Initial focus is 29,000 acres of habitat, subject to Adaptive Management.	Long Term Habitat Goal: 29,000 acres of suitable habitat in 10 habitat complexes. Little emphasis on sand pits, small wetlands and small wet meadows; focus is on restoring large areas of degraded habitat.
Habitat Goals During First Program Increment (or 13 Year period) for target species	10,000 acres of habitat: – initial focus on habitat complexes (river channel habitat and large wet meadows), and – up to 800 acres of "non-complex" habitats (sand pits, small wetlands and small wet meadows)	29,000 acres of suitable habitat in 10 habitat complexes. – little emphasis on sand pits, small wetlands and small wet meadows; focus is on restoring large areas of degraded river and wet meadow habitat.
Ownership Methods	Willing seller/lessor. Lands acquired by lease, easement, or purchase. No condemnation of land.	Lands would be acquired by lease, easement, or purchase. Entities with condemnation authority may elect to exercise their authorities in order to meet ESA responsibilities.

Taxes **"Good Neighbor" Policy**	Taxes on Program habitat lands paid or offset to counties. Program's policy is to avoid, and minimize impacts to adjacent landowners.	Taxes on habitat lands may not be paid or offset to counties. No specific policy.
Water Goals during the Program's First Increment	Goals for First Program Increment: Flow improvement measured relative to species and annual pulse flow targets. 130,000 – 150,000 acre-feet of flow improvement obtained by: – approximately 80,000 acre-feet provided by 3 state projects, – at least 50,000 acre-feet provided by incentive based Water Action Plan projects.	Goals (assuming no Program): Flow improvement measured relative to all FWS Instream Flow Recommendations, including species flows, annual pulse flows, and peak flow recommendations. Individual projects would provide average flow improvement of: – 417,000 af/year for species and annual pulse flows, and – achieve 10-year running average peak flow recommendations for Feb-Mar and May-June.
ESA Compliance for <u>completed consultations</u> (Existing and New Projects) that are dependent on a future Program. ("Existing" and "New" projects are defined in the boxes below)	The project's ESA compliance measures are provided by the Program's actions (for Existing projects), or by the Program's states and federal depletion plans (for New projects). Annual payments for habitat and water activities cease.	All projects (Existing and New) dependent on a future Program would re-initiate consultation and develop individual project ESA compliance measures. (Note: this does not apply for completed "minor depletion" biological opinions, as discussed below.)
ESA Compliance for <u>Existing Projects yet to be consulted upon</u>. ("Existing", projects are those projects in operation prior to July 1, 1997. The project's water depletions are referred to as "Existing depletions")	ESA compliance measures for effects to target species by Existing Projects are provided by the Program's habitat and flow improvement actions and Section 7 consultation is "streamlined".	ESA compliance measures for effects to target species would be provided by project sponsors undergoing Section 7 consultation. No "streamlined" Section 7 consultation. Project sponsors are to avoid, prevent, or offset their impacts to Service Instream Flow Recommendations, including species flows, annual pulse flows, and peak flow recommendations.
ESA Compliance for <u>New Projects yet to be consulted upon</u>. ("New" projects are those projects which begin or expand operations after July 1, 1997. The project's water depletions are referred to as "New depletions")	ESA compliance measures for New Projects are provided by the Program's state and federal depletion plans. Depletion plans offset new depletions to species and annual pulse flow targets. Impacts to peak flows are covered by the scope of the states and federal depletions plans.	New project sponsors are to avoid, prevent, or offset their impacts to all FWS Instream Flow Recommendations, including species and annual pulse flow targets, and peak flow recommendations when undergoing Section 7 consultation.
<u>Minor Depletions</u> (25 acre-feet or less) (A minor depletion may be either an "Existing" or "New" depletion)	The majority of minor depletions are addressed by: – Program actions (for Existing depletions), or by the – Program's states and federal new depletion plans (for new depletions).	Previously issued "minor depletion" biological opinions would not be re-opened for consultation. The Service would reassess how hundreds of future consultations for minor amounts of depletions (Existing and new) should be accomplished.

Cooperative Administration of Water between States	States work cooperatively to provide ESA compliance water to and through the habitat within the framework of existing state water laws, compacts, and decrees. States commit to propose modifications to state law, if necessary, in order to achieve Program water goals.	Existing state "water export" laws may greatly increase costs of ESA Compliance water. Protection of water for ESA purposes within and between states may be limited or non-existent, potentially increasing costs. Less opportunity for states to cooperatively resolve the distribution of ESA Compliance costs and effectiveness among the states and federal government.
Species and Habitat Monitoring	Program implements a coordinated and integrated monitoring effort to collect information on target species habitat and use. Information is used to guide descriptions of suitable habitat, flows, and Program goals. The monitoring plan and Adaptive Management Plan greatly expands the scope and scale of information collected in the central Platte River.	No formal coordination of monitoring efforts between groups. Target species monitoring activities proceed as currently practiced: – whooping crane roost site measurements collected when a confirmed whooping crane is reported by the public or biologists. – 5-year tern and plover census – Channel morphology measurements (cross-sections, sediment, vegetation) typically collected with specific research projects (e.g., Universities, USGS, Reclamation, COE, FWS, Districts) or privately funded.
Research on species needs, habitat, and physical processes of river channel habitat	Program funds are used to address key research needs on species habitat and use. Research projects are selected by the Governance Committee. Other research studies (next column) also utilized based on peer review.	No formal coordination of research efforts between groups. Limited research would continue as currently conducted: University studies, USGS studies, FWS and state wildlife agency studies, Districts, and privately funded studies associated with environmental compliance, etc.
Peer Review of studies, research, monitoring activities, flow targets, models	In addition to existing peer review activities (listed in box to right), Program funds are budgeted for independent peer review of FWS Instream Flow Recommendations, habitat models, channel morphology studies, Adaptive Management Plans, monitoring protocols, and other Program elements selected by the Governance Committee.	Current peer review activities continue, including internal agency peer review and peer review associated with published journal articles and published research studies.
Channel Habitat Restoration Activities	Sediment & vegetation interactions are researched and investigated initially on a small scale as part of the Land Action Plan and Adaptive Management Plan. Restoration methods which are judged effective and do not produce significant downstream impacts to land owners may then be implemented on larger scales on Program lands where applicable; i.e. an incremental approach.	Sediment augmentation and pulse flow activities would be a likely component of ESA compliance measures developed for individual water project operators. No incremental approach.
Habitat Restoration activities of others,	Currently existing, qualifying habitats of	Qualifying lands of Environmental Groups

including Environmental Groups, Service, and State wildlife agencies	Environmental Groups count towards the Program's long term goals after the first Program increment. Opportunities for a Program to work cooperatively with Environmental Groups and others to restore habitat. Restoration efforts (those activities not part of a Program) would continue as presently occurring by these groups.	count towards long term habitat goals. Opportunities for project sponsors to work cooperatively with Environmental Groups and others to restore habitat. Restoration efforts (those activities not part of a Program) would continue as presently occurring by these groups.

BACKGROUND ON ENDANGERED SPECIES ACT, SECTIONS 7 AND 9

ESA, Section 7(a)(1)

The ESA directs all federal agencies, in consultation with the Service, to use their existing authorities to further the purposes of the Act by carrying out programs for the conservation of listed species. The ESA specifically directs the Secretary of the Interior to review all agency programs administered by the Department and utilize such programs to further the purposes of the Act. Therefore, a specific triggering action is <u>not</u> necessary in order for federal agencies to review their activities vis-à-vis Section 7(a)(1), and use their authorities in a way that benefits protected species. This responsibility was affirmed in Sierra Club v. Glickman, 156 F. 3d 606 (5th CIR. 1998).

ESA, Section 7(a)(2) "ESA Consultation"

Water related projects which need a federal authorization, funding, or are carried out by a federal agency (often referred to as having a "federal connection", "federal nexus", or as a "federal project") require consultation with the Service under ESA if the action agency determines the project may affect a listed species. Federal agencies are required by section 7(a)(2) of the ESA to "consult" with the Fish and Wildlife Service to insure that the actions they authorize, fund, or carry out are not likely to jeopardize listed species or adversely modify designated critical habitat. Examples of known projects and activities in the Platte River basin subject to section 7 consultation and ESA compliance are listed in Table 3-3.

Consultation does not have to involve a specific water project, and includes all non-discretional federal agency activities which may affect listed species and their habitat.

ESA, Section 9

Section 7 of the ESA applies to all actions and projects having a federal connection. Section 9 of the ESA applies to all persons (including states, private, or local entities) and prohibits the take of endangered and threatened species without special exemption. "Take" is defined as harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. "Harm" is further defined by the Service to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. The Supreme Court upheld the Service's definition of harm on June 29, 1995 to include adverse modification of habitat, Sweet Home Chapter of Communities for a Great Oregon, et al. v. Babbitt, 515 U.S. 687 (1995).

Biological Opinion

Consultation is a mandatory process for any federal project or action with a federal connection that may affect listed species or designated critical habitat. Consultation is initiated by the federal agency and concludes with the issuance of a formal "biological opinion" by the Service. A biological opinion includes a description of the proposed action, current status of the listed species, effects of the action, and a determination by the Service on whether the project "is likely to", or "not likely to", jeopardize listed species or adversely modify-critical habitat. If the determination is "likely" to jeopardize or adversely modify or destroy critical habitat, the Service's biological opinion identifies reasonable and prudent alternatives (RPAs) if available.

Section 7 consultation is required whenever the proposed federal action may affect listed species or designated critical habitat, including:

- New projects proposed for construction, or
- Existing projects which require a renewed federal permit, license, funding, or approval to continue its operations (whether the project has been in operation for many years prior to passage of the ESA or not), or
- Existing projects (where federal discretion exists in operating the project) which have not completed section 7 consultation.

Reinitiation of formal section 7 consultation is required by the ESA where federal discretion is retained and:

- The amount or extent of incidental "take" is exceeded, or
- New information reveals effects of the federal action may affect listed species in a manner or extent not considered in the biological opinion, or
- The federal action is subsequently modified in a manner that causes an adverse effect to listed species or critical habitat that was not considered in the biological opinion, or
- A new species is listed or critical habitat is designated that may be affected by the federal action.

The existence of a Program does not alter the legal requirement for federal agencies to consult with the Service if listed species may be affected by their actions, and offset impacts to listed species and critical habitat occurring from such federal actions. The Program's actions are intended to provide the ESA compliance measures that may be relied upon by federal nexus projects choosing to participate in the Program and using the Program's actions or Depletions Plans to offset impacts to target species and target species critical habitat occurring from federal actions. In essence, section 7 consultations with a Program are still required by the ESA, but the Program provides the "solution" that may be relied upon for effects to the target species and their critical habitat. Numerous water-related activities throughout the Platte

River basin with a federal-nexus are required to undergo section 7 consultation. Example projects are discussed in more detail later.

Reasonable and Prudent Alternatives

During a “section 7 consultation”, the federal agency and the Service typically analyze the project and the Service determines the project’s individual and incremental effect on listed species and their designated critical habitats. The determination of effect is based on the best available information as determined by the FWS. Under ESA, jeopardy is likely when an action is reasonably expected, directly or indirectly, to diminish a species’ numbers, reproduction, or distribution so that the likelihood of survival and recovery in the wild is appreciably reduced. If a project or action is found to contribute to the current jeopardy of the species or adversely modify or destroy critical habitat, measures are developed, if they are available, and implemented to avoid, prevent, or offset that project’s adverse effects on the species or critical habitat. These measures are referred to as “reasonable and prudent alternatives” (RPAs). The RPAs may potentially include substantial modifications to existing operations and water use, but they must:

(1) be consistent with the purpose of the project,

(2) be consistent with the federal agencies legal authority and jurisdiction including their obligations under the Endangered Species Act,

(3) be economically and technically feasible,

(4) in the Service’s opinion, avoid the likelihood of jeopardy.

Jeopardy Biological Opinions

Since the late 1970's, the Service has issued “jeopardy biological opinions” for virtually all water-depletive projects in the Platte River basin, citing either new or continued water depletions as contributing factors in jeopardizing the continued existence of the target species and adversely affecting designated critical habitat. Jeopardy opinions have been issued for proposed and un-constructed projects and for existing projects which were in operation prior to passage of the ESA. A summary of ESA consultation history in the Platte River basin for the target species is found in volume 2, the *History of ESA Consultations on Platte River Target Species.*

Use of Instream Flow Recommendations and Land Habitat Goals in Consultations Without a Recovery Implementation Program

In the event that a Program is not implemented, the Service would undertake separate ESA section 7 consultations for each water and land activity with a federal connection that may affect the target species or their critical habitat. The full suite of the Service’s Instream Flow Recommendations (see Table 3-2) and habitat goals would be utilized during consultation, and each project’s effects on the flows and critical habitat must be avoided or offset. The Service’s basin wide land habitat goals for the species are to protect and restore 29,000 acres of suitable habitat in 10 large habitat complexes located between Lexington and Chapman, Nebraska.

Table 3-2.—Summary of FWS Instream Flow Recommendations for the Central Platte River

Exceedence probability (recurrence interval)	**Recommended flow in cfs**	**Notes**
2.5- And 5-Year Peak Flows		
20% (5 year)	16,000 (Feb-Jun)	– 5-day duration – >50% occurrence during May 20-June 20 – May-June preferred for habitat benefits – Feb-June OK for channel maintenance
40% (2.5 year)	12,000 (Feb-Jun)	– 5-day duration
Average Peak Flows		
10-year running mean of 5-consecutive-day exceedence	8,300 to 10,800 (Feb-Jun)	
Annual Pulse Flows		
75% (3 of 4 years)	3,100 to 3,600 (Feb-Mar) 3,000 (May-Jun) 3,400 (May-Jun)	– 30-day duration for Feb-Mar – 7- to 30-day duration for May-Jun – 10-year running mean of 30-consecutive-day exceedence
100% (all years)	2,000 to 2,500 (Feb-Mar)	– 30-day duration for Feb-Mar

Species Flows (All Other Periods)

Period	**Wet year[1]**	**Normal year[1]**	**Dry year[1]**
Jan 1 – Jan 31	1,000 cfs	1,000 cfs	6,00 cfs
Feb 1 – Mar 22	1,800	1,800	1,200
Mar 23 – May 10	2,400	2,400	1,700
May 11– Sep 15	1,200	1,200	800
Sep 16 – Sep 30	1,000	1,000	600
Oct 1 – Nov 15	2,400	1,800	1,300
Nov 16– Dec 31	1,000	1,000	600

[1] "Wet" years are defined as the wettest 33%, "dry" years as the driest 25%, and "normal" years all others.

Sources:
Bowman, D. Instream flow Recommendations for the Central Platte River, Nebraska. Workshop report, U.S. Fish and Wildlife Service, May 23, 1994. 9 pp.
Bowman, D. and D. Carlson. Pulse flow Requirements for the Central Platte River. Workshop report, U.S. Fish and Wildlife Service, August 3, 1994. 11 pp.

ESA requirements for protection of the target species would be met through separate offsetting measures developed for each project subject to ESA consultation. Under the section 7 consultation process, the Service would informally consult with all Federal agencies carrying out activities in the Platte River basin to determine the scope of the consultation and which agency activities might affect listed species or designated critical habitat. Table 3-3 presents a listing of some of the projects and activities for which separate consultations would likely be required.

Table 3-3.—Known Examples of Federal Water Project Actions Requiring Consultation Under ESA

(Note: Following are examples of water projects and activities that would require ESA consultation if the federal action agency determines they may affect a listed species or critical habitat. Projects with an asterisk* are examples of those that have completed consultation and are dependent on a future Recovery Implementation Program being adopted.)
Department of the Interior
U.S. Fish and Wildlife Service Water-related activities at Arapaho National Wildlife Refuge* Partner's For Wildlife Program projects resulting in new depletions Federal Aid Projects (cost sharing with beneficiaries/state agencies) U.S. Bureau of Reclamation North Platte River Projects (North Platte, Kendrick, and Glendo Projects) Colorado-Big Thompson Project U.S. Bureau of Land Management Rangeland water developments in CO and WY (ponds, springs) Renewal of Livestock Watering Facilities, WY* Wildlife habitat improvement projects in CO and WY (water related) National Park Service (Rocky Mtn. Natl. Park, Scottsbluff Monument, etc.) Domestic park use and other water-related activities
Department of Agriculture
Rural Economic & Community Development (RECD) Federal funding for municipal well field projects U.S. Forest Service Forest Management Plans (Routt, Medicine Bow, Arapaho-Roosevelt, Pike Forests) Water use for U.S. Forest Service management activities, campgrounds, fire protection City of Greeley, CO Peterson Lake Reservoir* City of Greeley, CO Barnes Meadow Reservoir* Water Supply & Storage Company, CO (Long Draw Reservoir storage on USFS lands)* Public Service Co. of Colorado (Excel Energy), Betasso pipeline* Hundreds of permitted projects on USFS lands, ranging from municipal reservoirs to direct diversions for irrigation in CO and WY Natural Resources Conservation Service Programs that finance the new construction/rehabilitation of water-related structures that result in net water depletions, including: Environmental Quality Incentive Program (EQIP) Agricultural Management Assistance (AMA) Watershed Protection and Flood Prevention Act (PL. 83-566) Watershed Rehabilitation Emergency Watershed Protection (EWP) Wetlands Reserve Program (WRP) Wildlife Habitat Incentives Program (WHIP) Resource Conservation and Development (RC&D) program activities funded with federal dollars Food Security Act Determinations that authorize wetland alterations provided that the alteration requires NRCS plan/agreement approval. These are: Minimal Effect (MW) Minimal Effect Mitigation (MWM) Mitigation Wetland (MIW) Farm Service Agency Conservation Reserve Program Conservation Reserve Enhancement Program (CREP)
Department of Energy
Rocky Flats Environmental Site (environmental cleanup from nuclear defense activities)

Department of Defense
Rocky Mountain Arsenal clean up efforts, CO
Cooperative water projects between the Army, Denver Water Board, and South Adams County Water & Sanitation District*
Corps of Engineers
404 Permitting activities (many water-related activities such as reservoirs, water diversion structures, bridges, etc., require a 404 permit)
City of Idaho Springs, CO storage reservoir* City of Broomfield, CO – McKay Ditch* Fox Hollow Golf Course, CO* Town of Erie, CO Prince Reservoir* Excel Energy, CO Gardeners Dam* City of Laramie, WY municipal supply* City of Torrington, WY municipal supply* Wheatland Irrigation District, WY Sand Lake Reservoir* Reuter-Hess Reservoir, Town of Parker, CO*
Flood control operations of Chatfield, Bear Creek, and Cherry Creek Reservoirs Reallocation of flood control storage space to municipal water supply projects
Federal Energy Regulatory Commission
Hydropower Licensing
Denver Water Board, CO Gross Reservoir Relicensing* CNPPID, FERC Project License 1417, NE (Kingsley Dam/Lake McConaughy)* NPPD, FERC Project License 1835, NE (Keystone Dam/North Platte Hydro)* Public Service Co of CO, Georgetown*
Federal Funding resulting in water-related effects and depletions
Federal Highway Administration construction projects resulting in depletions Natrona County, WY “33 Mile Road” improvement* Wildlife projects with Federal Aid funding from FWS State Departments of Transportation (road construction, bridges) State Wildlife Agencies (for projects creating new water depletions)

The Service has recommended instream flows and land habitat goals for the target avian species. River flows currently fall short of the recommended species and annual pulse flow targets by an average of 417,000 acre-feet per year annually at Grand Island. The Service’s recommended 10-year running average for peak flow at Grand Island (8,300 cfs – 10,800 cfs with 50% occurrence in May-June) also has not been met over recent history, nor has the recommended 30-day duration flow (2,000 cfs – 2,500 cfs during dry years, and 3,100 cfs to 3,600 cfs in wet and normal years) been achieved for the February 15 – March 15 time period.

It is highly likely that the basin-wide costs to achieve ESA compliance for projects under separate section 7 consultations (nonstreamlined) would be greater than the costs associated with a cooperative, basinwide Recovery Implementation Program (streamlined) for the following reasons:

1. During consultations, the Service would evaluate projects, and activities “interrelated and interdependent” to those projects, against all of the Service’s Instream Flow Recommendations, including the species and annual pulse target flow shortages of 417,000 acre-feet per year, all of the Service’s peak flow recommendations, and the long-term goal of 29,000 acres of suitable habitat in 10 large habitat complexes. (Note: With a Program, effects are still evaluated relative

to all of the Service's recommendations, but combinations of Program actions (e.g., sediment augmentation and pulse flow management activities), are used to offset adverse effects to peak flow recommendations).

2. The goal under separate consultations (nonstreamlined) would be to fully offset the continued effects of all Existing projects on the target species and their habitat and to all of the Service's Instream Flow Recommendations, including species and annual pulse flow targets and peak flow recommendations, sufficient to avoid or remove jeopardy and adverse modification, rather than taking an incremental, phased, adaptive management approach that was agreed to as part of a cooperative, basin-wide Recovery Implementation Program effort. Separate RPAs would be developed for each project and these would be funded by the individual project in order to replace depletions, provide habitat, and avoid or offset jeopardy.

3. New water projects (those in operation after the CA date of July 1, 1997) with a federal connection would offset effects of their new depletions to all of the Service's Instream Flow Recommendations, including species and annual pulse flow targets and all peak flow recommendations, without relying on the States or Federal Depletion Plans as provided in the proposed Program. Separate RPAs would be developed for each New project and these would be funded by the individual project in order to replace depletions, provide habitat, and avoid or offset jeopardy.

4. Absent a Recovery Implementation Program, provision of improved river flows would not be coordinated among all states and agencies, and the transport of ESA compliance water to the habitat area is likely to be less efficient or certain under separate project consultations. It is therefore likely that if existing state laws limit ESA compliance water protection ability, then greater amounts of water might be needed from individual projects in order to insure delivery of sufficient flows through the habitat area. Although some project's offsetting measures for habitat may be relatively small in acreage (i.e., measured in the 10's of acres), larger parcels of land may only be available for purchase, thereby increasing costs.

5. Each state agrees that during the term of the Program, it shall not, in any judicial or administrative proceeding: (1) assert a position adverse to either of the other states on any issue relating to the target species or the associated habitats; or (2) assert a position adverse to a water related activity in either of the other states relating to the target species or the associated habitats if that water related activity is covered by the Program, unless the other state consents to the participation in the proceeding or to the assertion made. In addition, if a signatory has concerns that a Program-approved activity is being implemented or operated in violation of an interstate water compact or decree with another signatory, attempts will be made within the context of the Program to resolve such concerns before any compact or decree enforcement action relating to that concern is taken before the United States Supreme Court or other appropriate judicial body. This provision reflects the commitment of the parties to resolve differences, if any, within the context of the Program. Without a Program, it is possible that lawsuits filed by water users, environmental groups, states, or others will greatly complicate required section 7 consultations. Lawsuits may result in court ordered activities, restrictions, and requirements, with less flexibility to alter those conditions based on new knowledge. Court orders could require existing projects to cease operations until re-initiation of consultation.

6. Without a Recovery Implementation Program, water development activities and planners would probably avoid any federal connection to the extent possible. Water projects which do not require federal approvals or funding may become more prevalent. Water development patterns could change in each state to further avoid any federal connection, creating new and competing

demands on the existing basin's over-appropriated water system. Some parties believe that the 417,000 acre-feet shortage to species and annual pulse flow targets would be a new "water demand" resulting in increased competition between the states and water users for existing water sources and creating a "ripple effect" on all water users.

7. Effects of water development in the Platte River basin on target species habitat are primarily illustrated by alterations in sediment movement, and reductions in peak flow magnitude, duration, and frequency relative to pre-development conditions (Murphy, Randle, Fotherby, Daraio, 2004). Additional analyses by the EIS team subsequent to signing the Cooperative Agreement in 1997 has led the Service to conclude that the on-going effects of water and sediment regulation, in addition to contributing to historic loss of habitat, are continuing today and resulting in the loss of existing habitat over time in the lower reaches of the designated critical habitat. It is therefore likely that additional measures involving pulse flow management and sediment augmentation would be requested of projects in the South Platte River basin and the North Platte River basin, including the Bureau of Reclamation projects and the Nebraska FERC projects, in order to offset the likelihood of jeopardy to target species and adverse modification to critical habitat. Also, based on what is now known about the importance of sediment movement, volumes and particle size in the Platte River system, it can be assumed that in the absence of a Recovery Implementation Program, sediment augmentation components would need to be included as part of the ESA compliance measures for the continued operations of both Nebraska FERC projects under their licenses. (With a Recovery Implementation Program, all of a project's impacts's (including impacts to channel morphology and habitat) are covered by the Program's adaptive management activities such as investigating and implementing channel habitat restoration methods (including sediment augmentation and pulse flow management) to address the channel degradation concerns.

8. Without a Recovery Implementation Program, budget and agency personnel needs would increase in order to complete required consultations on projects needing federal authorization, permits, licenses, etc. The number and timing of required consultations which could be completed by the Service would be directly linked to the Service's available budget and personnel.

DISCUSSION OF EXAMPLE PROJECTS AND ESA CONSULTATION

This section discusses some of the larger federal projects and activities in the Platte River basin requiring section 7 consultation. Before entering into formal section 7 consultation, the Service would informally consult with all federal agencies carrying out activities in the Platte River basin to ascertain the scope of consultations and to determine whether any of their actions may affect listed target species or designated critical habitat. Until this informal consultation begins it is not known whether additional programs not listed in Table 3-3 may also require consultation. For example, other USDA programs that provide financial support for public facilities and services such as the expansion of municipal well fields, the Rural Electric Program to help finance power generation and distribution facilities (including power to operate irrigation well pumping), and the Rural Utilities Service which provides technical assistance for the operation of rural water systems, will be evaluated.

COE 404 Permitting Activities (CO/WY/NE), and Forest Service Special Use Permits (CO/WY)

Many water-related activities in the Platte River basin either require a 404 permit issued by the Corps of Engineers in order to implement and maintain their projects, or are dependent on special use permits issued by the Forest Service for projects located on forest lands. The majority of 404 permit actions which the Service has consulted on with the Corps occur primarily in Colorado and are typically associated with municipal development, and to some extent, irrigation activities. Many municipalities in Colorado, and in Wyoming to a lesser extent, have projects requiring authorization by the Forest Service. See Table 3-3 for an example listing of previously completed section 7 ESA consultations which are dependent upon a Recovery Implementation Program being implemented. With a Program in place, these types of federal actions may complete a streamlined consultation for effects to the listed species and critical habitat in the Central and Lower Platte River.

Bureau of Reclamation Colorado-Big Thompson Project (CO)

The Colorado-Big Thompson Project (C-BT) is a complex water collection, distribution, and power system that provides supplemental water to northern/northeastern Colorado, including numerous ditch companies and municipalities. The project imports approximately 300,000 acre-feet of Colorado River water annually to the South Platte River basin. In addition to trans-basin supplies, the project has water rights for storing native South Platte River basin flows when available. An average of 20,000 acre-feet of storage space is reserved in the east slope reservoirs to capture CBT east slope rights. The Bureau of Reclamation (Reclamation) built and owns most of the facilities and manages the power facilities while the Northern Colorado Water Conservancy District (NCWCD) operates and maintains the water collection and distribution system in conjunction with Reclamation. This federal project has not undergone formal consultation with the U.S. Fish and Wildlife Service for effects to the target species and will still need to if there is no Program. With a Program in place, these types of federal actions may complete a streamlined consultation for effects to the listed species and critical habitat in the Central and Lower Platte River.

COE Tri-Lakes Project (CO)

The Tri-Lakes (Chatfield, Cherry Creek, and Bear Creek Reservoirs) were constructed by the Corps of Engineers for the primary purpose of preventing flood damages to metropolitan Denver areas. Total storage capacity is approximately 567,470 acre-feet. In addition to flood control, each of the reservoirs provides additional benefits in the form of “conservation pools” used for recreational and local wildlife purposes. Chatfield Reservoir is also used for water supply purposes. In the 1980's the Corps made an initial determination that an additional 22,700 acre-feet of conservation storage may be made available from the flood control space in Chatfield Reservoir. Currently, the Corps is undertaking a reallocation study to determine if additional flood control storage can be reallocated to water supply purposes.

At this time, section 7 ESA consultation has not been completed on the flood control operations of the Tri-Lakes project and their effects on listed species and critical habitat. Consultation is waiting upon the Corps to complete their “Water Control Manual” review on the procedures and operations of the projects. ESA consultation is also required in order to complete any re-allocation of flood control space to municipal use. With a Program in place, these types of federal actions may complete a streamlined consultation for effects to the listed species and critical habitat in the Central and Lower Platte River.

Bureau of Reclamation North Platte River Projects (WY and NE)

Reclamation began informal consultation with the Service as part of an effort to evaluate existing Reclamation projects and their effects on listed species beginning in approximately 1989. The Reclamation Wyoming Area Office initiated and led in the development of the North Platte River Water Utilization Model (NPRWUM) in order to have the analytic tools to evaluate their system operations, including simulation of reservoir operations, natural flow segregation, storage ownership accounting, and to estimate flows on the North Platte River for ESA section 7 consultation purposes. During 1994 to the present, the focus of the informal section 7 consultation changed with the negotiation and signing of the Cooperative Agreement to develop a Recovery Implementation Program. In recognition of the Cooperative Agreement efforts to provide for Reclamation's ESA compliance, Congress in 1998 extended each water service or repayment contract for the Glendo Unit concurrent with the term of the Cooperative Agreement. This was subsequently extended until no later than December 31, 2005. (note: currently, legislation has been introduced to extend until December 31, 2007 which would allow time for the Program to begin implementation and Reclamation to issue new water service agreements and repayment contracts). Therefore, because a Recovery Implementation Program became the focus of resolving ESA issues, Reclamation did not enter into formal consultation and the Service did not complete evaluations to determine Reclamation's impacts to the target species, nor determine any RPAs to the projects' operations. This activity would still be completed if a Recovery Implementation Program is not implemented. With a Program in place, these types of federal actions may complete a streamlined consultation for effects to the listed species and critical habitat in the Central and Lower Platte River.

Reclamation stores over 3.3 million acre feet of North Platte River water, generating power and providing significant irrigation deliveries to eastern Wyoming and western Nebraska. In anticipation of entering formal consultation, Reclamation's model is capable of simulating the allocation of a percentage of project waters to ESA needs, including accounts in Pathfinder Reservoir (North Platte Project), Glendo Reservoir (Glendo Project), and Seminoe Reservoir (Kendrick Project). Allocation of water to the ESA accounts would reduce water available for irrigation use and power generation. The best available commercial and scientific information indicates that the North Platte River Projects have had a substantial effect in regulating streamflow, sediment movement, consumption of water, and are a major factor in the historic reduction and loss of habitat for the target species in the central Platte River (Murphy, Randle, Fotherby, Daraio, 2004). Although consultation has not been completed, it is highly likely that ESA compliance measures would call for substantially greater quantities of water from the projects than the 34,000 acre-feet of storage space proposed as part of Pathfinder Dam modification (Wyoming's water project contribution in the proposed Program) if a Recovery Implementation Program is not implemented. The likely effect of providing additional existing reservoir storage space to ESA purposes would be to increase the number of years in which irrigation water is reduced by allocation to existing irrigation customers.

FERC Projects Nos. 1417 & 1835 (NE)

The Central Nebraska Public Power and Irrigation District owns and operates Lake McConaughy in Nebraska, and the project is operated in coordination with Nebraska Public Power District's North Platte/Keystone Diversion Dam Project. The Districts utilize Lake McConaughy's storage capacity of approximately 1,743,000 acre-feet to provide seasonal irrigation service and generate power year round. The biological opinion for these two FERC licensed projects was completed in 1997 and is dependent on a Recovery Implementation Program. Without a Program, re-opening the FERC licenses and completing separate section 7 consultations for these projects would likely provide substantial additional ESA obligations of these facilities above and beyond those currently identified in their FERC project licenses and 1997 biological opinion.

The 1998 FERC license settlement agreement for Lake McConaughy provides "default provisions" in the event the Cooperative Agreement fails or a Recovery Implementation Program is not implemented following the Cooperative Agreement. Default provisions begin in the first full water year (October through September), and remain in effect for a period of three full water years or until the license is amended following re-initiation of section 7 consultation (referred to as the "default period"). During the default period and depending on reservoir level, "baseflows" of either 400 cfs or 600 cfs are to be provided at Overton, Nebraska, during June through September if Lake McConaughy storage exceeds 1,200,000 acre-feet or 1,400,000 acre-feet, respectively. Once the Overton baseflow provisions begin, the amount of October through April storable inflow which is provided to the Environmental Account is slightly reduced from the current allocation of 10 percent to 8 percent. If Lake McConaughy storage exceeds 1,500,000 acre-feet at the end of May, the Districts are to pass 50% of the June inflows to Lake McConaughy in coordination with the Environmental Account manager.

RECENT ESA CONSULTATIONS (THOSE DEPENDENT ON A FUTURE RECOVERY IMPLEMENTATION PROGRAM)

The following sections summarize completed ESA section 7 consultations which occurred between 1994 and the present time, and describes how the completed consultations are dependent on a future Recovery Implementation Program. These projects are subject to reinitiation of consultation if a Program is not implemented.

Colorado "Front Range" Consultations

In 1993, the Service issued a series of draft jeopardy biological opinions for existing municipal and irrigation supply reservoir projects located on U.S. National Forest lands in the headwaters of the South Platte River basin in Colorado. Because of difficulties in delivering and protecting water for the target species across the Colorado-Nebraska state line, and to and through the habitats in Nebraska, implementing the RPAs recommended of the projects would have been very difficult for the project owners while still maintaining similar deliveries of water for project purposes. To help resolve these and other conflicts between water use and development activities in the Platte River basin and the ESA, the Governors of Colorado, Nebraska, and Wyoming, and the Secretary of the Interior, signed a Memorandum of Agreement in 1994 to develop a cooperative, basinwide Recovery Implementation Program which would protect and restore Platte River habitat and thereby provide ESA compliance for numerous existing and future projects subject to ESA consultation in all three states.

Completed Consultations Which Rely On A Future Recovery Implementation Program

During the above time period, discussions between the Service, project owners, the state of Colorado, and the U.S. Forest Service on how to finalize the draft biological opinions occurred. In light of anticipated agreement to cooperatively resolve Platte River target species issues by the three Governors and the Secretary, an approach was developed by the Service that would allow the projects to continue their operations without modification and be in compliance with the ESA until a Program could assume ESA compliance responsibilities. The RPAs in the biological opinions provided for an annual payment of funds by the projects to be used to protect, restore, and maintain habitat in Nebraska for the target avian species between the time of the above “Front Range” opinions and until a Recovery Implementation Program is adopted. With a Program, the habitat and flow improvement actions of the Program provides the measures to achieve ESA compliance for these existing water projects and the annual payments would cease. All of the completed consultations are dependent upon adopting and implementing a Recovery Implementation Program agreed to by the Secretary of the Interior and the three states and are subject to reinitiation of consultation if a Program is not implemented.

Table 3-3 lists example projects which have completed section 7 consultations during the interim period and are subject to re-opening if a Program is not implemented.

Minor Depletions Biological Opinion

In 1996, the Service issued a biological opinion on federal agency actions which result in “minor” depletions of 25 acre-feet or less to the Platte River system. This biological opinion, which was revised in 2002, provides conservation measures for both “Existing” and “New” project depletions. The conservation measures allow for project owners to offset the adverse impacts of their actions on the target species and designated critical habitat through either the one-time payment to, or a debiting of an equivalent sum of money (i.e., a “depletion fee”), from an account established by the USDA Forest Service and the U.S. Fish and Wildlife Service with the National Fish and Wildlife Foundation. The funds are used to protect, restore, and maintain Platte River habitats for the benefit of the target species. In the closing section of the opinion, re-initiation of consultation is warranted if the Cooperative Agreement fails to implement a Platte River Recovery Implementation Program. Although the Service would not re-initiate ESA consultation with all of the federal agencies for these previously completed consultations, it would reassess how future consultations for hundreds of such small volumes of depletions should be addressed. With a Program, the majority of future consultations for both new and existing projects could proceed in a streamlined fashion, regardless of the project size.

Since the date of the original Minor Depletions biological opinion, 162 consultations have been completed as shown in Table 3-4.

Table 3-4.—Minor Depletion Biological Opinions Completed (June 1996 – December 31, 2005)

State	Number of Minor Depletion Consultations	Total Minor Depletions in acre-feet
Colorado	107	530.9
Nebraska	61	257.3
Wyoming	97	437.0
Total	265	1,225.2

The NRCS completed consultation in 2001 on the minor depletive effects of its soil and water conservation program practices in Nebraska, and the Service concurred with a “no effect” determination. Therefore, some of the NRCS activities described in Table 3-3 would not be applicable to Nebraska as part of a No Action Alternative because consultation has already been completed and these biological opinions are not dependent upon a future Program. Similar consultations on NRCS activities have not been completed in Colorado or Wyoming at this time.

ESA SECTION 7 CONSULTATION PROCESS WITHIN A PROGRAM

As discussed in the background section, the existence of a Program does not alter the legal requirement for federal agencies to consult with the Service and offset impacts to listed species and critical habitat occurring from federal actions. With the Program in place, ESA Section 7 consultations for the effects of continued operations of Reclamation and Service projects in the Platte basin on the target species and on designated critical habitat in the Central and Lower Platte River are complete.

With a Program in place, ESA section 7 consultations for federal-nexus projects and their effects to listed species and designated critical habitat in the Central and Lower Platte River and would proceed in a streamlined manner, and "tier" off the programmatic EIS and programmatic biological opinion in subsequent NEPA analysis and biological opinions for the specific federal action. If other listed species are present and potentially affected then they must be addressed separately from the Program in the applicable final biological opinion for the specific project. The Program, through its programmatic biological opinion, only provides the ESA compliance measures for effects to listed species and their designated critical habitats in the Central and Lower Platte River.

In order to comply with the ESA, Program activities with a federal nexus must also complete site-specific consultations for effects to non-target listed species. Water Action Plan projects and willing seller/lessor of water activities are examples where the Program and the Service must consider other listed species and consult under ESA section 7 if needed. Depending on the significance of the federal action, additional NEPA analyses may also "tier" off the programmatic EIS. For example, prior to construction, a site-specific NEPA evaluation must be conducted for the local (non-target species) effects of the Pathfinder Modification project.

Future section 7 consultations could result in one of three possible outcomes for federal-nexus projects (note: non-federal nexus projects do not consult under ESA):

(1) complete a streamlined consultation (below) for an existing federal project (i.e., the project may be "covered" by the Program's habitat and water management activities),

(2) complete a streamlined consultation for a new federal project (i.e., the project may be "covered" by one of the States or Federal Depletion Plans), or

(3) complete section 7 consultation without relying on Program activities. Individual water projects would be responsible for complying with section 7 of the ESA. (Note: It is the project applicant's decision whether to elect to participate in the Program or not for ESA compliance.)

A "streamlined" consultation is one where: a) the federal action agency determines a project may affect listed species and initiates ESA consultation with the Service, b) the effects to listed species and their critical habitats in the Central and Lower Platte River had been analyzed in the programmatic EIS and programmatic biological opinion, and c) the Program's actions or Depletion Plans can be used as ESA compliance measures for that project's effects to the target species in the Platte River basin and their critical habitats in Nebraska and other listed species in the Central and Lower Platte River. Other listed species outside of the Central and Lower Platte River, if any, must also be addressed during consultation.

See the states and federal depletions plans in the Program document Water Section for more detailed discussion of the coordination between the Service, States, and the Governance Committee during streamlined section 7 consultations as part of a Program.

HISTORY OF ESA CONSULTATIONS ON PLATTE RIVER TARGET SPECIES

U.S. FISH AND WILDLIFE SERVICE

(Extracted from Draft, Revised Intra-Service Section 7 Consultation for Federal Agency Actions Resulting in Minor Water Depletions to the Platte River System)

Since 1978, the Service has consistently taken the position that Federal Agency actions resulting in water depletions to the Platte River system may jeopardize the continued existence of one or more Federally listed threatened or endangered species and adversely modify designated critical habitat. The Service's position on this resource issue of national and international importance has been well documented by a number of formal section 7 consultations with other Federal Agencies. Some of the more notable consultations, involving major Federal actions, are characterized below.

The first such Federal action which spawned this position was the Basin Electric Power Cooperative's (Cooperative) proposed Gray Rocks Dam and Reservoir Project on the Laramie River in Wyoming. A major purpose of this $1.6 billion project was to provide cooling water for a coal-fired electric-generating station. Following an out-of-court settlement over a lawsuit among the Cooperative, the State of Nebraska, and the National Wildlife Federation, the Service issued a jeopardy biological opinion to both the U.S. Army Corps of Engineers (Corps) and the Rural Electrification Administration on December 8, 1978 (U.S. Fish and Wildlife Service 1978a and 1978b), for project-related impacts stemming from 23,250 af of annual water depletions and their negative effects upon the endangered whooping crane (Grus americana) and its designated critical habitat area on the central Platte River, located over 300 miles downstream from the project site. Included within this biological opinion was a reasonable and prudent alternative which called for the project to establish a $7.5 million trust fund for maintaining and protecting whooping crane habitat. This reasonable and prudent alternative was one of several conditions included as part of the aforementioned settlement, which among other things, led to the establishment of the Platte River Whooping Crane Critical Habitat Maintenance Trust, Inc.

Less than 5 years after the Gray Rocks biological opinion was issued, the Service provided a biological opinion to the U.S. Bureau of Reclamation (Bureau) on January 20, 1983 (U.S. Fish and Wildlife Service 1983a), for the proposed Narrows Unit Project on the South Platte River in northeastern Colorado. It was determined that the proposed multi-purpose project would result in an annual depletion of 91,900 af to the central Platte River, and like the Gray Rocks Project, would jeopardize the continued existence of the endangered whooping crane and adversely modify the species' designated critical habitat area in Nebraska approximately 300 miles downstream from the project site. The Service proposed, as a reasonable and prudent alternative, that water storage be designed in the Narrows Unit Reservoir to provide needed supplemental Platte River flows for whooping crane roosting habitat and for channel width maintenance. The need for a reservoir storage operation study to precisely determine how to support the instream flow requirements also was included as part of the reasonable and prudent alternative. In addition, it was recommended that Service representatives be included in the planning for any resulting scheduled water releases; and, that the Service and Bureau work together to assure that the water released reaches the whooping crane habitat. As a result of this section 7 consultation, the Platte River Management Joint Study (Joint Study) was initiated by the Bureau and Service, in cooperation with the States of Nebraska, Colorado, and Wyoming. The intent of the Joint Study effort was to develop a fish and wildlife management plan for the Platte River system in central Nebraska that encompassed alternatives which would remove the jeopardy opinion, pursuant to the Act. Funding for the proposed Narrows Unit Project has not been authorized, and probably never will be.

On July 20, 1987, the Service issued a non-jeopardy biological opinion to the Corps on the Platte River off-site effects of the Wyoming Water Development Commission's (Commission) proposed Deer Creek Dam and Reservoir Project (U.S. Fish and Wildlife Service 1987a). The purpose of the proposed project (to be sited along Deer Creek, a North Platte River tributary in eastern Wyoming), would be to provide a water supply for Casper during dry years when the city cannot obtain sufficient water from its surface or groundwater rights. It was determined that the project could annually deplete an average of 9,600 af of water from the Platte River system and have a negative impact upon the whooping crane and the species' designated critical habitat area in central Nebraska. It was further determined that the seasonal amounts and timing of these instream flow depletions would not adversely impact the availability or suitability of nesting and foraging habitats of the least tern (Sterna antillarum) and piping plover, and would not adversely impact flows needed to sustain least tern forage fish populations. The proposed project also would not adversely impact bald eagle (Haliaeetus leucocephalus) foraging habitat or the species' forage fish populations. However, in order to preclude the likelihood of a situation involving jeopardy for the whooping crane and adverse modification of critical habitat; the Service agreed to accept the Commission's formal offer to fund the acquisition, restoration, and maintenance of a 24-acre whooping crane habitat area along the central Platte River. The Commission's offer was incorporated into the biological opinion as conservation measures, which were subsequently accomplished. The Commission has yet to approve funding for construction of the proposed project.

Shortly after the section 7 consultation was completed on the Deer Creek Dam and Reservoir Project, the Service issued another biological opinion to the Corps on October 14, 1987 (U.S. Fish and Wildlife Service 1987b), for the Denver Water Department's (Denver) proposed Two Forks Project on the South Platte River at the base of Colorado's "front range." The intended purpose for the proposed dam and 1.1 million acre-foot reservoir would be to provide a source of water for future growth and development in the Denver metropolitan area. The Service's biological opinion concluded that the project would not likely jeopardize the bald eagle, least tern, piping plover, and whooping crane, or adversely modify designated critical habitat for the whooping crane. The determination that the proposed project would not likely jeopardize the whooping crane or adversely modify the species' designated critical habitat was predicated on the Service's acceptance of Denver's formal offer to off-set the anticipated adverse effects that would result from the project's water depletions to the central Platte River through implementation of conservation measures prescribed in the biological opinion. These measures called for Denver to acquire, restore, and maintain approximately 221 acres of whooping crane habitat (i.e., consisting of roosting and wetland meadow habitat) along the central Platte River. The proposed project was not authorized because the Environmental Protection Agency vetoed the Corps' issuance of a section 404 permit for the project. This veto was legally challenged and upheld.

On June 2 and July 1, 1994, the Service issued final biological opinions to the U.S. Forest Service for its proposal to re-authorize special use permits for six water-related projects in the Arapaho-Roosevelt National Forests of Colorado's "front range" area (U.S. Fish and Wildlife Service 1994a, 1994b, 1994c, 1994d, 1994e, and 1994f). These biological opinions concluded that water depletions resulting from the existing projects were likely to jeopardize the continued existence of the following Federally listed species: whooping crane, least tern, piping plover, and pallid sturgeon (Scaphirhynchus albus). It also was determined that the projects were likely to destroy or adversely modify designated whooping crane critical habitat along the central Platte River in Nebraska. In addition, the biological opinions concluded that the projects may affect, but would not likely jeopardize the continued existence of the following Federally listed species: western prairie fringed orchid (Platanthera praeclara), bald eagle, American burying beetle (Nicrophorus americanus), and the Eskimo curlew (Numenius borealis). The Service concurred with a "no effect" determination for the peregrine falcon (Falco peregrinus) in the biological opinions for the U.S. Forest Service projects.

On July 25, 1997, the Service issued a final biological opinion to the Federal Energy Regulatory Commission for its proposal to relicense hydroelectric projects owned and operated by the Central Nebraska Public Power and Irrigation District and the Nebraska Public Power District (U.S. Fish and Wildlife Service 1997). The Service concluded that water depletions resulting from the existing projects were likely to jeopardize the continued existence of the whooping crane, least tern, piping plover, and pallid sturgeon, and result in the destruction or adverse modification of designated whooping crane critical habitat along the central Platte River in Nebraska. The reasonable and prudent alternative for the proposed relicensing action was based on implementation of a Memorandum of Agreement (Memorandum of Agreement 1994) and cooperative agreement which were signed by the Governors of the three Platte River basin States (i.e., Colorado, Nebraska, and Wyoming) on June 10, 1994, and July 1, 1997, respectively, and the ultimate implementation of a Central Platte River Recovery Implementation Program (Program). The intent of this Program would be to help conserve and recover Federally listed species associated with the central Platte River in Nebraska. The Program also would protect designated critical habitat for the whooping crane and proposed critical habitat for the piping plover, and help prevent the need to list additional Platte River Basin associated species pursuant to the Act. Based on the current status of negotiations between the Department of the Interior and the three Basin States regarding aspects of a future Program, the Service believes it is reasonable to assume that a Program could be implemented by June 30, 2003.

Subsequent to the seven aforementioned biological opinions completed in 1994 and 1997, the Service has issued the following biological opinions for Federal projects resulting in water depletions to the Platte River system:

- The Corps on April 6, 1998, for the City of Idaho Springs, CO (water intake)
- The U.S. Forest Service on May 22, 1998, for the City of Boulder (Lakewood raw water pipeline)
- The Department of Energy on February 11, 1999, for the City of Broomfield, CO (McKay Ditch)
- The Service on June 21, 1999, for Arapaho National Wildlife Refuge, CO (water management operations)
- The Bureau on September 21, 1999, for the City of Loveland, CO (Green Ridge Glade Reservoir)
- The U.S. Department of Agriculture, Rural Development on November 10, 1999, for the City of Douglas, WY (water system improvements)
- The U.S. Department of Agriculture, Rural Development on December 21, 1999, for the City of Torrington, WY (municipal water supply)
- The U.S. Forest Service on April 11, 2000, for the City of Greeley, CO (Twin Lakes Reservoir)
- The Corps on June 7, 2000, for the Denver Water Department (non-potable water reuse permit)
- The U.S. Department of Agriculture, Rural Development on September 8, 2000, for the 33 Mile Road Improvement and Service District (water supply project)
- The Corps on September 12, 2000, for the City of Lakewood, CO (Fox Hollow Golf Course)
- The Bureau of Land Management on September 18, 2000, for the reauthorization of livestock watering facilities, WY

- The Federal Energy Regulatory Commission on October 12, 2000, for the Gross Reservoir project, CO
- The Corps on July 12, 2001, for the Town of Erie, CO (Prince Reservoir)
- The U.S. Forest Service on August 3, 2001 for Sand Lake Dam rehabilitation and operation project, WY
- The Corps on August 9, 2001, for the City of Rawlins, WY (water intake and pipeline project)
- The U.S. Forest Service on August 16, 2001, for the City of Fort Collins (Joe Wright Reservoir/ Rockwell Ranch land exchange

The post-1994 biological opinions also concluded that water depletions resulting from the proposed actions were likely to jeopardize the continued existence of the Federally listed whooping crane, least tern, piping plover, and pallid sturgeon, and destroy or adversely modify designated whooping crane critical habitat along the Platte River in Nebraska. Also, the 1994-2000 biological opinions (including the 1996 minor water depletion biological opinion) included a conference opinion that the water depletions resulting from proposed actions were likely to jeopardize the continued existence of the candidate sturgeon chub (Macrhybopsis gelida). Conference opinions addressing the sturgeon chub were discontinued on April 18, 2001, when the Service published a 12-month finding (i.e., 66 FR 19910) that listing the sturgeon chub as a Federally endangered species was not warranted (U.S. Fish and Wildlife Service 2001). Hence, the impacts of minor water depletions on the sturgeon chub are not addressed in this revised biological opinion.

In addition, the 1994 to February 1999 biological opinions (including the 1996 minor water depletion biological opinion) concluded that Federal Agency actions resulting in water depletions to the Platte River system may adversely affect, but were not likely to jeopardize the continued existence of the American burying beetle. However, based on new information, the Service (1999) concluded that the American burying beetle population located along the central Platte River is not adversely affected by water depletions to the Platte River system. Therefore, the American burying beetle is not included in this revised biological opinion.

The August 3, 2001, Sand Lake Dam, August 9, 2001, City of Rawlins, and August 16, 2001, City of Fort Collins consultations were the first consultations to address the proposed critical habitat designation for the northern Great Plains piping plover breeding population on the Platte River in Nebraska. All three of these biological opinions concluded that the proposed actions were likely to result in the adverse modification of proposed critical habitat for the piping plover.

Since issuance of the 1996 minor water depletion biological opinion, two species, the Preble's meadow jumping mouse (Zapus hudsonius preblei) and Colorado butterfly plant (Guara neomexicana spp. coloradensis) were Federally listed as threatened species on May 13, 1998, and November 17, 2000, respectively. Also, as previously mentioned, the biological opinion was amended on May 21, 1997, to include populations of the Ute ladies'-tresses orchid in Colorado. Published and ongoing research on the these three species and their habitats, and the hydrology of areas occupied by and adjacent to these species, suggest that stream depletions may adversely affect these species. Depletions can alter the timing of naturally occurring flow regimes, alter riparian habitats, and may lower the water table supporting floodplain populations of these species downstream of proposed projects. However, available information is so far insufficient to ascertain to what degree streamflow depletions and change in timing of the natural flow regime may impact these species. Therefore, while we believe there may be project impacts, we do not have enough information to conclude that these impacts will adversely affect the Ute ladie's-tresses orchid, Preble's meadow jumping mouse, or Colorado butterfly plant. According, the impacts of minor water depletions on the aforementioned species are not addressed in this revised biological opinion.

The reasonable and prudent alternatives recommended in the six biological opinions for the U.S. Forest Service projects, and the subsequent biological opinions, call for each of the permitees to make an annual contribution of money (i.e., over an interim period) to an account established at the National Fish and Wildlife Foundation (Foundation) through a cooperative agreement with the Service. The financial contribution amount for each project was based on the ratio of its water depletions to total basin-wide depletions. Money from the Foundation account is to be dedicated toward the acquisition, conservation, recovery, and maintenance of aquatic and terrestrial habitat for Federally listed species and other fish and wildlife resources occurring along the central Platte River in Nebraska. A copy of the Service's 1995 cooperative agreement and 1997 memorandum of understanding with the Foundation are included within this biological opinion as Appendix B.

On July 12, 2001, the Service completed an informal section 7 consultation with the Natural Resources Conservation Service (NRCS) regarding soil and water conservation program practices administered by the NRCS, which individually result in annual minor flow depletions of 25 af or less to the Platte River basin in Nebraska. In particular, the Service was concerned that the construction of farm ponds and grade stabilization structures in areas that are hydrologically connected to the Platte River system would deplete instream flows that are crucial to the needs of one or more Federally listed species. Based on information submitted by the NRCS that the on-farm water conservation practices it has approved have resulted in some water savings and benefit to the Platte River, the Service concurred that NRCS's impoundment and grade stabilization projects are not likely to adversely affect flows in the Platte River in Nebraska, as well as four Federally listed species (i.e., the whooping crane and its designated critical habitat, least tern, piping plover and its proposed designated critical habitat, and pallid sturgeon).

The result of all the section 7 consultations described above is the Service's conclusion that the Platte River resource is (and has been for some time) in a state of jeopardy, and any Federal Agency action resulting in a water depletion to the Platte River will further or continue the deterioration of the remaining stressed habitat conditions. Consequently, the Service has adopted a jeopardy standard for all section 7 consultations on Federal Agency actions which result in water depletions to the Platte River. All Federal Agency actions resulting in projects which deplete Platte River flows require formal section 7 consultation to comply with the Act.

During the course of informal consultations with other Federal Agencies, the Service learned that there are over 1,000 projects which may require formal consultation in the near future. For example, the U.S. Forest Service has determined that about 600 individual livestock grazing permits may require formal consultation. These are informal consultations with the U.S. Forest Service, NRCS, Bureau of Land Management, and the Corps has also revealed that most of the actions which may require formal consultation in the immediate future are likely to result in individual project depletions of 25 af or less per year. Based on available information, it appears as though these actions will be independent from one another, and widely scattered throughout the Platte River Basin. The large number of pending or anticipated project proposals which will require separate section 7 consultations, combined with a limited Service staff, justifies the development of a more efficient approach to facilitate the accomplishment of this rather immense workload. A streamlined approach would allow section 7 consultations to be accomplished more efficiently under the Act and provide a mechanism for off-setting the adverse effect of each Federal Agency action. This also is consistent with and supported by the 1994 Interagency Memorandum of Understanding on implementation of the Act (Interagency Memorandum of Understanding 1994).

Using their authorities under section 7(a)(1) of the Act, the U.S. Forest Service (U.S. Forest Service 1996) and Service contributed $95,000 and $58,000, respectively, to the Foundation account for purposes of off-setting the adverse effects of Federal Agency actions resulting in minor water depletions (i.e., 25 af or less per year) to the Platte River system, and which would result in the development of a more efficient section 7 consultation approach for such Federal actions. The U.S. Forest Service and Service contributions, including any from other Federal Agencies and entities, were made to an existing account established at the Foundation through a cooperative agreement with the Service. The intent of this agreement is to establish administrative procedures whereby funds, contributed or donated to the Foundation for the purpose of fish and wildlife habitat conservation and recovery in the Platte River Valley, can be disbursed toward projects approved by the Service to facilitate the accomplishment of management of habitats and fish and wildlife conservation in the Platte River Valley. More specifically, habitat funds will be used toward acquisition, conservation, recovery, and maintenance of in-channel and adjacent out-of-channel habitat areas and habitat buffers, which are characterized in the agreement with the Foundation, a copy of which is included in Appendix B.

Funds deposited into the Foundation account can also be allocated toward projects (e.g., water conservation, etc.) or other means approved by the Service to acquire water for restoration of Platte River in-stream flows. The agreement provides a means for off-setting the adverse effects of Federal Agency actions resulting in minor water depletions to the Platte River system as addressed by this biological opinion (refer to Appendix B for more information regarding this agreement).

PLATTE RIVER EIS SCREENING REPORT

PURPOSE

During the public scoping process, many options were suggested by the public and by the EIS team to meet the purpose and need of the proposed Federal action. Most of these options focused on ways to improve Platte River flows or land habitat in central Nebraska. These options, or elements, were evaluated, and some were eliminated from further consideration. This document covers those elements that were screened out and not incorporated into alternatives.

SCREENING CRITERIA

The purpose of the screening analysis was to focus subsequent analysis on those elements that had the best chance to contribute to the main Program goal of improving Platte River habitat for the target species without causing adverse impacts to other habitat and species.

Screening analysis of the water-related elements focused on the following criteria:

- ➢ The amount of water produced by the element (acre-feet of average annual yield at the proposed site).
- ➢ Cost for each acre-foot of average annual water yield, at the element location. For the screening analysis, the maximum cost of acquiring instream flow waters was set quite high ($5,000 per acre-foot) in order to preserve all options that were reasonably affordable to provide instream flows for the target species.
- ➢ Likely improvement in flows at the habitat, for elements at a great distance from the habitat area (acre-feet of average annual improvement toward target flows at Grand Island, NE).

Screening analysis of the land/habitat-related elements focused on the following criteria:

- ➢ Likelihood of benefit to the target species.
- ➢ Reasonable cost for implementation.

For all elements, the following criteria also were considered:

- ➢ Adverse effects on endangered species or other critical environmental resources.
- ➢ Likelihood of implementation within the first Program increment (10-13 years). Implementation constraints primarily were legal and institutional.

Some elements suggested by the public during the scoping process were dropped from further consideration at the outset because they did not address the Cooperative Agreement's stated purpose and need. These elements included, for example, improving habitat downstream from Chapman, Nebraska (outside the Program area); moving the endangered species to other areas; and cloning the endangered species.

In the remainder of this document, elements screened from further consideration are divided into water elements and land/habitat elements.

WATER ELEMENTS

Water elements eliminated from further consideration fall into the following major categories:

- Basinwide - New sources of water
- South Platte Basin
  - New Storage
  - Reallocation/change of use
- North Platte Basin
  - New Storage
  - Enlarged/recovered storage
  - Reallocation/change of use
- Central Platte Basin
  - New Storage
  - Enlarged/recovered storage
  - Ground water

New Sources of Water (Basinwide)

This category contains options for developing new sources of water (water not currently in the Platte River system). Elements are briefly described, along with the reasons for removing them from further consideration.

Transfers From Out of Basin — This element considers the feasibility of importing water to the Platte River Basin from other basins.

Loup River. Under this element, water from the Loup River Basin would be transferred to the Central Platte River Basin. The following plans were reviewed:

- Build a dam on the North Loup River to transfer water from the North Loup River to the Middle Loup River
- Build a dam on the Middle Loup River to transfer water from the Middle Loup River to the South Loup River
- Build a dam on the South Loup River to transfer water into Amherst Reservoir on the Wood River. Water would then be released from Amherst Reservoir for uses in the Platte River Basin.

There are several disadvantages to using the Loup River Basin as a source of water for threatened and endangered species in the Platte River. First, importing water from the Loup River Basin would take water from existing users. The water would not be available to the entire length of the critical habitat because the terminal reservoir could not be situated above the target species' critical habitat. (See discussion of Amherst Reservoir under A New Central Platte Basin Storage) Second, the plan would involve building several dams, diversion dams, and miles of canals, which would result in extremely high costs and environmental impacts. Third, the plan potentially would cause loss of habitat for migratory birds in the Loup River Basin, including the least tern and piping plover.

Colorado River. A variety of options for importing water from the Colorado River Basin were considered. These options, all located in Colorado except as noted, included obtaining additional water from existing diversions and constructing one new reservoir. The options evaluated were:

- Little Snake Diversion Project, Wyoming
- Grand River Ditch
- Colorado-Big Thompson Project
- Windy Gap Project
- Moffat Tunnel System
- Berthoud Pass Ditch
- Vidler Water Tunnel
- Roberts Tunnel System
- Boreas Pass Ditch
- Otero Pump Station
- Union Park (new construction)

Four broad issues stand as serious impediments common to any potential use of Colorado River supplies for Platte River endangered species:

(1) Potential violation of the Colorado River Compact.

(2) Colorado's statutes governing exports of waters out of the State.

(3) Competing needs and uses for Colorado River water

(4) Existing endangered Colorado fish issues that would be exacerbated by additional diversions

Taken together, these issues make it highly unlikely that new Colorado River water can be used in the next 13 years for Platte River endangered species purposes.

Weather Modification in the Headwaters of the North Platte Basin ─ This element would involve the installation of propane cloud seeding devices in the headwaters reach of the North Platte River to augment local snowfall and streamflow. The EIS Team conducted an investigation into the likely results of weather modification, as described in the report: *The Feasibility of Operational Cloud Seeding in the North Platte River Basin Headwaters to Increase Mountain Snowfall* . Based upon this report, and the modeled routing of increased runoff through the North and Central Platte River systems, cloud seeding could decrease shortages to target flows at Grand Island, NE by an average annual 300 acre-feet at a cost of approximately $11.7 million, which translates to $39,000 per acre-foot. This is well over the $5,000 per acre-foot screening criteria limit.

Forest Management in the Headwaters of the North Platte Basin ─ The use of patch cutting, selective harvest, and other forest clearing methods designed to increase streamflow in the North Platte, Medicine Bow, and Laramie Rivers has been proposed to improve flow in the critical habitat area of the Central Platte River. The EIS Team conducted an investigation into the likely results of changes in forest management, as described in the report : *Estimating Additional Water Yield from Changes in Management of National Forests in the North Platte Basin 1*. Based upon the results of this report, and the routing of increased runoff through the North and Central Platte River systems, this type of forest management could decrease shortages to target flows at Grand Island, NE by an estimated average annual 2,700 acre-feet at a cost of more than $25 million. This translates to an average of $9,260 per acre-foot which is beyond the $5,000 per acre-foot screening criteria limit.

New South Platte Basin Storage

This section contains options for developing new storage in the South Platte River Basin. Elements are briefly described, along with the reasons for removing them from further consideration.

400,000-Acre-Foot Two Forks Reservoir ─ This project was one of two configurations of Two Forks Reservoir (a 400,000-acre-foot reservoir and a 1.1-million-acre-foot reservoir) proposed by the Denver Water Department and examined in the *Metropolitan Denver Water Supply EIS.* Two Forks Reservoir was selected for review because it has a favorable location above Denver for storing South Platte and Blue River flows and because it is an efficient dam site from a cost perspective. The 400,000-acre-foot configuration was selected for evaluation because (1) the smaller reservoir would have relatively fewer environmental impacts; and (2) Denver's near-term future water supply plans would utilize a sufficient amount of Two Forks' storable flow so that there would be very little additional water yield from a 1.1-million-acre-foot reservoir versus a 400,000-acre-foot reservoir.

Project cost data were obtained from the Metropolitan Denver Water Supply EIS. The EIS showed a total capital cost for the project of $309.8 million as of December 1986. This cost was updated to a September 1998 cost of $436 million. Costs per acre-foot of yield range from $11,000 to $22,000, depending on whether or not Blue River storable flows are included. This cost is well over the $5,000 per acre-foot ceiling established for this screening analysis.

Several major environmental impact and permitting issues also are associated with a 400,000-Acre-Foot Two Forks Reservoir. In addition, a large portion of Two Forks' yield would be derived from transmountain diversions of Blue River water. There are several substantial environmental and permitting issues associated with these depletions, including water quality, recreational, and Colorado River endangered species issues.

Badger-Beaver Recharge Project ─This element would divert river water from the South Platte through an extended Bijou Canal for delivery to Badger and Beaver Creeks, south of Fort Morgan, Colorado. At the Fort Morgan point, flows would recharge the alluvial aquifer system. Recharge water would accrue to the South Platte River from live flows in both creeks and high capacity wells. The Badger-Beaver Project was eliminated from further study because the alluvial aquifer system is near capacity for recharge with existing augmentation projects.

Denver Basin Aquifer (Douglas County) ─ This element considers conjunctive use of South Platte River flows and the Denver Basin aquifers. Conjunctive use involves storing excess riverflows in ground water aquifers during wet years and supplementing surface water supplies with pumped ground water during dry years. Conjunctive use would result in changes to reservoir levels at several reservoirs and changes in streamflow regimes on the South Platte and its North Fork above Strontia Springs.

A regional conjunctive use arrangement involving the Denver Basin aquifers beneath Douglas County has been the subject of the *Southern Regional Cooperative Action Phase 1 Study,* cooperatively prepared by the Douglas County Water Resource Authority and Denver Water. This potential project was selected for review because it basically represents a nonstructural alternative to Two Forks.

An operational analysis for this project showed that a regional conjunctive use project, as depicted in Scenario 5 Southern Regional Cooperative Action Phase 1 Study, could generate the same yields as a 400,000-Acre-Foot Two Forks Reservoir.

A conjunctive use project would have some of the same environmental and permitting issues as Two Forks Reservoir, although inundation-related impacts would be avoided. Conjunctive use would result in changes to reservoir levels in Cheeseman, Eleven Mile, and Dillon Reservoirs, and changes in streamflow regimes on the South Platte and its North Fork above Strontia Springs. As with Two Forks Reservoir, a large portion of the yield of a conjunctive use project would come from transmountain diversions of Blue River water. There are several environmental and permitting issues associated with these depletions, including water quality, recreational, and Colorado River endangered species issues.

Douglas County water providers are very interested in a conjunctive use project involving the Denver Basin aquifers for water supply purposes. It is therefore highly unlikely that such a project would be available for Platte River endangered species purposes at an affordable cost.

Clear Creek Reservoir ─ This reservoir, potentially situated on Clear Creek, west of Denver, could yield about 8,800 acre-feet of water per year for Platte River endangered species purposes.

The Colorado Water Resources and Power Development Authority (Authority) conducted a preliminary evaluation of Clear Creek storage alternatives in 1987. A representative 110,000 acre-foot Clear Creek Reservoir (Tunnel No. 1 site) was selected for review.

Storable flows averaged 23,000 acre-feet per year over the 1947-74 hydrologic study period. An operational analysis showed that a 110,000-acre-foot reservoir could yield about 8,800 acre-feet per year for Platte River endangered species purposes.

Project cost data obtained from the Authority study showed a total capital cost for the project of $305 million as of November 1987. This cost was updated to a September 1998 cost of $411 million. Costs per acre-foot of yield would be about $49,000, well above the $5,000-per-acre-foot ceiling established for this screening analysis.

Little Thompson Reservoir ─ The St. Vrain Basin Reconnaissance Study, conducted by the Colorado Water Resources and Power Development Authority in 1986, examined both structural and nonstructural water development options for the St. Vrain River Basin west of Longmont, Colorado. Little Thompson Reservoir was selected for review because of its relatively favorable ranking in that study and because it represents a broad class of proposed reservoirs in the Northern Front Range.

The Authority's study reports that about 13,000 acre-feet of additional native water could be developed on a firm yield basis from 80,000 acre-feet of additional storage. This 13,000-acre-foot estimate was adjusted down to 11,000 acre-feet based on similar yield adjustments calculated for other example projects. The yield at North Platte, reflecting evaporation and seepage transit losses, would be about 10,500 acre-feet.

Project cost data from the Authority's study showed a total capital cost of $83 million for an 86,000 acre-foot Little Thompson Reservoir project as of February 1986. This cost was updated to a September 1998 cost of $118 million. The resulting cost per acre-foot of yield was approximately $12,000, well above the $5,000-per-acre-foot ceiling established for this screening analysis.

Grey Mountain Reservoir ─ The Cache La Poudre Basin Study, conducted by the Colorado Water Resources and Power Development Authority in 1987, and the Cache La Poudre Basin Study Extension, conducted by the Northern Colorado Water Conservancy District, examined storage options in the Cache La Poudre Basin, west of Ft. Collins, Colorado.

Grey Mountain Reservoir was selected for review because of its relatively favorable ranking in those studies and because it represents a potential storage project in the Cache La Poudre Basin, the largest tributary of the South Platte Basin.

Studies show potential storable flows from the Cache La Poudre averaged 53,000 acre-feet per year over a 1949-83 hydrologic study period. An additional 10,000 acre-feet per year of potentially available Colorado-Big Thompson Project water was also identified for potential storage in Grey Mountain Reservoir.

An operational analysis showed that a 195,000-acre-foot Grey Mountain Reservoir could yield about 16,000 acre-feet per year from South Platte storable flows alone. If Colorado-Big Thompson Project storable flows contributed, the yield would be about 26,000 acre-feet per year. Yields at North Platte, reflecting evaporation and seepage transit losses, would be 16,000 acre-feet and 25,000 acre-feet, respectively.

Project cost data were obtained from the Authority's study. The study showed a total capital cost for a 195,000-acre-foot Grey Mountain Reservoir project of $146 million as of 1982. This cost was updated to a September 1998 cost of $228 million. The resulting costs per acre-foot of yield ranged from $9,000 to $15,000, well above the $5,000-per-acre-foot ceiling established for this screening analysis.

Hardin Reservoir ─ Hardin Dam [add location information] was selected for review because it represents several storage projects aimed at capturing and reregulating South Platte River flows below Greeley, where significant return flows enter the river.

Studies show potential storable flows for Hardin Dam averaged 170,000 acre-feet per year over a 1943-77 hydrologic study period. An operational analysis showed that a 400,000-acre-foot Hardin Reservoir could yield about 38,000 acre-feet per year at the reservoir site. The yield at North Platte, reflecting evaporation and seepage transit losses, would be about 37,000 acre-feet per year.

Project cost data were obtained from the 1982 project study. The study showed a total capital cost of $270 million for a 400,000-acre-foot Hardin Dam and Reservoir as of 1982. This cost was updated to a September 1998 cost of $437 million. The resulting costs per acre-foot were approximately $12,000, well above the $5,000-per-acre-foot ceiling established in this screening analysis. The environmental and permitting issues associated with Hardin Dam and Reservoir include inundation of major wetland areas and related wildlife impacts, as well as reductions in sediment load downstream.

Reallocation/Change of Use in the South Platte Basin

An alternative to developing new storage sites in the South Platte Basin was to reallocate existing storage to Program uses. Elements are briefly described, along with the reasons for removing them from further consideration.

Reallocation of Corps of Engineers Tri-Lakes system (Cherry Creek, Chatfield, and Bear Creek Reservoirs) ─ The option considers reallocating some flood control space in three Denver area reservoirs to storage for Program purposes. Reallocation of 23,000 acre-feet of Chatfield Reservoir flood control storage to Program water supply purposes was previously examined in the Metro Denver Water Supply EIS, which showed cost data. Yield at North Platte would be roughly 3,000-5,000 acre-feet. A total capital cost for a 23,000-acre-foot reallocation was estimated as $34 million as of 1998, for a per-acre-foot cost of roughly $7,000. Environmental and permitting issues would be substantial, including adverse impacts to recreational and riparian resources at the reservoir and potential increase of flood risk in the Denver area.

New North Platte Basin Storage

This section includes options for developing new storage in the North Platte River Basin. Elements are briefly described, along with the reasons for removing them from further consideration.

Deer Creek Reservoir ─ This proposed 66,000-acre-foot reservoir would be located near Glenrock, Wyoming, on Deer Creek, a tributary to the North Platte River. It provides new tributary storage between Alcova and Guernsey Reservoirs.

The most comprehensive document on Deer Creek is the Final Environmental Impact Statement for Regulatory Permits, Deer Creek Dam and Reservoir, Wyoming, September 1987 (DCEIS). This document presents an option that provides a firm yield for Deer Creek Reservoir of 6,400 acre-feet.

According to the DCEIS, the major effect of the Deer Creek project on the North Platte River system is that it would reduce the amount of surplus (excess-to-ownership) water in Glendo Reservoir, which has historically been used to satisfy irrigation demand and delay the need for storage water. When the excess-to-ownership account is reduced, the demand on storage increases. Based on the DCEIS hydrology studies, if Deer Creek Reservoir were in place, calls on reservoir storage for the North Platte Project would increase by 6,420 acre-feet per year.

The cost of constructing Deer Creek Reservoir was projected at $52 million in 1987. Annual operating, maintenance, and replacement costs were estimated at $35,000 per year. The Wyoming Water Development Commission subsequently (in 1990) estimated it would cost $45 million to construct the dam using roller-compacted concrete. Indexing the cost to the Construction Cost Index increases the 1994 cost to almost $58 million, or around $9,000 per acre-foot.

Dodge Dam and Reservoir ─ This project would be located on the Laramie River, approximately 40 miles north of Laramie and downstream from Wheatland No. 2 Reservoir. The project would provide replacement or supplemental storage for water now stored in Wheatland No. 2 and Wheatland No. 3 Reservoirs. Estimated capacity for the proposed reservoir has varied from 40,000 to 170,000 acre-feet.

The ability of this project to provide water for environmental purposes is limited because it would require an existing irrigation district to allow its reservoirs to be replaced without providing any benefit to the district. The lack of an adequate supply for existing irrigation is another complicating factor.

Estimated average yields and costs are 2,500 acre-feet and almost $20 million, or about $8,000 per acre-foot.

Enlarged/Recovered Storage in the North Platte Basin

An alternative to developing new storage sites in the North Platte Basin is to enlarge or improve existing reservoirs. These modifications could increase storage capacity or recover storage capacity that has been reduced since the reservoir was first constructed. Elements are briefly described, along with the reasons for removing them from further consideration.

La Prele Reservoir Enlargement ─ This reservoir, located on La Prele Creek, north of Douglas, Wyoming, could be enlarged to 40,000 acre-feet to increase the current usable storage capacity.

La Prele Creek is a tributary that enters the North Platte River west of Douglas, Wyoming. The dam and reservoir, which are privately owned by La Prele Irrigation District, have a usable capacity of 20,000 acre-feet. A 1969 Reclamation study investigated the possibility of increasing the usable storage capacity to 40,000 acre-feet. The study indicated that average yield would increase by 2,900 acre-feet, and losses to evaporation would increase by about 1,000 acre-feet per year. The current cost of enlarging the dam is estimated at $37 million, or about $13,000 per acre-foot.

Guernsey Dam and Reservoir Enlargement ─ This option considered raising the dam near Guernsey, Wyoming, to recover storage space lost to sediment. Raising the crest of the dam would require removing some structures.

The most significant impact of raising the elevation of Guernsey Reservoir would be on the railroad tracks which closely follow much of the south side of the reservoir and the right bank of the North Platte River upstream of the reservoir. Raising the maximum control elevation of the reservoir to 4431.5 feet would result in at least one segment of the tracks being inundated and two other segments, both with bridges, where the low chord of the bridges would be perilously close to the new water surface. These latter two segments would potentially be subject to damaging wave action. The lowest segment of threatened track is near the downstream end of Guernsey Reservoir, at Newell Bay, and includes two tunnels with openings whose floors are near or below elevation 4430 feet. Because these tunnel openings are so low, it would not be feasible to raise the tracks to a safe elevation at this location. Re-routing the tracks away from the reservoir would require a combination of cuts, excavations, and tunnels that would be prohibitively expensive. Furthermore, it would require the relocation of a junction currently located at junction point named Wendover, Wyoming. One possibility that was considered was diking off the tracks from Newell Bay and at the outlet from an unnamed creek located halfway between Newell Bay and Wendover. Diking at Newell Bay would require a large amount of material, with accompanying material and construction costs, because Newell Bay is quite deep. Diking at the other locations would not be feasible because at both of these locations there are confluences of creeks with the reservoir or the North Platte River.

Seminoe Reservoir Enlargement ─ Seminoe Reservoir is located on the North Platte River in Carbon County, Wyoming. Reclamation has studied the option of raising Seminoe Dam to enlarge its storage capacity.

Seminoe is a multipurpose reservoir built to provide water for both irrigation and hydroelectric energy. The normal high water line of the reservoir is elevation 6357 feet. At this level, the reservoir has a total storage of approximately 1 million acre-feet and covers about 20,290 surface acres.

In 1991, Reclamation completed a study that examined the potential to enlarge Seminoe Reservoir. The results of the study are reported in the Special Report, Seminoe Dam Kendrick Project, Wyoming, June 1991. This report analyzed variations of two scenarios for enlarging Seminoe Reservoir. The first scenario involved raising Seminoe Dam 18 feet, which would increase the conservation pool by 415,000 acre-feet. The second scenario involved raising Seminoe Dam 35 feet, which would increase the conservation pool by 909,000 acre-feet. The firm yield for scenario one is 7,300 acre-feet, and the estimated costs were $38.2 million. The firm yield for scenario two is 12,900 acre feet, and the 1991 estimated costs were $62.5 million. The current costs would be $47 and $77 million for the 18-foot and 35-foot raises, respectively, or about $6,500 and $6,000 per acre-foot, respectively.

Reallocation/Change of Use in the North Platte River Basin

This section includes options for obtaining Program water by reallocating or changing the use of water in the North Platte River Basin. Elements are briefly described, along with the reasons for removing them from further consideration.

Reallocate some Glendo Reservoir flood control/surcharge space to Program purposes ─ This option would involve increasing water storage for the Program by reducing flood control space. Given that Glendo Reservoir provides the only dedicated flood control space in the North Platte reservoir system, this option seems unlikely. Further, the average annual volume of water stored temporarily in the flood control space is 3,200 acre-feet (storage in this space is highly variable). This yield would be diminished if the Program used only a fraction of the full flood control space.

New Central Platte Basin Storage

This section describes elements for developing new storage in the Central Platte River Basin. Elements are briefly described, along with the reasons for removing them from further consideration.

Birdwood Creek Reservoir ─ Birdwood Creek flows south out of the Sandhills area of central Nebraska and enters the Platte River near Sutherland, Nebraska. The efficiency of a reservoir on Birdwood Creek also would be affected by the suitability of location. Area soils contain a significant amount of sand, which could allow great amounts of water to seep from the reservoir. The location’s shallow slope would increase the reservoir surface area and expose more water to evaporation. Another consideration is that Birdwood Creek does not have high spring peak flows that can be stored for release later in the year.

Amherst Reservoir ─ This site, located on the Wood River, would not be situated above critical habitat, so it would not benefit the target species. Another option suggested for this site would be to build a reservoir below the critical habitat and construct a system of pumps and canals to transport the water back above the critical habitat reach. Construction of the reservoir alone would be very costly; adding a system of pumps and canals would increase these costs substantially.

Enlarged/Recovered Storage in the Central Platte Basin

This section includes options for enlarging and/or recovering storage in the Central Platte River Basin. Elements being eliminated from further study are briefly described, along with the reasons for removing them from further consideration.

Kingsley Dam (Lake McConaughy) modification to restore original reservoir capacity ─ Kingsley Dam currently operates under a restriction on its maximum water surface elevation, to prevent wave damage to the dam crest during extreme wind events.

Adding wave protection to the dam crest would allow raising the maximum water surface by about five feet. Under this element, the regained storage space would be dedicated to the Program.

Modification to the structure would involve increasing the rip rap on the upstream face of the dam and constructing a concrete barrier to protect the upstream face from wave action, which would be expensive. EIS Team estimates of the cost for making necessary modifications to the structure range from $50 to $100 million. The increased reservoir yield would be roughly 9,000 acre-feet, for a cost ranging from $5,500 to $11,000 per acre-foot.

Prairie Bend or Similar Offstream Reservoirs

Large Plum Creek Reservoir — Several studies, generally under the umbrella of the Prairie Bend Project investigations, have considered construction of a reservoir of various sizes on Plum Creek to provide reregulation of Platte River flows through the habitat. Essentially, this type of reservoir would be to improve the reregulation of flows released out of the Lake McConaughy EA and also flows coming down the South Platte River. A small reservoir in this area is part of the Water Action Plan for the Governance Committee alternative.

Because of its cost, a larger reservoir here only makes sense if it replaces most if not all of the Program's other water elements. In 1990, the estimated cost of a reservoir with 200,000 af of capacity was roughly $137 million, not including the considerable costs for diversion works and a return canal to the Habitat Area. This reservoir would provide roughly 35,000 af of flow improvement annually at the Habitat Area. At today's costs, this option would exceed the entire first increment Program, and not cover all of the desired improvement in target flows.

Bladder Dam below the J-2 Return — This element is a bladder dam on the south channel of the Platte River near Lexington, below the J-2 Return canal. This part of the river channel carries only return flows from the Central Supply Canal back to the main river. The purpose of this element would be to store these return flows and release the water to help create short-duration high flows near bank-full in the central Platte Habitat Area. The initial estimate of the cost of this facility is between $20-25 million.

This element was not included in the alternatives in lieu of other operational methods for creating short-duration high flows near bank full. Drawbacks of the plan include the fairly limited capacity of such a facility, plus the fact that it would inundate an area that has been used as nesting habitat by the target species in the past and may be a site of future habitat restoration. The geology of the site to handle rapid fluctuations in storage level is also questionable.

Other sites for a reservoir that would provide pulse releases to the Habitat Area were evaluated in this area, on the Plum Creek and other drainages to the south. The primary drawbacks to these locations are the cost of providing substantial outlet and conveyance capacity back to the Central Platte River for the pulse releases, and the fact that the geology of these reservoir sites is not amenable to rapid drawdown of storage.

Ground Water Options in the Central Platte Basin

The following options consider using ground water to provide part of the Program's water supply.

Draw Down CNPPID Ground Water Mound ─ Augment Platte River flows by pumping water from the CNPPID ground water mound at a rate greater than the annual accretions. This element was eliminated from further consideration for the following reasons:

- ➢ One of the first results of mining the ground water mound would be to adversely affect wetland habitat that has resulted from the mound. Funk Lagoon would no longer sustain wetland conditions as the water table dropped from beneath the lagoon.

- ➢ Wet meadows within the Platte River may be adversely affected. Wet meadow habitat would become more susceptible to drought conditions that occur in the Platte system.

Note that the Groundwater Mound elements included in DEIS alternatives do not involve mining (permanently lowering) the groundwater mound.

Pumping Ground Water from Sandhills to the Platte River ─ This element would develop facilities to pump water from the Sandhills region and convey it to the river.

The lakes and marshes of the sandhills are fed by ground water. If the water table in the Sandhills is lowered, the lakes and marshes will soon dry up, and the associated wetland vegetation would quickly disappear.

This may impact the habitat of the Topeka Shiner, a federally proposed endangered species, and affect the area wetlands, which are considered unique habitats by the Service.

CHANNEL MANAGEMENT ELEMENTS

The following elements, all located in the Central Platte River area, were eliminated from further study:

Construct a sediment "Aslurry" pipeline around Kingsley Dam ─ This option would involve removal of sediment from the Lake McConaughy inlet area and constructing a slurry pipeline to transport the sediment around Kingsley Dam to an area downstream of the dam for reintroduction into the North Platte River system. The work would require removing about 1,000 acre-feet of sediment annually and reintroducing it downstream of the Keystone Diversion Dam to increase sediment load in the critical habitat area.

The estimated cost for constructing the pumping plants and pipeline was estimated to be nearly $24 million as of 1999, which does not include the additional costs of land required for the pumping plants or easements for the pipeline. In addition, the expected life of the pipe line would be only five to ten years because of the abrasiveness of the sediments.

Central Platte Bridge Modification/Removal to Restore Channel Width ─ This would involve removing or redesigning some of the bridges over the Central Platte to reduce flow restrictions and channel narrowing. Preliminary studies indicate that bridge modification or removal would be very expensive. In addition, the negative effects of bridges on the river channel are limited to areas immediately above and below the bridge and may vary from bridge to bridge. This would also be the case with any benefits realized from bridge modification or removal. Therefore, bridge modification and removal are not carried forward for further consideration.

Central Platte Main Channel Excavation to Provide Refuge for Fish Species on Which the Least Tern Feed ─ This would involve excavating areas in the main channel of the Central Platte River which would provide refuges for native fish during low water periods in the summer. Excavating channels could provide some thermal refuges for fish but would only do so for a very limited area and only for a very small percentage of the Central Platte River fish community. In addition, any potential benefit would come at a cost to existing habitats backwaters, sloughs, side channels, and important deep water shoreline habitats along sandbars and riverbanks which would all become less available at lower flows. Further, the sandy alluvium of the Platte would lead to rapid in-filling of most types of excavations.

Central Platte In-Channel Temporary Dams to Provide Refuge for Fish Species on Which the Least Tern Feed ─ This element involves building in-channel, temporary dams (such as bladder dams) as another means of providing refuge areas for fish during low flow periods. The cost to provide 6- to 9-foot-high inflatable dams at 10 major bridge crossings, with a concrete foundation for each dam, is nearly \$2 million per dam, or \$20 million. Further, the biological benefits of such an approach are not clear, compared to other options such as enhancing existing backwater areas.

LAKE MCCONAUGHY EA 2005 OPERATING PLAN

ENVIRONMENTAL ACCOUNT

2005 WATER YEAR ANNUAL OPERATING PLAN

INTRODUCTION

An Environmental Account (EA) of water in Lake McConaughy in Nebraska was established on October 1, 1999, as per Central Nebraska Public Power and Irrigation District (CNPPID) and Nebraska Public Power District (NPPD) (collectively, Districts) Federal Energy Regulatory Commission (FERC) licenses, for Project 1417 and Project 1835, respectively. The EA is managed by an EA Manager appointed by the U.S. Fish and Wildlife Service (Service), and was established primarily to benefit four federally listed threatened or endangered "target" species (i.e., whooping crane, interior least tern, piping plover, and pallid sturgeon). The EA Manager is required to develop an Annual Operating Plan (AOP) for releases from the EA in coordination with an EA Committee (EAC) by the end of October of each year. Guidelines and operating rules for the EA are described in the FERC licenses and Appendix A, *Water Component*; TAB 1A, *An Environmental Account for Storage Reservoirs on the Platte River System in Nebraska*, of the *Cooperative Agreement for Platte River Research and Other Efforts Relating to Endangered Species Habitats Along the Central Platte River, Nebraska*.

The EA AOP for the 2005 water year consists of three main parts as follows: 1) Background; 2) Summary of Water Year 2004; and 3) Water Year 2005 Projections and EA Release Priorities. Attachments to this document include: EA Water Year Comparisons (Appendix A); Reservoir Operating Rules during the Non-Irrigation Season for Predicted Year Types (Appendix B); Reference List of Documents Relevant to EA Operations (Appendix C); Graph of Historic Mean Daily Flows at Grand Island (Appendix D); and Schematic Diagram of the Platte River and Diversion Systems between Lewellen/Julesburg and Overton (Appendix E).

BACKGROUND

On July 1, 1997, a Cooperative Agreement (CA) was signed by the states of Nebraska, Wyoming, and Colorado and the Secretary of the Department of the Interior to develop a basin-wide Platte River Recovery Implementation Program (Program) to improve and maintain habitats associated with four federally listed, target species in the Platte River basin. A long-term objective of the proposed Program is to provide sufficient water to and through the central Platte River to benefit the target species and their associated habitats. Operations of the EA will be integrated into the proposed Program when it is implemented sometime in 2006.

The proposed Program will be implemented on an incremental basis and administered using an adaptive management approach. During the first increment of 13 years, various water- and land-related activities will be conducted. Effects of Program activities on the associated habitats and responses of the target species to those effects will be monitored and evaluated during the first increment. A first increment goal is to improve the occurrence of Platte River flows in the associated habitats (relative to the present occurrence of target flows; referred to as "reducing shortages to target flows") by an average of 130,000 to 150,000 acre-feet (af) per year as measured at Grand Island, Nebraska, through re-regulation and water conservation/supply projects. The EA in Nebraska is currently in place and two additional projects, in

Colorado and Wyoming, are being developed to supply over half of the water during the first increment of the proposed Program.

Service-recommended target flows will serve as the reference point for determining periods of excess and shortage in the operation of Program re-regulation and water conservation/supply projects during the first increment, or until such time as new information becomes available which indicates modification of the recommended flows is warranted. Recommended target flows are described in detail in the Service's "Instream Flow Recommendations for the Central Platte River" (May 23, 1994) and "Pulse Flow Requirements for the Central Platte River" (August 3, 1994) and summarized in Table 3 (pages 9-11). Additional information regarding the instream flow recommendations and pulse flow requirements, as they relate to the Program, can be found in "USFWS Instream Flow Recommendations: Proposed Definitions and Usage for the Platte River Recovery Implementation Program" (November 18, 2003, *Draft*).

This EA AOP outlines the Service's general intentions for operation of the EA in the 2005 water year. Changing hydrologic conditions and other considerations may require a change in the course of action described in this AOP.

SUMMARY OF WATER YEAR 2004

The Districts are required to predict Storable Natural Inflows (SNI) and Water Year-Type (i.e., very wet, wet, transitional, dry, and very dry) by October 15 of each year. The SNI for October through March is used for calculating "Type-of-Year" whereas the SNI for October through April is used in assigning contributions to the EA. These predictions establish certain reservoir operating rules during the non-irrigation season (see Appendix B). The EA Manager is notified by the Districts of any modification to the predictions that would result in a change in the Year-Type. To assist the EA Manager in developing the EA AOP, the Districts have also provided projections for flows at Overton and Grand Island, based on their predicted operations.

The Districts' predictions for SNI and Type-of-Year for the 2004 water year and the actual water volumes were as follows:

Item	Prediction	Actual
SNI, October through March	280,000 af	280,000 af
SNI, October through April	330,000 af	320,000 af
Type-of-Year	Very Dry	

Based on anticipated below average carry-over storage in Lake McConaughy and water supply on the North Platte, the Districts' 2004 Water Year Operation Plan called for maximizing storage while meeting their minimum operational flow requirements. During the non-irrigation season, inflows into Lake McConaughy were 63% percent of normal. Lake McConaughy storage content peaked on April 26 at 686,000 af, which was 12,300 af higher than projected.

During the irrigation season, outflows from Lake McConaughy were 80% percent of projected and 62% of normal; inflows were about 36% of normal and 100% of projected. Lake McConaughy elevation declined over 22 feet during the irrigation season, 13.7 feet less than the projected 3,183.2 feet as a result of lower than anticipated releases.

WY2004 EA Volume

Actual accruals, losses, and total EA volume during the 2004 water year are illustrated in Table 1.

Table 1. Water Year 2004 EA Volume and Release Information

Month	WY2003 Carry-Over (+)	10% Storable Inflows (af) (+)	Evap./Seepage Losses (af) (-)	EA Releases (af) (-)	End of Month EA Volume (af)
October (03)	53,632	4,074	738	0	57,282
November		5,175	376	0	62,081
December		5,007	267	0	68,821
January (04)		4,546	266	0	71,101
February		4,522	313	0	75,310
March		4,902	726	0	79,486
April		4,155	770	0	**82,871**
May		0	1,008	0	81,863
June		0	919	0	80,944
July		0	1,167	0	79,777
August		0	1,201	0	78,576
Sept.		0	1,208	0	**77,368**
Totals		**32,381**	8,959	0	

* EA storage was credited with 314 af on 10-01-04 as per Central's FERC license

Carry Over

2004 Flows and EA Releases

Flows at Grand Island during the 2004 water year are illustrated in Figure 1 (page 12).

The EA accrued 32,381 af during the WY2004 non-irrigation season (October 1 to May 1). This accrual combined with carry-over from WY2003 and minus evaporation/seepage losses, resulted in a total EA volume of 82,871 af at the start of the WY2004 irrigation season (May 1 to Sept. 30), slightly less than the 85,000 af predicted. No EA releases were made during WY2004.

After the 2003 irrigation season, flows at Grand Island did not "recover" until mid-November (i.e., flows registered 0 cfs at the Grand Island gage until November 17). Below average precipitation/snow pack conditions occurred throughout the majority of the Platte River basin in Colorado and Wyoming during the winter/spring period resulting in no elevated spring flows in Nebraska. Early spring storms and river ice cover in central Nebraska contributed to a slight increase in flows for short periods in parts of the central Platte River reach (i.e., < 2,000 cfs); however, no significant spring rise (i.e., pulse flow) occurred for the fourth consecutive year.

In the absence of these beneficial flows that promote in-channel vegetation removal, river habitats continue to degrade, and at an accelerated rate during this drought cycle. The Service continues to place the highest priority on increasing the frequency, magnitude, and duration of higher flow events through the central Platte River reach and is increasingly interested in using the EA to facilitate higher magnitude, longer duration flows in an effort to remove in-channel vegetation through inundation and/or scouring flows.

During the WY2004 winter period, options for implementing an EA pulse flow in the spring of 2004 were actively pursued. Several pulse flow planning meetings were held including:

- February 23, 2004, meeting with the pulse flow workgroup -- outlined a preliminary plan for an EA pulse release; identified limitations of a pulse release
- February 24, 2004, meeting with environmental groups -- outlined a preliminary plan for island leveling projects
- March 10, 2004, meeting with the pulse flow planning workgroup -- outlined a process for hydrology and vegetation monitoring
- April 8, 2004, meeting with Randal, Anderson, Kerkman, and Kwapnioski -- further developed a pulse flow implementation plan

Although excellent progress in planning was made, on March 12, 2004, the Service decided not to go forward with implementation of a spring EA pulse release. A sample of the numerous factors considered in the decision-making process is provided in Table 2, below.

Table 2. Pros and Cons Considered During EA Pulse Flow Planning

Reasons to Implement an April 2004 EA Pulse Release:	**Reasons in April 2004 for Delaying an EA Pulse Release:**
• Vegetation conditions on the river indicate a pulse flow is needed • Disking has occurred from Minden bridge to Chapman bridge • Island leveling at Cottonwood Ranch has occurred as part of NPPD's FERC-approved habitat plan and the USGS has monitoring in place • Island leveling at the Uridil Property will likely occur before the EA pulse • The pulse flow work group developed a preliminary pulse plan that includes timing and magnitude of flows • River conditions are good for "testing system plumbing"	• Island leveling at Rowe will not occur until after whooping crane migration • Clearing/leveling equipment operation in the river channel would not be permitted from March 23 to May 10 (possibly May 1) • Except for Cottonwood Ranch, Rowe, and Uridil properties, very little monitoring is in place • Because of low base flows, the estimated EA water needed will be 62 kaf (projected EA water available is 85 kaf) • Total EA volume needed will be roughly 1/3 of the projected total volume of Lake McConaughy at the end of the irrigation season • Flows reached the 2,000 cfs level at Overton and Kearney in late February/early March overtopping a large portion of vegetated islands • Little to no South Platte flows to build on; a minimal pulse expected (i.e., about 3 days @ ≈3,000 cfs at Overton) • Proposed timing of pulse (i.e., April 26-28 at Overton) may not be conducive for first-wave vegetation removal • Pulse flow work group still working on preliminary pulse plan • EA water will be retained in Lake McConaughy providing more water for use during the rest of WY2004, if needed, or to "carry-over" into the next water year for use in WY2005

Average flows were 311 cfs during the WY2004 whooping crane spring migration period (i.e., March 23 to May 10). To reserve the limited supply of EA water for possible use later in the water year or as carry-over, no EA releases were made to augment flows during this time period.

In May and June, the negative effects on channel habitat from the lack of pulse flows and prolonged low to zero flow periods were again apparent with the early proliferation of dense vegetation on islands and sandbars in the river. The long-term establishment of these plant communities continue to degrade channel habitats used by whooping cranes, least terns, and piping plovers, and hinder restoration efforts.

Based on continued and predicted very dry river conditions and past experience, the Service decided to forego flow augmentation during the summer period (May 11 to September 15) for a second consecutive year. Current irrigation operations, system constraints, EA volume, and drought limit effective EA augmentation throughout the summer which makes securing the desired benefits for the riverine community difficult to achieve. Although conditions made EA augmentation impractical during the summer period, the May 11 to September 15 time period remains a Service priority. Until such time as river conditions improve and EA augmentation is effective during this time period, it is hoped that plovers and terns nesting in the central Platte River reach will fledge their young before the river dries. For those birds still nesting when zero flows occur, it is also hoped that they will be able to find and reach sufficient fish and/or macroinvertebrate densities in riverine areas where perennial water sources still exist to sustain them throughout the remainder of the nesting season.

Without EA augmentation, flows at Grand Island began diminishing by late May. By June 6, the USGS gage at Grand Island registered 0 cfs. Other than a brief respite during July due to rain showers, zero to very low flow conditions persisted at Grand Island through the rest of the 2004 water year and into WY2005. Periods of low to zero flow were experienced at several other Platte River gages; however, occasional storms and cooler temperatures throughout the summer resulted in fewer zero flow days in the central Platte River in 2004 than in 2003.

With no EA releases made in WY2004, 77,368 af of EA was carried-over into WY2005.

WATER YEAR 2005 PROJECTIONS AND EA RELEASE PRIORITIES

Water Year 2005 Projected Water Supply

The Districts provided the following predictions for SNI and Type-of-Year for the 2005 water year to the EA Manager on October 4, 2004.

Item	Prediction
SNI, October through March	280,000 af
SNI, October through April	325,000 af
Type-of-Year	Very Dry

The Type-of-Year is based on the predicted SNI (280,000 af) and Lake McConaughy carry-over contents on October 1, 2004 (356,500 af), in accordance with Section III of the EA Document. If the predictions hold true, EA content by the end of the non-irrigation season will be about **106,000 af** (i.e., 10% SNI + Carry-Over - Evap./Seep. *or* 32,500 + 77,368 - 3,500 = 106,868).

Prior to the WY2003 EA AOP, flows at Grand Island were projected and compared to the Service's instream flow recommendations for the purposes of projecting shortages during target flow periods.

During drought conditions; however, estimating flows at Grand Island based on the Districts' projected operations, has proven problematic. Shortages were determined from estimates of flows at Overton and Grand Island, using projected Jeffery and J-2 returns and average river gains/losses. Based on experiences during drought conditions, use of average gains/losses overestimate flow expected to occur at Grand Island. Use of average monthly gains/losses from high loss periods (e.g., 1993-1994) also provide erroneous results. Therefore, a more general description, based on operations and conditions experienced during the drought water years 2002 to 2004, was again used to predict flow conditions for water year 2005.

Due to below normal water supply forecasts and Lake McConaughy carry-over storage, the Districts will follow a conservation mode of operation to maximize storage. During the non-irrigation season, no Lake McConaughy releases are planned beyond those required for maintenance/repair, or in anticipation of icing conditions at the Keystone Diversion Dam, or if Sutherland Reservoir levels fall below elevation 3,045. On October 15, 2004, CNPPID began releasing water from the J-2 Return in a cyclic pattern. Continued cycling at the J-2 hydroplant is anticipated throughout the remainder of the non-irrigation season. The average daily flow level, about 500 cfs at Overton, is expected to occur through late spring. During the irrigation season, releases will be made for irrigation customers and routed through the Districts' storage and regulating facilities, as much as possible, to generate electricity and to conserve water. A shorter than normal irrigation season and reduced delivery rate of irrigation water is expected in WY2005, which will result in decreased flows of roughly 400 cfs at the North Platte “choke point.” Regardless, if drought conditions persist and similar 2003/2004 gains/losses are experienced between Overton, Kearney, and Grand Island, very low to zero flows are expected to occur again, as early as mid-July at Grand Island.

Water Year 2005 Environmental Account Release Priorities

Numerous hydrologic and biologic conditions must be considered throughout the year in determining EA releases. The duration and quantity of water to be released will depend on historic and existing conditions, Service target flow recommendations, EA volume, release priorities identified in this AOP, and experience. Based on the continuation of “very dry” conditions for the 2005 water year, the Districts' drought-conditions operation plan, and flow conditions experienced during the 2002 to 2004 “very dry” water years, Service priorities for WY2005 are very similar to those described for WY2004 (Table 3, pages 9-11).

Winter/Early Spring (December-March): No significant spring rise (i.e., pulse flow) has occurred for four consecutive years. In the absence of these important hydrologic processes, vegetation has proliferated and become well established in the channel throughout the majority of the central Platte River reach. With a lack of significant pulse flow events and a continuing in-channel habitat degradational trend, the ability to use the EA to augment and/or create a pulse flow to facilitate those beneficial river processes, is increasingly more important. In addition, a pulse flow, in conjunction with ongoing land management activities in the central Platte River habitat reach (i.e., vegetation disking and mechanical sediment deposition), will provide a means of addressing a number of identified research needs.

The Service recognizes that the system and institutional mechanisms required to use the EA to augment or create pulse flows in the central Platte River reach are challenging and many are not yet known. Regardless, pulse flows remain the Service's highest priority and, considering the severe encroachment of woody and herbaceous vegetation into low lying areas as a result of the drought, current plans are again to use the EA for this purpose during the 2005 water year. The Service will continue to build upon the EA pulse flow planning progress made during the 2004 water year in preparation for implementing an EA-facilitated pulse release in WY2005.

Because of the many uncertainties and complexities associated with using the EA to augment or create pulse flows, the EA Manager will coordinate all planning and development activities with the appropriate parties, including the EAC, well in advance. Because monitoring will be an important part of the effort, coordination with the CA's Technical Committee and integration with the future Program's Integrated Monitoring and Research Plan will also be pursued.

Whooping Crane Migration Season (March 23-May 10): If projected average daily flows of 500 cfs occur at Overton during this period, and gains to Grand Island are similar to those in water year 2004, shortages to the Service's dry year flow target of 1,700 cfs, at Grand Island, will again occur during this important whooping crane migration period. Hydrologic conditions and the status of the whooping crane migration will be closely monitored during this time. If it is determined that *base flows* are inadequate to provide stop-over opportunities for migrating whooping cranes in the central Platte River, EA releases may be made to augment flows during this period.

Late Spring (May/June): As stated previously, improvement of spring pulse events is the Service's highest flow priority (Bowman 1994; Bowman and Carlson 1994). Existing long-term averages for pulse flows are well below Service targets and current projections suggest that below average flow conditions will again occur throughout most of the water year. If conditions during winter/early spring (with or without EA releases) have not resulted in beneficial pulse flow(s) which promote natural river processes (e.g., in-channel vegetation removal, sandbar formation), the Service will proceed with plans to use the EA for pulse flow augmentation during this priority period. All attempts will be made to time EA releases to improve the magnitude and/or duration of natural peak events that result from mountain snow melt and/or uncontrolled runoff events. However, current plans are to proceed with pulse flow augmentation plans even if a natural peak flow does not occur.

Summer (June-September): If drought conditions persist, flows during summer 2005 are expected to be similar to those in 2004. Even if hydrologic conditions improve during the water year, it is doubtful that much water will reach the central Platte River during the summer months due to the on-going drought coupled with the Districts' anticipated operations for providing irrigation deliveries and maximizing storage. The expected shorter-than-normal irrigation season may have some effect on flow recovery in late summer/early fall but will probably not prevent low to zero-flows during most of the irrigation season. If a sufficient amount of water is in the EA after the spring pulse period(s), consideration will be given to augmenting extremely low flows during the plover and tern nesting season (June 1 to August 15) to maintain a forage base of macroinvertebrates and fish. Additional consideration will be given to the possibility that increased EA releases (i.e., above 500 cfs) might be possible during this time period due to a reduced delivery rate of irrigation water which could "free-up" an additional 400 cfs of channel capacity in the channel at North Platte. Final plans to augment during this period will be based on EA volume and releases, hydrologic conditions, conveyance capacity, lake levels, the presence/absence of nesting terns and plovers, distribution and quantity of forage fish in the river, and availability of suitable riverine foraging habitat.

If EA releases are made during this period and CNPPID's hydrocycling operations will result in fluctuating EA releases at the J-2 return, the potential effects on the fish and macroinvertebrate communities will be considered. The Service believes that fluctuating EA releases from the J-2 return negate anticipated benefits from flow augmentation. Suspension of EA releases may be necessary. Until there is a better understanding of CNPPID's hydrocycling operations and impacts, the EA Manager is to be notified, in advance, of all hydrocycling operations that may affect EA releases. Further investigations into this issue and coordination with CNPPID is underway.

Carry-Over: Carry-over of EA water from one water year to the next insures that an adequate amount of EA water will be available for use during the early months of the non-irrigation season before additional water is accumulated or for other purposes during the next water year, especially if EA contributions are at a minimum during the non-irrigation season. With no EA releases made in WY2003 or 2004, an adequate amount of EA water will be available in WY2005 for implementing a beneficial pulse flow event (FWS Priority #1) or augmenting flows during the summer period (FWS Priority #2). With very dry hydrologic conditions again expected and the EA augmentation priorities described in this AOP, the need to release EA water during the 2005 water year is anticipated. As the water year progresses, habitat, species, and hydrologic conditions, EA volume and releases, and lake levels will be closely monitored to determine how much EA water can or should be retained in Lake McConaughy for carry-over purposes.

Table 3. Release Guidelines for the Environmental Account for the Water Year 2005 ***(The two pulse flow periods are shaded.)***				
Period	**Recovery Flow Targets (cfs) at G.I.**	**Principal Affected Resources**	**2004 Water Year Priority**	**Comments**
Oct 1 - Nov 15	2,400 (wet) 1,800 (normal) 1,300 (dry)	whooping crane, waterfowl	Low	Although flows will be well below dry flow targets during this period, EA carry-over plus 10 percent of the SNI will be conserved for higher priority uses later in the water year.
Nov 16 - Dec 31	1,000 1,000 600	fish community, bald eagle	Low	Projections indicate flows will be at or near dry year targets during this period.
Jan 1 - Jan 31	1,000 1,000 600	fish community, bald eagle	Low	Projections indicate flows will be at or near dry year targets during this period.
Feb 1 - Feb 15	1,800 1,800 1,200	sandhill crane, waterfowl, fish community, bald eagle	Low	With similar 2003/2004 gains during this time period, projections indicate flows may be at or near dry targets during this period.
Feb 16 - March 15	3,350 3,350 2,250	Sustaining processes of the river and riparian wetland systems such as ice-scouring for channel maintenance; sediment supply; sandbar formation; nutrient cycling; and groundwater recharge to stimulate biological activity in wet meadows.	High	Estimates indicate continued shortages to dry flow targets during this period in 2005. If conditions are conducive to pulse flow augmentation and adequate planning and coordination has occurred, highest priority will be given to using the EA to enhance desired river processes as described in the *Principal Affected Resources* sections during this time period. Highest priority will be given to pulse flow augmentation/creation anytime between this period and the May/June pulse flow period.
March 16-March 22	1,800 1,800 1,200	sandhill crane, waterfowl, fish community, bald eagle	Low	With similar 2003/2004 gains during this time period, projections indicate flows will be at or near dry targets. *Also see comments for Feb./Mar Period.*

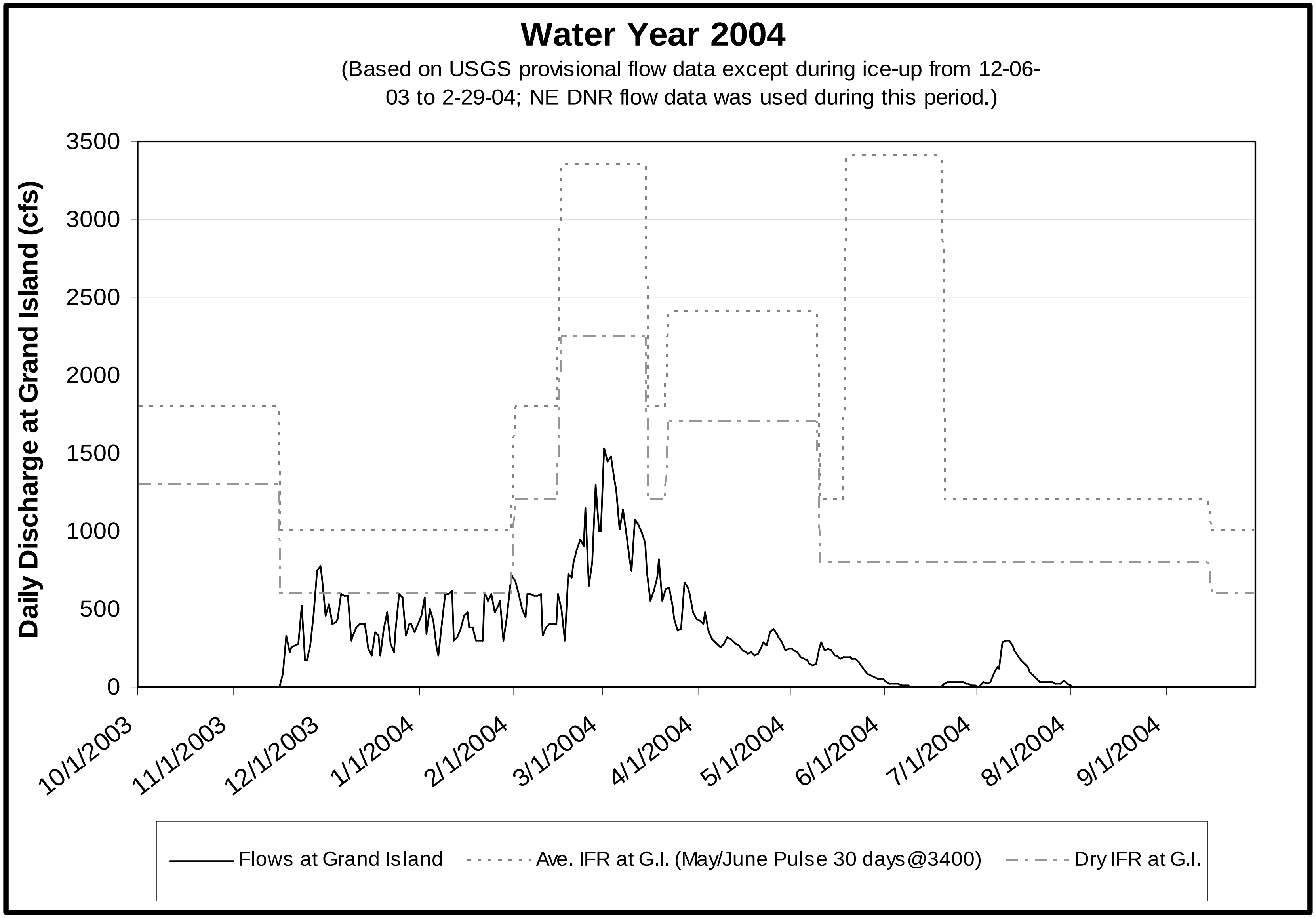
Table 3. Release Guidelines for the Environmental Account for the Water Year 2005 ***(The two pulse flow periods are shaded.)***				
March 23 - May 10*	2,400 2,400 1,700	whooping crane, fish community, piping plover, least tern, sandhill crane	Medium/Low	With similar 2003/2004 gains during this time period, projected flows indicate dry targets will not be met. A medium/low priority will be given to maintaining adequate *base flows* during this period for spring migration. *Also see comments for Feb./Mar Period.*
May 1 - June 30*	10-year running average of 30-day exceedance for 3,400 cfs, and 5-day exceedance of 8,300-10,500 cfs	The principal affected resources are river and riparian wetland processes such as maintaining channel morphology; sediment supply; sandbar formation; nutrient cycling; backwater habitats; groundwater recharge; and behavioral cues for fish spawning; reproduction, movement, and redistribution.	High	If conditions during winter/early spring (with or without EA releases) have not resulted in beneficial pulse flow(s) which promote natural river processes (e.g., in-channel vegetation removal, sandbar formation), the Service will proceed with plans to use the EA for pulse flow augmentation during this priority period. All attempts will be made to time EA releases to improve the magnitude and/or duration of natural peak flows; however, current plans are to proceed with pulse flow augmentation plans even if a natural peak does not occur. *Also see comments for Feb./Mar Period.*
May 11 - Sept 15*	1,200 1,200 800	fish community, least tern	Medium	Based on 2003/2004 conditions, extreme shortages will again occur during much of this period. If adequate EA volume exists, tentative plans are to augment low flows during the plover and tern nesting season (June 1 to August 15) to maintain a forage base of macroinvertebrates and fish. Final plans to augment during this time period will be based on EA volume and releases, lake levels, conveyance capacity, hydrologic and habitat conditions, and fish/bird survey results.

Table 3. Release Guidelines for the Environmental Account for the Water Year 2005 ***(The two pulse flow periods are shaded.)***				
Sept 16 - Sept 30	1,000 1,000 600	fish community	Low	Based on 2003/2004 conditions, zero to very low flow conditions could again occur during this time period. Because EA water may be limited and terns and plovers have migrated out of the area by this time, a lower priority is given. If river flows recover by this time, lower ambient temperatures and decreasing irrigation demand should result in improving river conditions for the fish community.
Carry-Over	N/A	Use of EA water for beneficial purposes as described for other time periods.	Medium/Low	Considering drought conditions in the basin of the last four water years, flow augmentation needs, and predicted continued very dry conditions for WY2005, retaining EA water for carry-over purposes, may be difficult. As the water year progresses, hydrologic conditions, EA volume, reservoir levels, and EA releases will be closely monitored to determine how much water can or should be retained in Lake McConaughy for carry-over purposes.

* During May 1 - June 30, high priority pulse flow requirements overlie the flows for species-specific physical aquatic habitat. May and June recovery flow targets are designed to capture natural variability: a 10-year running average with a 30-consecutive-day exceedance of 3,400 cfs, and a 5-consecutive-day peak flow exceedance of 8,300-10,500 cfs (see **) (Within this broad goal there are further recommendations that certain flow levels be achieved with specific frequencies (see Bowman and Carlson et al. 1994)).

** The 5-day peak flow with ramped rate of rise and decline may occur in either February-March or May-June.

Figure 1. Water Year 2004 Flows at Grand Island



APPENDIX A. ENVIRONMENTAL ACCOUNT WATER YEAR COMPARISON TABLE (IN AF)

Water Year (Oct. 1 to Sept. 30)	**WY2000**	**WY2001**	**WY2002**	**WY2003**	**WY2004**	**WY2005**
Lake McConaughy/Irrigation						
McConaughy contents after irrigation Season (Oct. 1)	1,157,100	900,200	900,200	577,100	443,800	356,500
Type of Year Prediction	Wet	Dry	Dry	Very Dry	Very Dry	Very Dry
McConaughy contents at the start of irrigation season (May 1)	1,476,000	1,204,000	1,155,000	821,221	683,225	602,600*
Total Kingsley Inflow (yearly total)	848,608	859.300	573,530	473,440	443,280	429,000*
Total Kingsley Outflow (yearly total)	1,427,000	843,750	851,270	608,060	525,240	590,000*
Environmental Account						
10% of Storable Natural Inflows during non-irrigation season	35,378	48,704	46,052	33,857	32,381	32,500*
Total Evap./Seepage Losses (yearly total)	8,542	5,616	5,573	6,841	8,959	
EA Volume at the end of non-Irrigation Season (May 1)	132,307	92,480	72,268	58,787	82,871	106,000*
EA Releases (yearly total)	82,810	61,269	42,843	0	0	
EA volume on September 30 (for carry-over into next water year)	44,026	27,846	26,302	53,632	77,368	

* Projection/estimate

APPENDIX B. RESERVOIR OPERATING RULES DURING THE NON-IRRIGATION SEASON FOR PREDICTED YEAR TYPES *(summarized from: Appendix A, Water Component; TAB 1A, An Environmental Account for Storage Reservoirs on the Platte River System in Nebraska, of the Cooperative Agreement for Platte River Research and Other Efforts Relating to Endangered Species Habitats Along the Central Platte River, Nebraska)*

Year Type	Lake McConaughy Contents [1]	Keystone Diversion Dam[3]	Central Diversion Dam[3]	Other
Very Wet	Plus PSNI[2] > 2.1 maf	≥700 cfs Avg.≥875 cfs	Oct. 10 - Nov. 15: ≥1,000 cfs; Avg. 1,600 cfs Nov. 16-Feb. 14: ≥800 cfs; Avg. 1,000 cfs Feb. 15-≈May 1[4]: ≥1,100 cfs; Avg. 1,400 cfs	No upper limit on outflows from Lake McConaughy other than meeting standards for safety and beneficial use.
Wet	≥1.50 maf *or* Plus PSNI[2]: 1.85 maf - 2.1 maf	≥ 700 cfs If Oct.1 lake level is <1.25maf: ≥450 cfs	Oct. 10 - Nov. 15: ≥900 cfs; Avg. 1,200 cfs Nov. 16-Feb. 14: ≥800 cfs; Avg. 1,000 cfs Feb. 15-≈May 1[4]: ≥1,000 cfs; Avg. 1,240 cfs	No upper limit on outflows from Lake McConaughy other than meeting standards for safety and beneficial use. Releases should be managed to allow Lake McConaughy to fill to ≈1.5 maf by Mar. 31 and to licensed or authorized capacity thereafter. Filling to less than ≈1.5 maf by Mar. 31 is allowed if expected inflows after that date could cause spills or downstream flooding. If needed to allow Lake McConaughy to fill, releases from Central Diversion Dam could follow rates outlined for Transitional conditions.
Transitional	Between wet and dry conditions	≥450 cfs Avg. ≤900 cfs (exclusive of the EA)	Oct. 10 - Nov. 15: ≥900 cfs; Avg. 1,000 cfs Nov. 16-Feb. 14: ≥800 cfs; Avg. 950 cfs Feb. 15-≈May 1[4]: ≥850 cfs; Avg. 1,100 cfs	No upper limit on outflows from Lake McConaughy other than meeting standards of safety and beneficial use. Releases should be managed to allow Lake McConaughy to fill to between 1.27 and 1.5 maf by Mar. 31, taking into account if the transition is from wet to dry or dry to wet. If needed to allow Lake McConaughy to fill, releases from Central Diversion Dam could follow rates outlined for dry conditions.

APPENDIX B. CONT.

Year Type	McConaughy Contents[1]	Keystone Diversion Dam[3]	Central Diversion Dam	Other
Dry	< 800 kaf **or** Plus PSNI[2]: < 1.55 maf	Avg. 250 cfs - 700 cfs (exclusive of EA)	Oct. 10 - Nov. 15: ≥700 cfs; Avg. 900 cfs Nov. 16-Feb. 14: ≥700 cfs; Avg. 850 cfs Feb. 15-≈May 1[4]: ≥800 cfs; Avg. 960 cfs	No upper limit on outflows from Lake McConaughy other than meeting standards for safety and beneficial use. Releases should be managed to impound between 250 kaf and 550 kaf during the non-irrigation season to optimize reservoir storage. If needed to allow Lake McConaughy to fill, releases from Central Diversion Dam may be less than the average but not less than the minimums for a dry year.
Very Dry	<650 kaf	Avg. 250 -700 cfs		Non-irrigation season releases below those for a very dry year shall be coordinated and managed to maximize multiple use of water and to share shortage effects.

[1] As of Oct. 1 and including the EA
[2] Oct. 1-Mar. 31
[3] Non-Irrigation Season Releases
[4] Beginning of irrigation season

APPENDIX C. REFERENCE LIST OF DOCUMENTS RELEVANT TO EA OPERATIONS

○ Proposed Platte River Recovery Implementation Program; Appendix A; Water Component; TAB 1A, An Environmental Account for Storage Reservoirs on the Platte River System in Nebraska.

○ U.S. Fish and Wildlife Service Instream Flow Recommendations for the Central Platte River, Nebraska - May 23, 1994.

○ U.S. Fish and Wildlife Service Pulse Flow Requirements for the Central Platte River - August 3, 1994.

○ Agreement in Principle for License Conditions for Projects Nos. 1417 and 1835 - June 30, 1997.

○ Agreement on All Issues Reached in FERC Trial Staff Settlement Meetings - Jan. 15, 1998.

○ Central NE Public Power and Irrigation District's FERC License - July 29, 1998.

○ NE Public Power District's FERC License - July 29, 1998.

○ DOI's Amended Comments Under Section 10(j) of the Federal Power Act - Aug. 11, 1994.

○ Nebraska's Surface Water Regulations.

○ EA Permits/Contracts.

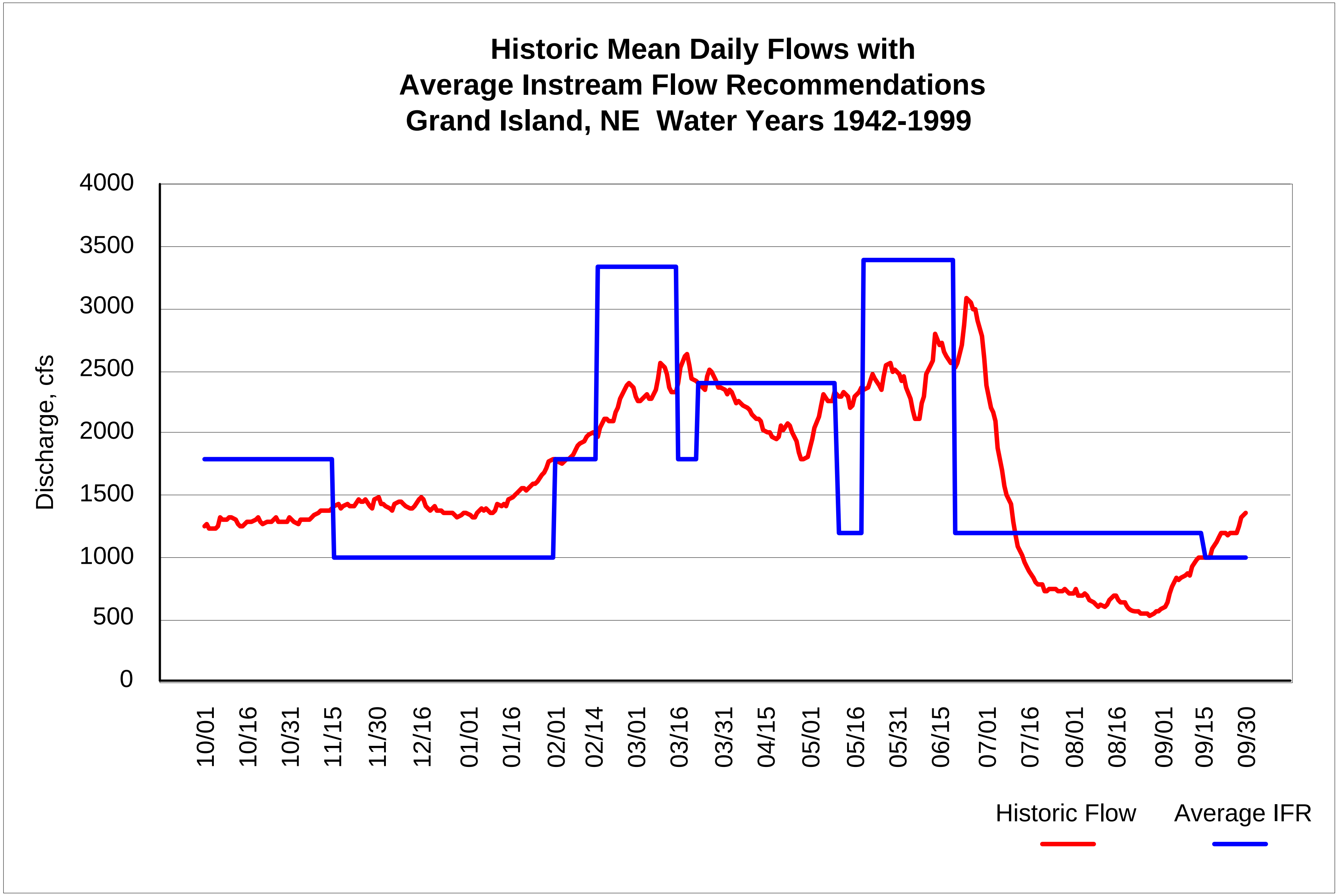
○ Administrative Plan for Managing Water Commitments - September 23, 1999 (as amended).

○ Water Year Operations Plans for Central and NPPD

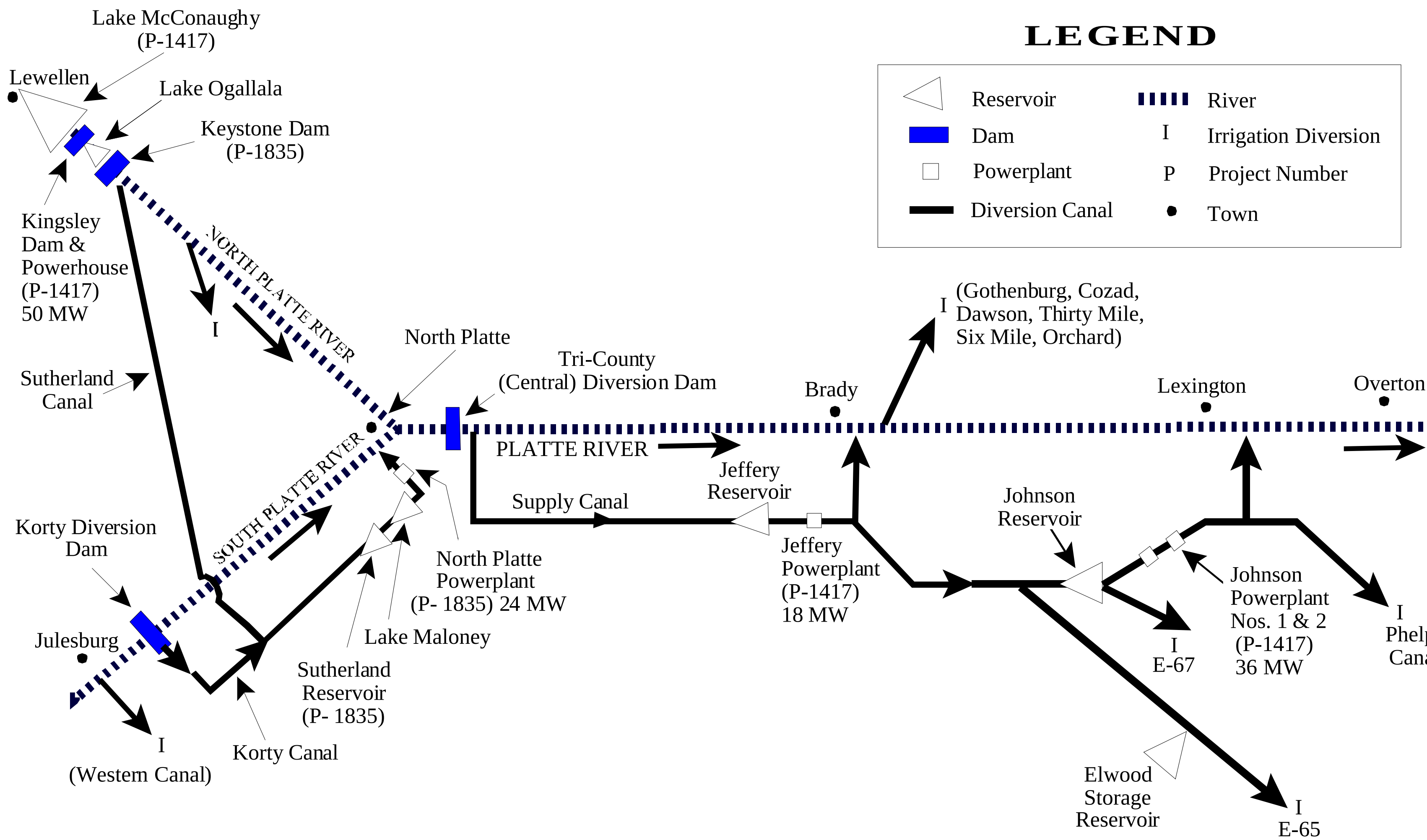
○ U.S. Bureau of Reclamation's North Platte River System Annual Operation Plans

○ USFWS Instream Flow Recommendations: Proposed Definitions and Usage for the Platte River Recovery Implementation Program - November 18, 2003, *Draft*

APPENDIX D. MEAN DAILY FLOWS AT GRAND ISLAND



APPENDIX E. SCHEMATIC DIAGRAM OF THE PLATTE RIVER AND DIVERSION SYSTEMS BETWEEN LEWELLEN/JULESBURG AND OVERTON ***(Source: Shen et Al. 1985)***



DESCRIPTION OF THE MAJOR WATER FACILITIES LIKELY TO BE AFFECTED BY THE PROPOSED PROGRAM

There are major Federal and private water projects whose operations would be affected by the alternatives, in the North and the central Plate basins. This attachment provides a brief description of the major project features and functions.

RECLAMATION'S NORTH PLATTE RIVER WATER PROJECTS.

Some elements of the action alternatives affect the operation of Reclamation water projects on the North Platte River in Wyoming. Short descriptions of the facilities most likely to be affected are provided for the North Platte Project, Kendrick Project, the Kortes and Glendo Units of the Pick-Sloan Missouri Basin Program, as well as La Prele Reservoir, Grayrocks Reservoir, and the Dave Johnson Powerplant. Because most of the North Platte River projects are owned and operated by Reclamation, they are operated as a system, providing flexibility to move water from one facility to another to best meet project needs.

North Platte Project

The North Platte Project extends 111 miles along the North Platte River Valley from Guernsey, Wyoming, to Bridgeport, Nebraska. The project provides full service irrigation for about 226,000 acres. Supplemental irrigation service is furnished to another 109,000 acres.

Project features include five storage dams (Pathfinder, Guernsey, and the three small dams of the Inland Lakes Project), four diversion dams, one pumping plant, one hydropower generation plant, and about 2,000 miles of canals, laterals, and drains.

Pathfinder Reservoir. Pathfinder Reservoir, with a storage capacity of 1,016,507 acre-feet, is the main storage facility of the North Platte Project. The original capacity of the reservoir was 1,070,000 acre-feet. During the non-irrigation season, water is released to enhance fish and wildlife habitat and to operate downstream powerplants. During the irrigation season, water is released as required to meet downstream demands.

Guernsey Dam. About 190 miles below Pathfinder Dam, Guernsey Dam stores and releases river flow to meet irrigation demands. Water released from Pathfinder Reservoir can be stored in Guernsey Reservoir, which has a capacity of this dam and released to fit varying irrigation demands. The original capacity of about 45,612 acre-feet. Guernsey Powerplant has two 3,200-kilowatt generators.

Whalen Diversion Dam. This dam diverts water from into the Fort Laramie Canal on the south side of the river and into the Interstate Canal on the north side of the river. These canals deliver irrigation water.

Inland Lakes. Lake Alice, Lake Minatare, Lake Winters Creek, and Reservoir No. 2 (Little Lake Alice) are off stream equalizing reservoirs and are also known as the Inland Lakes. The reservoirs are fed from water diverted at Whalen Diversion Dam through the Interstate Canal, which ends at Lake Alice. The Reservoir Supply Canal carries water from Lake Alice to the other reservoirs. The combined storage capacity of the Inland Lakes is about 74,111 acre-feet.

Kendrick Project

The Kendrick Project (formerly Casper-Alcova) conserves the waters of the North Platte River for irrigation and electric power generation. Major features of the project are Seminoe Dam and Powerplant, Alcova Dam and Powerplant, the Casper Canal, laterals, and drains, and 573 miles of power distribution systems with six substations and switch yards. The total reported irrigated lands in production during recent years are approximately 24,000 acres.

Seminoe Dam and Powerplant. The Seminoe Dam and Powerplant are situated on the North Platte River about 72 miles southwest of Casper, Wyoming. Seminoe Reservoir, with a total capacity of 1,017,273 acre-feet, provides storage capacity for the water to irrigate the project lands. Seminoe Powerplant contains three units, each composed of a 15,000-kilowatt generator.

Alcova Dam and Powerplant. Alcova Dam, constructed 1935-38, is on the North Platte River about 37 miles downstream from Seminoe Dam and 10 miles downstream from Pathfinder Dam of the North Platte Project. The dam forms a reservoir, with a total capacity of 184,405 acre-feet, from which water is diverted into Casper Canal for irrigation of lands in the Kendrick Project. Water released for downstream uses passes through the Alcova Powerplant or over a controlled spillway. Alcova Powerplant was authorized and built after completion of Alcova Dam; it first generated power in 1955. It consists of two units, each an 18,000-kilowatt vertical-shaft generator.

Kortes Unit

The Kortes Unit of the Pick-Sloan Missouri Basin Program consisting of Kortes Dam, Reservoir, and Powerplant, is in central Wyoming in a narrow gorge of the North Platte River 2 miles below Seminoe Dam of the Kendrick Project, and about 60 miles southwest of Casper, Wyoming.

Kortes Dam. Kortes Dam is constructed in the Black Canyon on the North Platte River. The level of water in Kortes Reservoir controls the tailwater elevation of Seminoe Powerplant. The 83-acre Kortes Reservoir is confined to the narrow canyon and provides storage for only 4,765 acre-feet of water. The reinforced-concrete powerhouse occupies the entire width of the canyon at the toe of the dam. The plant has three 12,000-kilowatt generators.

Glendo Unit

The Glendo Unit of the Pick-Sloan Missouri Basin Program consists of Glendo Dam, Reservoir, and Powerplant; Fremont Canyon Powerplant; and Gray Reef Dam. Unit features are located on the North Platte River in eastern and central Wyoming and are adjacent to, and work in conjunction with, other units of the Pick-Sloan Missouri Basin Program and the Kendrick and North Platte Projects.

The unit furnishes a maximum of 40,000 acre-feet of water annually from Glendo Reservoir for irrigation in Wyoming and Nebraska, and electrical power is supplied to Wyoming, Colorado, and Nebraska by Glendo and Fremont Canyon Powerplants, which have uprated capacities of 38,000 and 66,800 kilowatts, respectively.

The Glendo Unit provides irrigation, power generation, flood control, fish and wildlife enhancement, recreation, sediment retention, pollution abatement, and improvement of the quality of municipal and industrial water supply in the North Platte River Valley between Gray Reef Dam and Glendo Reservoir.

Within the limits of the amended decree, storage facilities of the North Platte River system provide considerable flexibility. Maximum capacity for regulation and storage is afforded through exchange of water between Glendo Reservoir and upstream reservoirs.

Glendo Dam, Reservoir, and Powerplant. About 25 miles above Guernsey Dam, Glendo Dam forms a reservoir 14 miles in length, having a total capacity of 795,196 acre-feet at water surface elevation 4653, the top of the flood control capacity. Space is provided in the reservoir for storing 115,000 acre-feet of sediment, an estimated 100-year accumulation. There are 454,337 acre-feet allotted for irrigation and power and 271,917 acre-feet for flood control. In addition, a surcharge capacity of 329,251 acre-feet is available. These capacities differ slightly from the original storage allocations because of sediment accumulation. A 1,025 foot long 3 foot diameter pipeline tunnel was constructed in 1992-93 through Glendo Dam to allow low volume releases of 25-40 cubic feet per second during the non-irrigation season, without adversely affecting existing water uses. The Glendo Powerplant contains 2 units each an installed capacity of 19,000 kilowatts.

Fremont Canyon Powerplant. The Fremont Canyon Powerplant, on the left bank of the North Platte River at the head of Alcova Reservoir, consists of two 33,400-kilowatt generators, driven by two 33,500-horsepower Francis-type hydraulic turbines. Water for power generation is conveyed to the powerplant by a three mile long tunnel from Pathfinder Reservoir.

Gray Reef Dam and Reservoir. Gray Reef Dam is on the North Platte River about 27 miles southwest of Casper, and 2 miles downstream from Alcova Dam. The reservoir has a total capacity of 1,800 acre-feet, with a surface area of 182 acres. Gray Reef Reservoir is operated to reregulate widely fluctuating water releases from the Alcova Powerplant of the Kendrick Project.

La Prele Reservoir

La Prele Reservoir is an existing irrigation and industrial water supply reservoir in Wyoming, located on La Prele Creek approximately 13 miles upstream of the confluence with the North Platte River near Douglas, WY. The reservoir, with a current storage capacity of 20,000 acre-feet, was completed in 1909. It is currently operated by the La Prele Irrigation District . The reservoir delivers irrigation water to approximately 11,000 acres of farmland. Five thousand acre-feet of storage is owned by the Panhandle Eastern Pipeline Company (PEPL). These waters might be available for sale or lease to the Program.

Laramie River

Water leasing may occur on the Laramie River below Grayrocks Dam. This could affect reservoir storage on the Laramie River. The Laramie River Station, a 1,650 megawatts coal-fired electric generating station located six miles east of Wheatland, WY, could also be affected. Water for steam generation and cooling at Laramie River Station comes from Grayrocks Reservoir, 6 miles east of the plant.

North Platte River Basin Above Pathfinder Reservoir

This area includes the North Plate, the Medicine Bow, and the Sweetwater Rivers. There is the potential for water leasing in this area, which would affect land and water use.

Dave Johnson Powerplant

Dave Johnson power plant is a 750 MW coal-fired electric generating station located east of Glenrock, WY. Dave Johnson receives water for cooling from the North Platte River and changes in operations could affect the supply of cooling water for the plant.

CENTRAL PLATTE RIVER PROJECTS

Central Nebraska Public Power and Irrigation District (CNPPID) Facilities

The water-related facilities of the CNPPID include Lake McConaughy on the North Platte River in Nebraska, and a large system of diversion dams, canals, irrigation distribution systems, smaller reservoirs, and associated hydroelectric plants stretching from Lake McConaughy down the Platte Valley past Kearney, NE.

Lake McConaughy, which is impounded behind Kingsley Dam in Nebraska, is the largest reservoir in Nebraska. The Kingsley Dam Project consists of dams, reservoirs, canals, and powerplants (Figure 2-2). Construction of the three-mile-long dam began in 1938 and was completed in 1941 by Central as part of a massive irrigation and power generation project. At full storage, the dam contains as much as 1,743,100 acre-feet of water covering approximately 31,000 acres. The lake is up to 21 miles long, about 3-1/2 miles wide for a considerable distance from the dam, and approximately 140 feet deep near the dam. A structure called the “Morning Glory Spillway” exists at the dam to release water from the reservoir if it is at a level greater than 1427.4 feet MSL. In the 1980s, a single-turbine hydroelectric power generation facility was constructed at Kingsley Dam with a nominal power generation capacity of 50 megawatts.

Lake Ogallala, immediately below Kingsley Dam, was created by the removal of earth for construction of the dam and the diversion structure which directs water into the Sutherland Canal. The primary purpose of Sutherland Canal is to divert cooling water to the Gerald Gentleman power generation station, and water for hydroelectric power generation to the North Platte hydroelectric plant. Lake Ogallala occupies about 640 surface acres and inundates about 1-1/2 miles of North Platte River channel. It currently serves as a reregulation facility for discharges from Lake McConaughy.

Fifty miles downstream frm Kingsley Dam, at the confluence of the North and South Platte rivers near North Platte, Nebraska, is an 874-foot-long diversion dam known as the Tri-County or Central Diversion Dam. This diversion sends the majority of Platte River water through the 75-mile-long Tri-County Canal. Normally, canal flows are greater than flows in the Platte River channel except during times of high river flow. This supply canal is divided into two sections: (1) the “Jeffrey Section”, which runs from the canal headgate (mile 0.0) to the Jeffrey Return to the Platte River (mile 26.9), and (2) the “Johnson Section”, which runs from the Jeffrey Return to the Johnson Return to the Platte River at mile 75.5. The canal has a capacity of approximately 2,170 cfs, and Jeffrey Return has a capacity of 600 cfs.

Among the features associated with the Tri-County Canal system are (from upstream to downstream) Jeffrey Lake, Midway Lakes, Gallagher Lake, Plum Creek Lake, Elwood Reservoir, and Johnson Reservoir. This supply canal furnishes water for four hydroelectric generating plants with an aggregate nominal generating capacity of 104 megawatts. In addition, it provides cooling water for the Canaday Steam Electric Station, which is gas and/or oil fired and has a 108 megawatt capacity. A significant portion of the water diverted through the Tri-County Canal is returned to the Platte River channel on the south side of Jeffery Island (known as the “Johnson-2” or “J-2” Return channel), a few miles upstream of the Overton Bridge. The Tri-County Canal also furnishes irrigation water to three irrigation laterals owned by the Central District that service approximately 120,000 acres in three Nebraska counties (Gosper, Phelps, and Kearney).

Nebraska Public Power District (NPPD) Platte River Facilities

The North Platte/Keystone Diversion Dam Project consists of diversion dams, impoundments, canals, and powerplants. The 1,296 foot-long Keystone Diversion Dam, located on the North Platte River 2 miles downstream from Kingsley Dam, impounds a portion of Lake Ogallala and diverts water through the 32-mile-long Sutherland Canal into the Sutherland Reservoir, which is located slightly south of the South Platte River.

The 1,244-foot-long Korty Diversion Dam on the South Platte River diverts water into Sutherland Reservoir through a 7-mile-long supply canal. Sutherland Reservoir has a maximum surface area of 3,050 acres and usable storage capacity of 64,723 acre-feet. The Gerald Gentleman Station, a two-unit, coal-fired, steam-electric generating station with a combined rating of 1,300 MW, is authorized to withdraw no greater than 1,250 cubic feet per second (cfs) of project waters for condenser cooling from Sutherland Reservoir. A 19-mile-long supply canal connects Sutherland Reservoir to Lake Maloney, a reservoir with a surface area of 1,670 acres. Lake Maloney supplies water through a 2-mile-long power canal to the 24-MW North Platte Powerhouse, which is located on the South Platte River immediately upstream of the junction with the North Platte.

Together, the two projects have a total of five hydroelectric powerplants with a combined dependable capacity of 116 MW. The annual electric generation of the combined projects varies considerably but averages about 450 gigawatt hours (Gwh).

The two projects are operated in a coordinated manner for irrigation and power production. Central's Project No. 1417 provides storage water and direct irrigation service for a large portion of central Nebraska along the Platte River Valley. By contract, the first 125,000 acre-feet of water stored each year are reserved to NPPD for use by three irrigation canals owned by NPPD and four private canals. Additionally, Central has contracted to make 11,400 acre-feet of storage water available each year from Lake McConaughy to five irrigation canals along the North Platte River for irrigation of approximately 30,000 acres of land. This storage water supplements natural flow rights held by these irrigation canals. Also, Central supplies about 230,000 acre-feet of water to irrigate nearly 113,000 acres in Lincoln, Dawson, Gosper, Kearney, and Phelps counties. Project No. 1835's Sutherland Reservoir reserves 20,000 acre-feet of storage water for use by NPPD's canals and for privately owned canals, all located outside project boundaries.

Kearney Canal. The Kearney Canal is 16 miles long with a 1.5 Mw powerplant that began producing power in 1889 and was refurbished in 1996.

SOUTH PLATTE RECLAMATION PROJECTS

Colorado-Big Thompson Project

Colorado-Big Thompson is one of the most complex projects undertaken by Reclamation. It includes more than 100 water and power facilities which store, regulate and divert water from the west slope of the Rockies under the Continental Divide to 125 water user organizations and municipalities on the east slope. In 1990 the project provided irrigation water for about 632,000 acres of farmland which produced nearly $331 million worth of crops. It also provided municipal water to 445,000 people in communities of the South Platte River Basin. Its six powerplants are capable of producing 184 megawatts of power.

The project diverts approximately 260,000 acre-feet of water annually (310,000 acre-feet maximum) from the Colorado River headwaters on the western slope to the Big Thompson River, a South Platte River tributary on the eastern slope, for distribution to project lands and communities. The Northern Colorado Water Conservancy District apportions the water used for irrigation to more than 120 ditches and 60 reservoirs. Eleven communities receive municipal and industrial water from the project. Electric power produced by six powerplants is marketed by the Western Division of the Pick-Sloan Missouri Basin Program.

1. The western slope collection system traps runoff from the high mountains and stores, regulates, and conveys the water to the Alva B. Adams Tunnel for diversion under the Continental Divide.

To assure irrigation and power generation under prior rights on the Colorado River, Green Mountain Reservoir was constructed on the Blue River. Spring runoff is stored in this reservoir and later released to meet the requirements of the Colorado River, and to allow diversion of water by the project throughout the year.

Irrigation systems on the Colorado River, above the Blue River confluence, were improved to enable continued use of existing rights. Releases are made from Lake Granby to maintain the Colorado River as a fine fishing stream.

The principal storage features are Lake Granby and Granby Dam, located on the Colorado River near Granby. Willow Creek, a tributary below Lake Granby, is diverted by Willow Creek Dam and Canal. Willow Creek Pumping Plant lifts the water 175 feet; it then flows by gravity to Lake Granby.

Granby Pumping Plant lifts the water 125 feet from Lake Granby to Granby Pump Canal. The canal conveys the water 1.8 miles to Shadow Mountain Lake, which also intercepts North Fork flows of the Colorado River. Shadow Mountain Lake connects with Grand Lake to make a single body of water from which diversions flow to the Alva B. Adams Tunnel to begin the journey to the eastern slope.

Emerging from Alva B. Adams Tunnel into the East Portal Reservoir, the water flows across Aspen Creek Valley in a siphon and then under Rams Horn Mountain through a tunnel. At this point, it enters a steel penstock and falls 205 feet to Marys Lake Powerplant. This powerplant is located on the west shore of Marys Lake, which provides afterbay and forebay capacity for reregulating the flow. Between Marys

Lake and Estes Powerplant, on the shore of Lake Estes, the water is conveyed by Prospect Mountain Conduit and Prospect Mountain Tunnel.

Lake Estes, below Estes Powerplant, is formed by Olympus Dam constructed across the Big Thompson River. The afterbay storage in Lake Estes and the forebay storage in Marys Lake enable the Estes Powerplant to meet daily variations in energy demand.

Water from Lake Estes and some Big Thompson River floodwaters are conveyed by Olympus Siphon and Tunnel and Pole Hill Tunnel and Canal to a penstock through which the water drops 815 feet to Pole Hill Powerplant. It is then routed through Pole Hill Powerplant Afterbay, Rattlesnake Tunnel, Pinewood Lake, and Bald Mountain Pressure Tunnel, and dropped 1,055 feet through two penstocks to Flatiron Powerplant. This powerplant discharges into Flatiron Reservoir, which regulates the water for release to the foothills storage and distribution system. The afterbay storage in Flatiron Reservoir and the forebay storage in Pinewood Lake enable Flatiron Powerplant to meet daily power loads.

Southward, the Flatiron reversible pump lifts water from Flatiron Reservoir, a maximum of 297 feet and delivers it through Carter Lake Pressure Conduit and Tunnel to Carter Lake. When the flow is reversed, the unit acts as a turbine-generator and produces electric energy.

The St. Vrain Supply Canal delivers water from Carter Lake to the Little Thompson River, St. Vrain Creek, and the Boulder Creek Supply Canal. The latter delivers water to Boulder Creek and Boulder Reservoir. The South Platte Supply Canal, diverting from Boulder Creek, delivers water to the South Platte River.

Northward, the Charles Hansen Feeder Canal transports water from Flatiron Reservoir to the Big Thompson River and Horsetooth Reservoir. The canal crosses the Big Thompson River in a siphon above the river and highway. Water from the Big Thompson River can be diverted into the canal by Tunnel No.1, Horsetooth Supply Conduit.

Project water deliveries and Big Thompson River water to be returned to the river are dropped through a chute from the feeder canal ahead of the siphon crossing, or are passed through the Big Thompson Powerplant to convert the available head to electric energy.

Horsetooth Reservoir is west of Fort Collins between two hogback ridges, where Horsetooth Dam closes the gap at one end. Soldier, Dixon, and Spring Canyon Dams and Satanka Dike close the remaining gaps. An outlet at Soldier Canyon Dam supplies water to Fort Collins, rural water districts, Colorado State University, and the Dixon Feeder Canal for the irrigated area cut off from its water supply by the reservoir.

The principal outlet from Horsetooth Reservoir is through Horsetooth Dam into the Charles Hansen Canal. This canal delivers water to a chute discharging into the Cache la Poudre River and to a siphon crossing the river to supply the Poudre Valley and Reservoir Company Canal. A turnout supplies the Greeley municipal water works. Water is delivered to the river to replace, by exchange, that water diverted upstream of the North Poudre Supply Canal, which conveys it to the North Poudre Ditch.

Green Mountain Dam, Reservoir, and Powerplant

Green Mountain Dam is on the western slope 13 miles southeast of Kremmling on the Blue River, a tributary of the Colorado. This dam provides replacement storage for water diverted by the project to the eastern slope. The dam is an earthfill structure, 309 feet high, with a crest length of 1,150 feet and a volume of 4,360,211 cubic yards. The reservoir has a total capacity of 153,639 acre-feet. The powerplant has two units with a total installed generating capacity of 21,600 kilowatts.

Granby Dam and Lake Granby

Granby Dam is located on the Colorado River about 5.5 miles northeast of Granby. It collects and stores most of the project water supply, including the flow of the Colorado River and water pumped from Willow Creek. The dam is constructed of compacted earthfill, 298 feet high, with a crest length of 861 feet. There are 12,722 feet of auxiliary dikes. The reservoir has a capacity of 539,800 acre-feet. Total volume of the dam is 2,974,000 cubic yards. The dikes have a total volume of 1,739,000 cubic yards.

Willow Creek Dam, Reservoir, and Pumping Plant

Willow Creek Dam is 127 feet high, 1,100 feet long, and constructed of earthfill. There are 3.4 miles of canals with a capacity of 400 cubic feet per second and a pumping plant with two 200-cubic-foot-per-second pumps that lift water 175 feet into Lake Granby. The dam diverts an average of 40,000 acre-feet of water each year from Willow Creek into Lake Granby. The reservoir capacity is 10,600 acre-feet.

Shadow Mountain Dam and Reservoir

Shadow Mountain Dam, located on the Colorado River below its confluence with the Grand Lake outlet, is an earthfill structure 63 feet high and 3,077 feet long. The reservoir formed by the dam has a total capacity of 18,400 acre-feet and is linked to Grand Lake through a connecting channel. Shadow Mountain Lake receives the water pumped from Lake Granby and also intercepts North Fork flows of the Colorado River. Project water is released from Grand Lake directly into the Alva B. Adams Tunnel, through which it flows to the eastern slope of the Continental Divide.

Alva B. Adams Tunnel

This 9.75-foot-diameter, 13-mile-long tunnel extends from Grand Lake through the Continental Divide to a point 4.5 miles southwest of Estes Park. It has a capacity of 550 cubic feet per second.

Carter Lake Dam and Reservoir

Carter Lake is one of the two main project storage reservoirs in the East Slope distribution system. Water is stored in this reservoir for delivery to the Little Thompson River, St. Vrain Creek, Boulder Creek, and the South Platte River, for return to Flatiron Reservoir for use in the Big Thompson or Cache la Poudre Valleys, or for power generation.

Carter Lake Reservoir is formed in a natural basin in the foothills by a 214-foot-high earthfill dam and two smaller dams across low saddles in the surrounding hills. The reservoir has a total capacity of 112,230 acre-feet.

Horsetooth Reservoir

Horsetooth Reservoir, with a total capacity of about 151,750 acre-feet, furnishes the main supply for the Poudre Valley, where 50 percent of the project water is used. The reservoir is 6.5 miles long, and is formed by four large earthfill dams. Horsetooth Dam closes the northern end of the valley, and Soldier Canyon, Dixon Canyon, and Spring Canyon Dams close natural outlets eroded through the hogback ridge. These dams have heights of 155, 226, 240, and 220 feet, respectively. The dams contain more than 10 million cubic yards of earthfill.

FISH AND WILDLIFE SERVICE WATER-USE ACTIVITIES COVERED BY THE PROGRAM

Historic Activities

Within the Platte River basin, the U.S. Fish & Wildlife Service manages ten national wildlife refuges (NWR's), the Saratoga National Fish Hatchery in Wyoming, and the Rainwater Basin Wetland Management District (WMD) in Nebraska (the latter falling only partially within the Platte drainage basin). The Service also works with a large number of private landowners throughout the watershed to restore and/or create wetlands to benefit migratory waterfowl.

The ten FWS refuges in the Platte River basin are:

- Arapaho NWR (Colorado)
- Bamforth NWR (Wyoming)
- Crescent Lake NWR (Nebraska)
- Hutton Lake NWR (Wyoming)
- Mortenson Lake NWR (Wyoming)
- North Platte NWR (Nebraska)
- Pathfinder NWR (Wyoming)
- Rocky Flats NWR (Colorado)
- Rocky Mountain Arsenal NWR (Colorado)
- Two Ponds NWR (Colorado)

Management of all the field operations identified above involves at least some water use, including consumptive uses that pre-date the 1997 Cooperative Agreement and thus represent historic depletions to Platte River flows. Water use on the ten refuges and at the WMD includes groundwater pumping and/or surface water diversions to maintain ponds, wetlands, streams and/or wet meadow areas; water supplies to support staff and site visitors; and irrigation of refuge grounds. At the Saratoga Fish Hatchery, water from wells and springs is used to rear hatchery fish and support on-site fishery staff.

New Activities

The U.S. Fish & Wildlife Service has implemented some new water-related activities in the Platte basin since the Cooperative Agreement was signed in 1997, and anticipates that more such activities will be implemented during the first increment of the Program. These have included or may in the future include:

- New wildlife ponds at Arapaho National Wildlife Refuge (Jackson County, Colorado);
- Additional well drilling and/or water impoundments for wetland maintenance within the Rainwater Basin WMD (Phelps County, Nebraska);
- New or enlarged impoundments, or modified management of existing impoundments at the Rocky Flats National Wildlife Refuge (Jefferson County, Colorado);
- New water supply wells, ponds, or wetland impoundments at the Rocky Mountain Arsenal National Wildlife Refuge (Adams County, Colorado);
- Water-supply well for the Black-footed Ferret Conservation Center (Larimer County, Colorado);
- Wetland restoration and wetland creation projects implemented in cooperation with private landowners throughout the Platte basin; and
- Other activities unforeseen at this time.

Each of these activities has the potential to further deplete Platte River flows. However, the aggregate new depletions resulting from all of the above activities are not expected to exceed 200 acre-feet/year by the year 2020, and are likely to be much less. New depletions to Platte River target flows associated with the above water-related activities will be addressed as described in the Federal Depletions Plan (for federally-initiated activities on federal lands) and/or the corresponding state depletion plan (for federal activities primarily benefiting private landowners).

FISH AND WILDLIFE SERVICE MOUNTAIN-PRAIRIE REGION INSTREAM FLOW RECOMMENDATIONS AND PROPOSED USAGE FOR THE PLATTE RIVER RECOVERY IMPLEMENTATION PROGRAM, SEPTEMBER 1, 2005

1. BACKGROUND

The purpose of this Section is to:

(1) Define the terminology used by the U.S. Fish and Wildlife Service (FWS) for its instream flow recommendations during implementation of the Platte River Recovery Implementation Program (Program) and future Section 7 consultations;

(2) Clarify how these flow recommendations have been (and will continue to be) used in the context of Program-related activities; and

(3) Provide historical context to the origin and use of these terms.

2. DEFINITION OF TERMS

This document provides definitions for these six terms in the context of the Program:

- (FWS) Instream flow recommendations
- Species flows
- Annual pulse flows
- Peak flows
- Target flows
- Short-duration high flows

Figure 1 illustrates the relationship between these terms. The figure is followed by definitions.

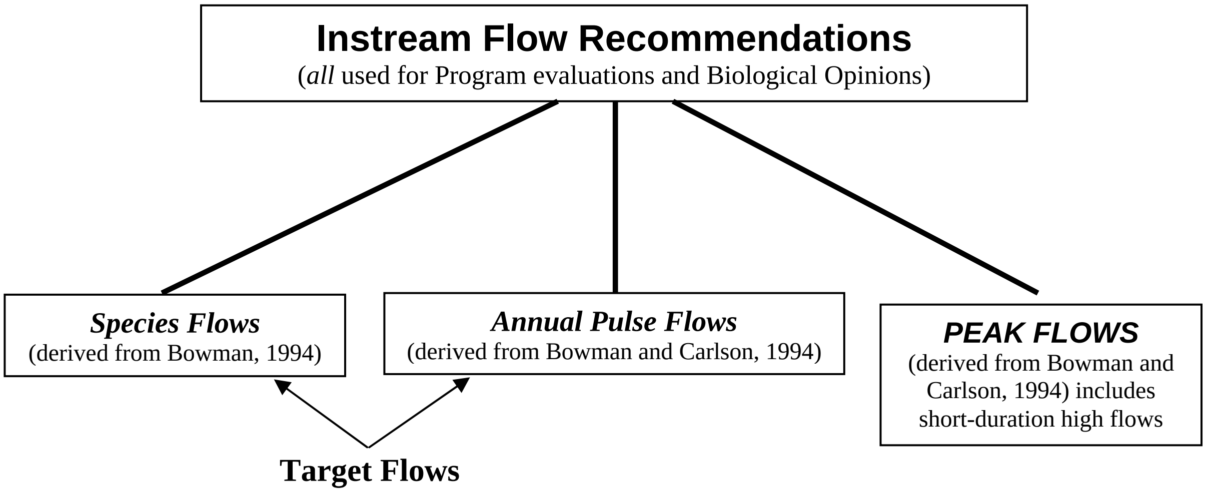


Figure 1.—Schematic showing relationships between FWS-recommended flows.

INSTREAM FLOW RECOMMENDATIONS

Defined as the entire suite of flow recommendations for the central Platte River articulated in two FWS documents: *Instream Flow Recommendations for the Central Platte River* (Bowman, May 23, 1994), and *Pulse Flow Requirements for the Central Platte River* (Bowman and Carlson, August 3, 1994). Collectively, these recommendations are intended to achieve the flow-dependent goal of "rehabilitating and maintaining the structure and function, patterns and processes, and habitat of the central Platte River Valley ecosystem". Subsets of these recommendations have since been categorized as "species flows", "annual pulse flows", and "peak flows" by FWS, as illustrated conceptually in **Figure 1.**

A strategy recommended by FWS, subject to adaptive management during the First Increment of the Program, includes the creation or augmentation of flows in the central Platte River to discourage seedling establishment in the active river channel and to promote sandbar creation/mobilization (Murphy et al., 2003). These are termed "short-duration high flows". FWS considers these to be encompassed under the peak flow recommendations.

Species Flows

Defined as all flow recommendations quantified in the document *Instream Flow Recommendations for the Central Platte River, Nebraska* (Bowman, 1994). These were established as recommended "wet year", "dry year" and "normal year" minimum flows for various periods of the year (for example, from February 1 through March 22) for the purpose of meeting the habitat needs of native biotic components of the ecosystem. They are presented in Table 1 of Bowman, 1994 (**Appendix A-1** to this document) and summarized as follows:

Table 1.—Species Flows

Period	Wet year [1]	Normal year [1]	Dry year [1]
Jan 1 – Jan 31	1000 cfs	1000 cfs	600 cfs
Feb 1 – Mar 22	1800	1800	1200
Mar 23 – May 10	2400	2400	1700
May 11 – Sep 15	1200	1200	800
Sep 16 – Sep 30	1000	1000	600
Oct 1 – Nov 15	2400	1800	1300
Nov 16 – Dec 31	1000	1000	600

1 "Wet years are defined as the wettest 33%, "dry" years as the driest 25%, and "normal" years all others. A method for declaring type-of-conditions in the central Platte in real time is provided in **Appendix D.**

Annual Pulse Flows

Defined as the recommended flows in excess of species flows which

- Occur in most (75%) or all years;
- Have a duration of 7 to 30 days;
- Are in the range of at least 2,000 to 3,600 cfs (varying with frequency-of-exceedance and time of year); and
- May be augmented or created by the Program.

Annual pulse flows are a subset of the flows quantified in Table 2 and Table 3 of Bowman and Carlson (1994; see **Appedices A-2 and A-3** to this document). They were identified as being important to maintaining the physical structure and other characteristics of the river for biological benefits. The annual pulse flows may be summarized as follows:

Table 2.—Annual Pulse Flows

Exceedance probability (recurrence interval)	Recommended flow in cfs	Notes
75% (3 of 4 years)	3,100 to 3,600 (Feb-Mar) 3,000 (May-Jun) 3,400 (May-Jun)	30-day duration for Feb-Mar 7- to 30-day duration for May-Jun 10-year running mean of 30-consecutive-day exceedance
100% (all years)	2,000 to 2,500 (Feb-Mar)	30-day duration for Feb-Mar

Annual pulse flows do not include the "peak flows" defined below, except in the sense that pulse flows may encompass the peak flow in years when the timing of the two coincide. In those years, Program-augmented annual pulse flows are likely to improve the peak flow 10-year running average, improving conditions relative to FWS running-average recommendations.

Peak Flows

In the context of the Program, "peak flows" refer to the highest flows maintained for five consecutive days in any given year. FWS peak flow recommendations were presented in Bowman and Carlson, 1994 (see **Appendices A-2 and A-3**). These are summarized as follows:

Peak Flows

Exceedance probability (recurrence interval)	Recommended flow in cfs	Notes
20% (1 in 5 years)	16,000 (Feb-Jun)	5-day duration At least 50% of these flows should occur between May 20 to June 20 May-June preferred for habitat benefits Feb-June OK for channel maintenance
40% (2 in 5 years)	12,000 (Feb-Jun)	5-day duration
10-year running average of 5-consecutive-day exceedance	8,300 to 10,800 (Feb-Jun)	

As described by Bowman and Carlson, the recommended peaks in excess of 12,000 cfs "will be natural occurrences beyond the control of water resources managers in the Platte River basin". The Program will not create nor augment flows of this magnitude. However, the FWS recommends that efforts be made to protect the frequency and magnitude of these naturally-occurring peak flows as new water-related activities occur in the Platte River basin. Because the Program is likely to augment the annual peak flow in many lower-flow years, for example by augmenting short-duration high flows, it is anticipated that the Program will improve the 10-year running average peak flow relative to existing conditions.

Target Flows

Defined as the "species flow" plus the "annual pulse flow" recommendations, as described above. The Target flows are the flow levels that the Program actively seeks to establish through provision of Program water and re-timing of river flows. Target flows are used as the basis for "scoring" the water-related benefits of Program activities relative to the 130,000–150,000 acre-foot/year First-Increment goal for reductions in shortages to targets (see discussion in Section 3).[1]

SHORT-DURATION HIGH FLOWS

In the context of the Program, these are defined as flows of approximately three to five days duration with magnitudes approaching but not exceeding bankfull channel capacity in the habitat reach. These flows are desired on an annual or near-annual basis to help scour vegetation encroaching on channel habitat areas and to mobilize sand and build ephemeral sandbars to benefit the target species.

1 "Scoring" refers to quantifying (in thousands of acre-feet) the extent to which a water project results (or is anticipated to result) in reductions in stream flow shortages to target flows, as compared to the present condition. Scoring provides one tool for evaluating and comparing the potential benefits of water projects in the context of the Program, however it is not the only means of assessing potential benefits and adverse impacts.

The following applies to short-duration high flows:

- To the extent that Program water is used to create or augment these flows, they will be counted toward the Program score.
- Program water will not be used to achieve these flows when it may cause flows to rise above flood stage as defined by the National Weather Service.
- These are not included in target flows. That is, they will *not* be used as a basis for calculating shortages relative to the 130,000 to 150,000 acre-foot/year First Increment objective.
- To the extent that FWS uses Program water to produce such flows, such use shall not decrease the target flow shortage reduction credited to the Program's initial three water projects or to any subsequently approved Program water project.
- Should the FWS EA Manager request that a Program water project avoid diverting or storing water for the sake of augmenting/protecting a short-duration high flow, that project will not be penalized for failing to achieve reductions in shortages to target flows that it otherwise would have achieved had no such request been made.

3. APPLICATION OF INSTREAM FLOW RECOMMENDATIONS IN THE CONTEXT OF THE PROPOSED PROGRAM

The following table summarizes how FWS instream flow recommendations, as defined above, have been and will continue to be applied in the context of various Program-related activities:

Instream flow recommendations used as basis for evaluation

		Species	Annual Pulse	Peak
(1)	FWS estimate of historic shortages to targets (417,000 af/year)	X	X	
(2)	"Scoring" of the Program relative to the 130,000 - 150,000 af/year First Increment goal	X	X	
(3)	Water Conservation/Supply Reconnaissance Study, Final Report and Reconnaissance-Level Water Action Plan: "scoring" of potential projects	X	X	
(4)	FWS consideration/approval of any proposed Water Plan projects (new or substitutional) as an element of the Program	X	X	X
(5)	Replacement obligations under state and federal depletions plans, for projects covered by the plans	X	X	Depends on commitments in Plans
(6)	EIS and BO evaluation of the Program	X	X	X
(7)	Future evaluations of Program benefits (for example, at the end of the First Increment)	X	X	X
(8)	Operation of approved Water Plan projects relative to target flows	X	X	

The following discussion elaborates on this summary:

(1) Calculation of historic shortages to target flows.

In 1994, FWS estimated "Instream Flow Shortages" at Grand Island, Nebraska, by comparing 1943-1992 historic daily flows against the recommended daily instream flow over each of ten periods of the year (October 1 through November 15, etc.). The daily instream flows used for this comparison were the **species flows** and the **annual pulse flows** only (*i.e.*, the "Target flows"). Peak flows (as defined above) were not incorporated into the analysis, and thus do not factor into the estimated 417,000 af/year historic shortage (**Appendix A-4**).

(2) "Scoring" the Proposed Program and alternatives relative to FWS instream flow recommendations.

The impacts that various alternatives (including the Program) would have on flows in the central Platte River are "scored" for comparative purposes in the EIS on the basis of the extent to which they reduce shortages to **target flows**. This is consistent with the basis for calculation of historic shortages to targets (item #1).

Because scoring is typically calculated on a monthly shortage (not daily shortage) basis using the Opstudy model, "weighted monthly" Target flows (as total acre-feet/month) are used for scoring comparison purposes (**Appendix A-5**). The weighted-monthly technique follows an approach recommended by the Platte River Technical Group (Altenhofen, 1996). To fully recognize the benefits of all Program flows, flows that are greater than the weighted monthly average minimum targets and that are created or augmented by the Program are also counted as contributing to the score.

Appendix B describes in greater detail how FWS anticipates the Program score will be calculated, using OpStudy and/or other tools.

This is not intended to imply that evaluations of the Program will not also include the evaluation of impacts to **peak flows**. Because peak flows are identified as an essential component of the suite of recommended flows established in the 1994 FWS documents, impacts on peak flows must be evaluated, along with impacts relative to other flow recommendations, as the FWS believes peak flows are critical to the maintenance of river-associated habitat for the target species (see item 7).

(3) Water Conservation/Supply Reconnaissance Study, Final Report (Boyle Report).

The Water Conservation/Supply Reconnaissance Study, Final Report, undertaken by Boyle Engineering Corporation (1999), pursuant to the Cooperative Agreement (1997), evaluated alternatives on the basis of their ability to "reduce target flow shortages". For their analysis, Boyle used what they term "FWS (July 1997) weighted-average monthly species instream flow recommendations" (Table 2.1 of their report). The target flows they used for their analysis were the same weighted-averages of **species flows and annual pulse flows** that are used to "score" Program alternatives (item #2). See Appendix A-5.

(4) FWS Consideration/Approval of any Proposed Water Plan Projects (New or Substitutional) as an Element of the Program.

While the water-related benefits provided by the operation of any Program water conservation/supply project will be measured on the basis of reductions in shortages to species flows and annual pulse flows, the *evaluation* of any new or substitutional proposed project for inclusion in the Program must also include an evaluation of impacts to **peak flows** before being approved by the FWS. Presumably, the project will be approved only if its positive effects relative to meeting Target flows (species + annual pulse flows) outweigh any negative effects relative to maintaining peak flows. Projects that are included in the Water Plan at the time the Program is adopted will not be subject to further evaluation for impacts on peak flows, provided that the scope, location, and scale of the finalized project is consistent with its reconnaissance level description in the Water Plan.

(5) Replacement Obligations under State and Federal Depletion Plans, for Projects Covered by Plan

Because many flow re-regulation activities of benefit to target species in the central Platte River may have some negative effect on the frequency and/or magnitude of peak flows, FWS has agreed that water replacement obligations for projects covered by a corresponding state or federal depletions plan will be determined on the basis of the extent to which they create or increase shortages to **species flows and annual pulse flows** only, on average, relative to pre-1997 conditions. There are no replacement obligations relative to peak flows for projects covered by depletions plans, beyond those described within the corresponding plan and within the Program Document, Section E.

(6) EIS and Biological Opinion (BO) evaluations of the Program

The environmental impacts of the Program are analyzed in an Environmental Impact Statement (EIS), and compliance of the Program with the requirements of the Endangered Species Act is evaluated separately in a Biological Opinion (BO).

EIS evaluations consider the effects of the Program (and other alternatives) on **all flows** in the central Platte River. For comparative "scoring" purposes, the EIS evaluation also estimates reductions in shortages to **target flows** (species flows and annual pulse flows) associated with each of the water alternatives.

Similarly, the BO considers the effects of the Program on **all flows**. This includes consideration of the Program's effects relative to the FWS's **species flows, annual pulse flows, and peak flow** recommendations, as the FWS considers *all* of these flow recommendations important to the structure and function, patterns and processes, and habitat of the central Platte River ecosystem.

(7) Future evaluations of Program benefits.

As noted above, only Target flows **(species flows and annual pulse flows)** have been used as the basis for:

- Calculating “historic shortages to target flows”;
- Establishing replacement obligations for projects covered by state and federal future depletions plans;
- Reconnaissance-level evaluations of potential Program flow augmentation projects (Boyle’s “Water Conservation/Supply Reconnaissance Study, Final Report”; and
- “Scoring” the Program and alternatives relative to FWS goals.

Nevertheless, **peak flow** recommendations are identified as an essential component of the suite of flow recommendations established by FWS for the central Platte River because of their importance for the maintenance of river-associated habitat. Thus they also will be evaluated in terms of Program benefits for the target species. It remains an objective of the FWS to (1) minimize reductions in the frequency and magnitude of the highest peak flows and (2) improve the long-term running average annual peak flow magnitudes in the central Platte River, because the FWS considers peak flows an essential factor in conserving the ecosystems upon which the listed species and other species depend. Future evaluations of the Program will require a balanced assessment of the positive effects on species and annual pulse flows versus the negative effects on peak flows.

(8) Operation of approved Water Plan projects relative to target flows

Implementation of many water conservation and reregulation projects under the Program requires that they operate, to the extent practicable, with respect to target flows. The applicable target flows may be expressed in terms of **weighted-monthly averages, fixed daily values** or **flexible daily values**, depending upon the Program element. For any approved Program Water Plan project, the applicable Target flows will be decided upon as part of the project approval process. To apply these target flows, it will be necessary to determine whether the operations (past or projected) occur under “wet”, “normal”, or “dry” flow conditions.

Criteria that will be used to determine in real-time whether “wet”, “normal”, or “dry” hydrologic conditions exist are described in **Appendix D**.

For Program water activities operating against **weighted-monthly averages**, the monthly target flows will be quantified as shown in the final column of the tables in **Appendix A-5** for the corresponding “wet”, “average”, and “dry” conditions. As already discussed, these weighted-monthly averages are derived from the FWS’s recommendations for species flows and annual pulse flows.

For Program water activities operating against **fixed daily values**, the daily target flows will be determined as shown in **Appendix E**. These values are based on FWS recommendations for both species flow targets and annual pulse flow targets. These values reflect the daily values used to calculate the weighted-monthly averages as shown in Appendix A-5.

For Program water activities operating against **flexible daily values**, the daily target flows in May and June will be determined as shown in **Appendix F**, or by some similar method agreed upon by the Governance Committee. These values also are based on FWS recommendations for both species flows and annual pulse flows. The methodology shown in Appendix F is intended to address the full suite of annual pulse flow timing, magnitude, and duration recommendations of FWS, while taking into account antecedent flows.

A BRIEF HISTORY OF INSTREAM FLOW RECOMMENDATIONS TERMINOLOGY AND USAGE

Early 1994 FWS identifies the need for a workshop to develop instream flow recommendations for the central Platte River. This resulted from the need to provide flow recommendations to the Federal Energy Regulatory Commission (FERC), and from comments received from representatives of the three Platte River basin states during discussions about establishing a cooperative Platte River Recovery Implementation Program.

May 23, 1994 *Instream Flow Recommendations for the Central Platte River* is prepared by David Bowman, FWS, presenting the results of a workshop held March 8-10, 1994, at the National Ecology Research Center of the National Biological Survey in Fort Collins, Colorado. The purposes of this workshop included (1) "to formulate the instream flow targets the Service will use in fulfilling its legislated responsibilities in the central Platte River Valley ecosystem", and (2) "to prioritize these instream flow targets by season and by normal, wet, and dry years". This document includes Table 1 quantifying instream flow recommendations ("targets") for average, wet, and dry years for the central Platte River, excluding pulse flows.

June 10, 1994 Memoradum of Agreement for the Central Platte River Basin Endangered Species Recovery Implementation Program is entered into by the Department of the Interior and the States of Colorado, Nebraska, and Wyoming, "to initiate the development of a mutually acceptable Program that would help conserve and recover federally listed species associated with the Platte River Basin in Nebraska upstream of the confluence with the Loup River; help protect designated critical habitat for such species; and help prevent the need to list more basin associated species pursuant to the Endangered Species Act."

August 3, 1994 *Pulse Flow Requirements for the Central Platte River* is prepared by David Bowman and Dave Carlson, FWS, presenting the results of a workshop held May 16-20, 1994, at the Midcontinent Ecological Science Center of the National Biological Survey in Fort Collins, Colorado. The purpose of the workshop was to "determine the pulse, or peak, flows needed to achieve the Service's flow-dependent goal for the central Platte River Valley ecosystem." "Pulse flow recommendations" are presented in Tables 2 and 3 of this document. These include both high flow events (above 12,000 cfs and 16,000 cfs) that last about five days and aren't expected to occur in the average year ("peak flows" as defined here); more moderate flows of 2,000 to 3,600 cfs lasting a week to a month and recommended in February/March or May/June most years ("annual pulse flows" as defined here); and 10-year running mean recommendations for five-consecutive day exceedance (8,300 to 10,800 cfs) and 30-consecutive-day exceedance (3,400 cfs).

October 1994 FWS estimates an average of 417,000 af/year of historic instream flow shortages relative to the FWS instream flow recommendations (document dated October 17, 1994). This estimate was based on an analysis of daily flows at Grand Island from 1943 to 1992 relative to recommended **species flows and annual pulse flows**.

March 1996 Jon Altenhofen (Northern Colorado Water Conservancy District) proposes a method for "more specifically quantifying the duration, magnitude, and frequency" of the FWS instream flow recommendations for the May-June period (memo to the Platte River Technical Group, March 4, 1996). These flow values were adopted by FWS to "score" the Program and alternatives in the EIS in terms of their ability to reduce shortages to **target flows** on a monthly weighted-average basis (Appendix A-5). These are used in subsequent proposed project evaluations and consultations, including the Kingsley Dam Biological Opinion (1997).

July 1997 Platte River Cooperative Agreement is signed by the three state governors and the Secretary of the Interior. A specific objective articulated in the Cooperative Agreement is to improve "the occurrence of Platte River flows in the associated habitats relative to the present occurrence of target flows (hereinafter referred to as 'reducing shortages to the target flows') by an average of 130,000 to 150,000 acre-feet per year". The term "target flows" is footnoted with a reference to the May 23, 1994 and August 3, 1994 FWS documents.

December 1999 Boyle Engineering Corporation delivers their *Water Conservation/Supply Reconnaissance Study, Final Report* to the Water Management Committee. In determining the hydrological effects of a specific project, Boyle assumed that diversion to recharge or storage are made "only during periods of target flow excesses at the critical habitat" and that releases for the benefit of the critical habitat are "only made during periods of target flow shortages". The "target flows" used by Boyle for this assessment were the same monthly weighted-average **species flow and annual pulse flow** recommendations used by the FWS and the Program since 1996.

January 2001 The U.S. Bureau of Reclamation (Murphy and Randle) release a report ("*Platte River Channel: History and Restoration*") that describes anticipated continued erosion of medium-sized sand and channel narrowing downstream toward Grand Island, Nebraska over the next several decades without changes in management of the river, and recommends **short-duration high flows** as one component of a strategy to "restore a small but significant portion" of the historic Platte River channel.

April 2001 FWS provides a table to the Water Management Committee summarizing all FWS instream flow recommendations, and introducing the conceptual categories of "**species flows**", "**annual pulse flows**", and "**peak flows**" as defined in this document.

February 2005

The National Research Council of the National Academies publishes their report *Endangered and Threatened Species of the Platte River* (2005). Among the questions reviewed by the NRC was: "*Were the processes and methodologies used by the USFWS in developing its central Platte River Instream Flow Recommendations (i.e., species, annual pulse flows, and peak flows) scientifically valid?*"

The NRC report included these conclusions:

➢ "The proposed instream flows that resulted from the DOI agencies' analysis and that are summarized in Table 4-3, 4-4, and 4-5 appear to the committee to be in the correct magnitude and timing to achieve the desired results of using river processes to foster habitat for the threatened and endangered species". (p 142)

➢ "USFWS has developed instream-flow recommendations through literature reviews, field observations, data collection and analysis, numerical modeling, workshops, and other approaches. Those processes and methods are scientifically valid, and the techniques applied in the Platte River continue to be used for many other rivers. DOI-recommended flow values appear reasonable, but their effects on this river system require further analysis based on empirical data collection and field observations …" (p. 151)

➢ "Although the Instream Flow Incremental Methodology (IFIM) and Physical Habitat Simulation System (PHABSIM) were the best available science when DOI agencies reached their recommendations regarding instream flows, there are newer developments and approaches, and they should be internalized in DOI's decision processes for determining instream flows. The new approaches, centered on the river as an ecosystem rather than focused on individual species, are embodied in the concepts of the normative flow regime. Continued credibility of DOI instream flow recommendations will depend on including the new approach." (p. 11)

REFERENCES

Altenhofen, J. 1996. “Proposed specifics for May/June instream flow targets”. Memo to the Platte River Cooperative Agreement Technical Group. March 4, 1996. 2 pp. plus attached table.

Bowman, D., 1994. “Instream flow recommendations for the Central Platte River, Nebraska”. U.S. Fish and Wildlife Service, May 23, 1994. 9 pp.

Bowman, D. and D. Carlson, 1994. “Pulse flow requirements for the Central Platte River”. U.S. Fish and Wildlife Service, August 3, 1994. 11 pp.

Boyle Engineering Corporation (Boyle), 1999. Water Conservation/Supply Reconnaissance Study, Final Report. Prepared for the Governance Committee of the Cooperative Agreement for Platte River Research, December 1999. 12 chapters plus appendices.

Cooperative Agreement for Platte River Research and Other Efforts Relating to Endangered Species Habitats along the Central Platte River, Nebraska. July 1997. 14 pp. plus attachments.

Murphy, P.J., T.J. Randle, L.M. Fotherby, and J.A. Daraio, 2003. "Platte River Channel: History and Restoration," U.S. Department of the Interior, Bureau of Reclamation, Technical Service Center, Sedimentation and River Hydraulics Group, Denver, Colorado.

National Research Council of the National Academies, 2005. Endangered and Threatened Species of the Platte River. The National Academies Press, Washington, D.C. 299 pp.

U.S. Fish and Wildlife Service (USFWS), 1994. Untitled document quantifying instream flow shortages relative to the Service’s 1994 instream flow recommendations, including pulse flows. October 17, 1994. 6 pp. plus attachments.

APPENDIX A

FWS MOUNTAIN-PRAIRIE REGION INSTREAM FLOW RECOMMENDATIONS AND PROPOSED USAGE FOR THE PLATTE RIVER RECOVERY IMPLEMENTATION PROGRAM

APPENDIX A-1

(From Bowman, 1994)

Table 1.—Instream flow targets by seasonal priorities (ranking) for normal (average), wet, and dry years for the central Platte River, Nebraska. Normal (average) year flows will be equaled or exceeded 3 out of 4 years. Normal and wet year target flows will be met 3 out of 4 years, and in the driest 25 percent of the years, the dry year targets will be met

Season	**Normal year Ranking & Flow (cfs)**	**Wet year Ranking & Flow (cfs)**	**Dry year Rank & Flow (cfs**
May and June*	*	#1 *	*
Feb. and March*	*	#2 *	*
May 11–Sept. 15	**#1 @ 1,200**	**#3 @ 1,200**	**#1 @ 800**
March 23–May 10	#2 @ 2,400	#4 @ 2,400	#2 @ 1,700[1]
Feb. 1–March 22	#3 @ 1,800	#5 @ 1,800	#3 @ 1,200[2]
Sept. 16–30	#4 @ 1,000	#6 @ 1,000	#6(tie) @ 600
Oct. 1–Nov. 15	#5 @ 1,800	#7 @ 2,400	#6(tie) @ 1,300[3]
Nov. 16–Dec. 31	#6 @ 1,000	#8 @ 1,000	#5 @ 600
Jan .1–31	#7 @ 1,000	#9 @ 1,000	#4 @ 600

* These specific flow recommendations were not provided in this 1994 document. They were developed in a subsequent workshop as described in Bowman and Carlson, 1994 (see Appendices A-2 and A-3).

[1] Includes 650 cfs for fish community.

[2] Includes 650 cfs for fish community.

[3] Includes 600 cfs for fish community.

APPENDIX A-2

(From Bowman and Carlson, 1994)

Table 2.—Peak and annual pulse flow recommendations for the central Platte River Valley ecosystem during May and June.[1]

	Period	Flow (cfs)	Duration (days)	Frequency (yrs) Exceedence (%)
Very wet	May 1—June 30*	≥ 16,000	5**	1 in 5 (20%)
Wet	May 1–June 30*	≥ 12,000	5**	1 in 2.5 (40%)
Normal	May 20–June 20	≥ 3,000	7-30***	3 in 4 (75%)
Dry	May 11–June 30	none****		all remaining (100%)

* At least 50% of these peak flows should occur during May 20 to June 20, with May 1 to June 30 as the timeframe for broadest benefit for channel maintenance, and instream and wet meadow habitats. Occurrence between February 1 and June 30 would accomplish the necessary effects for channel maintenance. The 10-year running average for the mean annual peak flow targets should range from approximately 8,300 cfs to 10,800 cfs.

** The duration of these peak flows should emulate the historic, natural pattern: (a) ascended over approximately 10 days, (b) cresting for approximately 5 days, and (c) descending over approximately 12 days.

*** The target is for a 10-year running average for the 30-day exceedence flow (i.e., 10-year running average of the annual level exceeded for 30 consecutive days) of at least 3,400 cfs. A flow of 3,000 cfs should be exceeded for 7-30 days in at least 75% of years. Annual pulse flows should be followed by descending flows approximating a rate of 800 cfs/day.

**** No annual pulse flows during May and June in driest years; target flows identified in the March 1994 workshop (Bowman 1994), apply under dry year conditions.

[1] The original Bowman and Carlson document collectively referred to these as “pulse” flows. Here the language has been changed to “peak” and “annual pulse” flows to maintain consistency with the terminology since developed in the context of the Platte River Recovery Implementation Program.

APPENDIX A-3
(From Bowman and Carlson, 1994)

Table 3.—Peak and annual pulse flow recommendations for the central Platte River Valley ecosystem during February and March.[1]

	Period	**Flow (cfs)**	**Duration (days)**	**Recurrence (yrs) Exceedence (%)**
Very wet	Feb. 1—March 31	≥ 16,000*	5**	1 in 5 (20%)
Wet	Feb. 15–March 15	≥ 12,000*	5**	1 in 2.5 (40%)
Normal	Feb. 15–March 15	≥ 3,000–3,6000	30	3 in 4 (75%)
Dry	Feb. 15–March 15	2,000–2,5000	30	all remaining (100%)

* At least 50% of these peak flows should occur during May 20 to June 20, with May 1 to June 30 as the time frame for broadest benefit for channel maintenance, and instream and wet meadow habitats. Occurrence between February 1 and June 30 would accomplish the necessary effects for channel maintenance. The 10-year running average for the mean annual pulse flow targets should range from approximately 8,300 cfs to 10,800 cfs.

** The duration of these peak flows should emulate the historic, natural pattern: (a) ascended over approximately 10 days, (b) cresting for approximately 5 days, and (c) descending over approximately 12 days.

[1] The original Bowman and Carlson document collectively referred to these as “pulse” flows. Here the language has been changed to “peak” and “annual pulse” flows to maintain consistency with the terminology since developed in the context of the Platte River Recovery Implementation Program.

APPENDIX A-4

INSTREAM FLOW SHORTAGES AT GRAND ISLAND, NE 10/11/94

(Thousands of Acre-Feet, Sorted from highest to lowest)

Water Years 1943-1992

Wet and Average Years

Period	10/1 - 11/15	11/16 - 1/31	2/1 - 2/14	2/15 - 3/15	3/16 - 3/22	3/23 - 5/10	5/11 - 5/19	5/20 - 6/20	6/21 -9/15	9/16 - 9/30	Total
AVG IFR, CFS	**1,800**	**1,000**	**1,800**	**3,350**	**1,800**	**2,400**	**1,200**	**3,000**	**1,200**	**1,000**	**Annual**
Total KAF	**164.2**	**152.7**	**50.0**	**192.7**	**25.0**	**233.3**	**21.4**	**190.4**	**207.1**	**29.8**	**1266.5**
1978	80.6	27.7	23.8	103.8	0.0	71.5	4.4	159.6	187.5	16.7	675.6
1976	91.0	3.8	9.5	92.0	0.2	75.0	7.5	149.5	191.1	11.5	631.1
1943	119.4	25.2	0.4	98.6	18.2	56.7	0.9	97.7	172.3	29.2	618.6
1944	129.5	23.5	19.2	84.1	5.8	42.9	0.0	100.6	180.5	25.9	612.1
1948	87.2	9.8	20.4	72.8	0.0	67.7	8.4	175.2	139.0	22.6	603.0
1968	48.8	12.7	9.8	97.3	7.5	126.8	5.3	154.1	129.9	5.9	598.0
1965	101.3	33.1	18.4	115.5	7.1	129.5	13.5	84.3	86.0	0.4	589.1
1982	88.4	5.2	8.9	73.8	0.0	125.3	7.4	132.9	139.7	3.9	585.6
1967	75.9	18.7	8.1	119.8	11.3	174.2	12.5	75.1	81.4	2.8	579.8
1989	78.2	3.1	12.7	70.7	0.5	154.4	15.2	169.9	73.4	1.1	579.2
1979	108.2	27.2	28.6	87.9	0.0	56.6	1.4	144.1	95.6	18.5	568.1
1960	75.4	20.4	1.7	118.2	1.9	44.0	0.3	111.9	159.0	29.8	562.5
1975	82.9	15.8	18.5	102.1	0.1	87.4	5.2	131.0	112.2	0.9	556.1
1945	94.4	12.3	12.7	84.3	9.6	132.4	3.2	63.9	127.3	13.0	553.0
1977	94.9	22.6	16.0	116.9	1.2	46.0	0.6	95.0	140.9	8.6	542.6
1990	81.9	22.6	7.1	84.9	1.2	36.2	0.7	125.2	153.3	19.3	532.4
1966	0.0	1.9	4.5	59.4	0.0	42.7	11.8	169.6	181.1	17.5	488.6
1950	43.7	16.5	6.0	78.2	1.9	64.3	0.2	114.7	128.2	12.8	466.4
1962	54.3	15.5	0.1	98.6	0.0	102.5	16.6	69.0	93.2	10.7	460.4
1969	53.7	14.9	8.8	72.3	0.0	83.1	4.9	127.4	83.8	1.9	450.8
1947	34.0	14.7	20.2	88.4	0.0	83.9	6.0	114.7	78.2	10.7	450.7
1958	78.8	6.2	20.4	96.5	2.1	27.5	0.0	36.0	136.5	27.2	431.2
1949	100.0	18.2	22.2	44.2	1.0	19.3	0.0	43.0	95.9	7.8	351.6
1972	19.5	2.3	0.7	14.5	0.0	42.6	0.0	112.5	127.5	11.1	330.8
1970	24.6	1.3	0.0	52.7	0.0	11.8	0.0	114.6	124.1	0.2	329.3
1974	0.0	0.0	0.0	0.0	0.0	0.0	0.0	109.2	173.0	14.0	296.2
1988	13.5	0.9	0.0	19.4	0.0	36.1	0.0	120.8	104.7	0.0	295.3
1951	46.2	13.7	15.4	63.1	0.3	66.7	3.5	45.6	35.2	0.0	289.7
1980	120.4	6.8	2.2	9.1	0.0	0.3	0.0	0.0	131.2	9.8	279.9
1952	13.8	1.4	0.0	20.3	0.0	8.6	0.0	74.7	131.4	26.0	276.3
1971	27.9	3.8	2.1	46.2	0.0	18.8	0.0	0.0	100.6	7.4	206.8
1985	0.0	0.0	0.0	3.2	0.0	20.7	0.0	86.6	80.6	0.0	191.1
1986	8.7	2.0	5.1	25.2	0.0	0.1	0.0	67.7	8.8	0.0	117.6
1987	0.0	0.0	0.0	57.0	0.0	0.2	0.0	1.5	47.5	0.0	106.2
1983	71.5	0.0	0.0	17.1	0.0	0.1	0.0	0.0	0.0	0.0	88.7
1984	26.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	56.6	0.0	83.5
1973	13.9	0.6	0.0	12.0	0.0	0.0	0.0	0.0	26.2	0.0	52.6
Mean Shortag	**59.2**	**10.9**	**8.7**	**64.9**	**1.9**	**55.6**	**3.5**	**91.3**	**111.2**	**9.9**	**417.0**

Wet and Average years measured against Average Instream Flow Recommendation

Dry Years

Period	10/1 - 11/15	11/16 - 1/31	2/1 - 2/14	2/15 - 3/15	3/16 - 3/22	3/23 - 5/10	5/11 - 9/15	9/16 - 9/30	Total
Dry IFR, CFS	**1,300**	**600**	**1,200**	**2,250**	**1,200**	**1,700**	**800**	**600**	**Annual**
Total KAF	**118.6**	**91.6**	**33.3**	**129.4**	**16.7**	**165.2**	**203.1**	**17.9**	**775.8**
1956	99.6	17.3	10.7	65.9	1.3	98.2	199.2	17.9	510.1
1957	117.5	55.9	14.3	91.1	6.4	74.9	100.5	2.2	462.9
1955	79.2	4.0	7.0	42.2	3.2	92.9	167.8	17.9	414.1
1954	86.7	4.0	0.0	37.6	0.9	67.1	151.6	17.9	365.8
1961	68.1	5.5	2.5	61.0	0.0	71.4	113.0	10.4	331.8
1991	64.2	6.9	1.1	48.2	0.6	82.8	113.4	6.9	324.3
1964	47.2	3.1	3.2	65.0	0.3	41.7	150.1	8.4	319.0
1981	66.7	0.4	19.0	33.4	1.5	86.1	86.3	3.8	297.3
1959	65.8	13.9	4.7	24.5	0.0	1.8	150.6	11.5	272.7
1946	23.4	5.7	1.5	38.0	0.0	86.1	117.1	0.1	271.9
1953	44.0	0.6	0.0	33.1	0.0	31.8	141.6	17.9	269.0
1992	74.6	0.2	0.0	29.8	0.0	51.6	85.1	13.8	255.1
1963	14.7	0.7	0.0	16.7	0.0	43.8	159.3	1.2	236.4
Mean Shortag	**65.5**	**9.1**	**4.9**	**45.1**	**1.1**	**63.9**	**133.5**	**10.0**	**333.1**

Years were classified as being wet, average, or dry based on annual volume at the Grand Island gage for water years 1943-1992 (33% Wet, 42% Average, and 25% Dry).
Each daily flow was compared against the daily flow target, and the sum of calculated shortages is shown for each time period.
The only difference between wet and average year Instream Flow Recommendations is the 10/1-11/15 time period. For simplicity, the Wet and Average years are compared against the Average Instream Flow Recommendation.

APPENDIX A-5 (PAGE 1)

"Wet" Instream Flow Recommendation Hydrograph

Month	Begin	End	cfs	# Days	Kaf	Total Kaf	Average cfs
Jan	1	31	1,000	31	61.5		
Jan						61.5	1,000
Feb	1	14	1,800	14	50.0		
Feb	15	28	3,350	14	93.0	143.0	2,575
Mar	1	15	3,350	15	99.7		
Mar	16	22	1,800	7	25.0		
Mar	23	31	2,400	9	42.8	167.5	2,724
Apr	1	30	2,400	30	142.8		
Apr						142.8	2,400
May	1	10	2,400	10	47.6		
May	11	19	1,200	9	21.4		
May	20	26	4,900	7	68.0		
May	27	31	3,400	5	33.7	170.8	2,777
Jun	1	20	3,400	20	134.9		
Jun	21	30	1,200	10	23.8	158.7	2,667
Jul	1	31	1,200	31	73.8		
Jul						73.8	1,200
Aug	1	31	1,200	31	73.8		
Aug						73.8	1,200
Sep	1	15	1,200	15	35.7		
Sep	16	30	1,000	15	29.8	65.5	1,100
Oct	1	31	2,400	31	147.6		
Oct						147.6	2,400
Nov	1	15	2,400	15	71.4		
Nov	16	30	1,000	15	29.8	101.2	1,700
Dec	1	31	1,000	31	61.5		
Dec						61.5	1,000
Total Kaf						**1,367.5**	

"Average" Instream Flow Recommendation Hydrograph

Month	Begin	End	cfs	# Days	Kaf	Total Kaf	Average cfs
Jan	1	31	1,000	31	61.5		
Jan						61.5	1,000
Feb	1	14	1,800	14	50.0		
Feb	15	28	3,350	14	93.0	143.0	2,575
Mar	1	15	3,350	15	99.7		
Mar	16	22	1,800	7	25.0		
Mar	23	31	2,400	9	42.8	167.5	2,724
Apr	1	30	2,400	30	142.8		
Apr						142.8	2,400
May	1	10	2,400	10	47.6		
May	11	19	1,200	9	21.4		
May	20	31	3,400	12	80.9	150.0	2,439
Jun	1	20	3,400	20	134.9		
Jun	21	30	1,200	10	23.8	158.7	2,667
Jul	1	31	1,200	31	73.8		
Jul						73.8	1,200
Aug	1	31	1,200	31	73.8		
Aug						73.8	1,200
Sep	1	15	1,200	15	35.7		
Sep	16	30	1,000	15	29.8	65.5	1,100
Oct	1	31	1,800	31	110.7		
Oct						110.7	1,800
Nov	1	15	1,800	15	53.6		
Nov	16	30	1,000	15	29.8	83.3	1,400
Dec	1	31	1,000	31	61.5		
Dec						61.5	1,000
Total Kaf						**1,291.9**	

APPENDIX A-5 (PAGE 2)

"Dry" Instream Flow Recommendation Hydrograph

Month	Begin	End	cfs	# Days	Kaf	Total Kaf	Average cfs
Jan	1	31	600	31	36.9		
Jan						36.9	600
Feb	1	14	1,200	14	33.3		
Feb	15	28	2,250	14	62.5	95.8	1,725
Mar	1	15	2,250	15	66.9		
Mar	16	22	1,200	7	16.7		
Mar	23	31	1,700	9	30.3	114.0	1,853
Apr	1	30	1,700	30	101.2		
Apr						101.2	1,700
May	1	10	1,700	10	33.7		
May	11	31	800	21	33.3	67.0	1,090
Jun	1	30	800	30	47.6		
Jun						47.6	800
Jul	1	31	800	31	49.2		
Jul						49.2	800
Aug	1	31	800	31	49.2		
Aug						49.2	800
Sep	1	15	800	15	23.8		
Sep	16	30	600	15	17.9	41.7	700
Oct	1	31	1,300	31	79.9		
Oct						79.9	1,300
Nov	1	15	1,300	15	38.7		
Nov	16	30	600	15	17.9	56.5	950
Dec	1	31	600	31	36.9		
Dec						36.9	600
Total Kaf						**775.8**	

NATIONAL RESEARCH COUNCIL REPORT ON ENDANGERED AND THREATENED SPECIES OF THE PLATTE RIVER

- Press Release
- Conclusions

NEWS

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Date: April 28, 2004
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FOR IMMEDIATE RELEASE

Platte River Assessments for Endangered and Threatened Species Are Scientifically Valid

WASHINGTON -- Areas along Nebraska's Platte River are properly designated as "critical habitats" for the river's endangered whooping crane and threatened piping plover, says a new report from the National Academies' National Research Council. The committee that wrote the report also concluded that recommendations by the federal government aimed at protecting these and other federally listed species were scientifically valid at the time they were made, although future decisions should be based on newer scientific approaches.

The report focuses on the central Platte River, which provides habitat for endangered whooping cranes and interior least terns, as well as threatened piping plovers, and on the lower Platte River, where broad, shallow waters provide important habitat for endangered pallid sturgeon. The Platte River Basin stretches across three states; the North and South Platte Rivers originate in Colorado -- the North Platte flowing through Wyoming -- and meet in Nebraska to form the central and lower Platte River.

A series of dams and reservoirs have been constructed throughout the river basin for flood control and to provide water for farm irrigation, power generation, recreation, and municipal use. The alterations to the river and surrounding land caused by this extensive water-control system, however, resulted in habitat changes that were at odds with the protection of the listed species. For example, sparsely vegetated, open, sandy areas near shallow water preferred by the listed birds are being replaced by narrow river channels and expanding woodlands.

Conflicts over the protection of federally listed species and water management in the Platte River Basin have existed for more than 25 years. In recent years, the Fish and Wildlife Service of the U.S.

Department of the Interior issued a series of opinions requiring that new water depletions would have to be balanced by mitigation measures, and a lawsuit forced the designation of "critical habitat" for the piping plover. These and other controversies prompted the Department of the Interior and the Governance Committee of the Platte River Endangered Species Partnership to request that the Research Council examine whether the current designations of "critical habitat" for the whooping crane and piping plover are supported by existing science. The Research Council was also asked to assess whether current habitat conditions are affecting the survival of listed species or limiting their chances of recovery, and to examine the scientific basis for the department's instream-flow recommendations, habitat-suitability guidelines, and other decisions.

The report concludes that in most instances habitat conditions are indeed affecting the likelihood of species survival and recovery. For example, the central Platte habitat is important to whooping cranes because many, if not all, stop there during migration at some point in their lives; about 7 percent of the total population stops there in any one year. The report also notes that if whooping crane deaths -- which occur primarily during migration -- were to increase by only 3 percent, the general population would probably become unstable. Whooping cranes are the rarest species of crane in the world; only about 185 wild birds remain. If habitat conditions decline substantially, recovery of the whooping crane could be slowed or reversed, the report adds.

Deterioration and loss of habitat in the central Platte is contributing to the continuing drop in numbers of piping plovers and interior least terns, the report says. Human activities and increased attacks by predators on nests are also key factors in the birds' decline. Almost no piping plovers live along the central Platte anymore, but because the area did provide a suitable habitat for reproduction until a few years ago, it should still be considered a critical habitat, according to the committee. Although the population of interior least terns on the central Platte River continues to decline, the birds are nesting on the lower Platte River, the report notes.

Current habitat conditions on the lower Platte River are not adversely affecting pallid sturgeon, the report says; the area still retains the characteristics preferred by the species. However, it is appropriate to consider the lower Platte critical to the survival and recovery of the fish because of their low numbers in other parts of the Platte and in the Missouri River, where dams have depleted suitable habitat.

The report committee cited many gaps in knowledge, and urged that a systematic inventory of all actions contributing to the decline of the listed species be undertaken. This knowledge would help environmental interests, water users, and government officials reach a cooperative agreement on how to manage water and promote the species' recovery. An approach to decision-making that considers multiple species and habitats outside the Platte River Basin should replace the current approach, which has focused on single species and specific locales. The dynamics and connections between surface water and groundwater need to be better understood, as do the effects of the currently required flow on the river's shape and vegetation. The cost-effectiveness of conservation actions also should be considered, as permitted under the Endangered Species Act, and the burden of these measures should be borne equitably among water users.

The report was sponsored by the U.S. Department of the Interior. The National Research Council is the principal operating arm of the National

Academy of Sciences and the National Academy of Engineering. It is a private, nonprofit institution that provides science and technology advice under a congressional charter. A committee roster follows.

Copies of **Endangered and Threatened Species of the Platte River** will be available in June from the National Academies Press; tel. (202) 334-3313 or 1-800-624-6242 or on the Internet at **http://www.nap.edu**. Reporters may obtain a copy from the Office of News and Public Information (contacts listed above).

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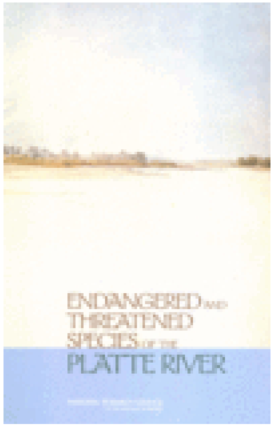

Endangered and Threatened Species of the Platte River

Committee on Endangered and Threatened Species in the Platte River Basin, National Research Council

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ENDANGERED AND THREATENED SPECIES OF THE PLATTE RIVER

Committee on Endangered and Threatened
Species in the Platte River Basin

Board on Environmental Studies and Toxicology
Water Science and Technology Board

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NOTICE: The project that is the subject of this report was approved by the Governing Board of the National Research Council, whose members are drawn from the councils of the National Academy of Sciences, the National Academy of Engineering, and the Institute of Medicine. The members of the committee responsible for the report were chosen for their special competences and with regard for appropriate balance.

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Conclusions and Recommendatons

In the previous chapters, the Committee on Endangered and Threatened Species in the Platte River Basin has explored science and its application for policy on the central and lower Platte River. The committee presents here its responses to the series of questions (reviewed in Box 1-2) included in its charge. In this chapter, for each question, we state our conclusions and the primary sources of evidence leading to them.

To reach its conclusions, the committee considered the extent of the data available for each question and whether the data was generated according to standard scientific methods that included, where feasible, empirical testing. The committee also considered whether those methods were sufficiently documented and whether and to what extent they had been replicated, whether either the data or the methods used had been published and subject to public comment or been formally peer-reviewed, whether the data were consistent with accepted understanding of how the systems function, and whether they were explained by a coherent theory or model of the system. To assess the scientific validity of the methods used to develop instream-flow recommendations, the committee applied the criteria listed above, but focused more directly on the methods. For example, the committee considered whether the methods used were in wide use or generally accepted in the relevant field and whether sources of potential error in the methods have been or can be identified and the extent of potential error estimated. The committee acknowledges that no one of the above criteria is decisive, but taken together they provide a good sense of the extent to which any conclusion or decision is supported by science. Because some of the decisions in question were made many years ago, the committee felt that it was important to ask whether they were supported by the existing science at the time they were made. For that purpose, the committee asked, in addition to the questions above, whether the decision makers had access to and made use of state-of-the-art knowledge at the time of the decision.

The population viability analysis (PVA) developed by the committee was constrained by the short study period. It did not include systematic sensitivity analyses and did not base stochastic processes and environmental variation on data from the Platte River region. A more thorough representation of environmental variation in the Platte River could be developed from regional records of climate, hydrology, disturbance events, and other stochastic environmental factors. Where records on the Platte River basin itself are not adequate, longer records on adjacent basins could be correlated with records on the Platte to develop a defensible assessment of environmental variation and stochastic processes. In addition, a sensitivity analysis could demonstrate the effects of wide ranges of environmental variation on the outcomes of PVAs. In its analysis, the committee did not consider methods and techniques that are under development by researchers such as the new SEDVEG model. SEDVEG is being developed, but is not yet completed or tested, by USBR to evaluate the interactions among hydrology, river hydraulics, sediment transport, and vegetation for application on the Platte River. The committee did not consider USGS's in-progress evaluation of the models and data used by USFWS to set flow recommendations for whooping cranes. The committee did not consider any aspects of the Environmental Impact Statement that was being drafted by U.S. Department of the Interior (DOI) agencies related to species recovery, because it was released after the committee finished its deliberations. The Central Platte River recovery implementation program proposed in the cooperative agreement by the Governance Committee also was not evaluated, because it was specifically excluded from the committee's charge.

The committee's experience with data, models, and explanations led us to the identification of three common threads throughout the issues related to threatened and endangered species. First, change across space and through time is pervasive in all natural and human systems in the central and lower Platte River. Change implies that unforeseen events may affect the survival or recovery of federally listed species. Land-use and water-use changes are likely in the central and lower Platte River region in response to market conditions, changing lifestyles, shifts in the local human population, and climate change; such changes will bring about pressures on wildlife populations that are different from those observed today. For example, riparian vegetation on the central Platte River has changed because of both natural and anthropogenic impacts. Regardless of its condition and distribution before European settlement in the middle 1800s, the riparian forest of the central Platte River was geographically limited from the middle 1800s to the first decades of the 1900s. At the time of the first aerial photography of the river in 1938, extensive sandbars, beaches, and braided channels without extensive forest cover were common in many reaches of the central Platte. Between the late 1930s and the middle to late 1960s, woodland covered increasing portions of the areas that had previously been without trees. By the late 1990s, clearing of woodlands had become a major habitat-management strategy to benefit whooping cranes that desire open roosting areas with long sight lines. Whooping cranes have used the newly cleared areas, but the overall effects of clearing on the crane population and on the structure of the river are not completely known. As with most habitat-management strategies in the central Platte River, there has been no specific monitoring to assess the success of clearing. Unintended effects remain to be investigated.

From a planning and management perspective, stable conditions are desirable so that prediction of outcomes of decisions can be simplified; but stability is rare, especially in the Platte River Basin. Explanations of existing hydrological, geomorphologic, and biological conditions and predictions of future conditions that fail to discern and accommodate change are not likely to be successful. Science can inform decision makers about expected outcomes of various choices, but prediction of the outcomes is likely to be imprecise because of ecosystem variability. Management choices therefore must include some flexibility to deal with the inevitable variability and must be adaptive, continually monitoring and adjusting. The conditions our parents would have seen in these ecosystems a half-century ago were not the conditions we see now, and present conditions are not likely to be the ones our children or grandchildren will see.

A second thread identified by the committee is that one's view of an ecosystem depends on the temporal and spatial scales on which it is examined. The variability in scale of processes in smaller drainage basins nested within larger ones is obvious, but most natural systems have a similar nested hierarchical structure. The groups of birds and fish that use the Platte River Basin are a fraction of the larger, more widely distributed population, so conditions along the river affect only a portion of each population at any time. Loss of the subpopulations that use the Platte River might not damage the entire population if there were no losses elsewhere—something that Platte River managers cannot assume. The concentration of listed species along the central Platte indicates the importance of the river, despite the fact that the birds can be found elsewhere in Nebraska during migration or nesting periods. The river is important from a management perspective because it contains all the habitat features that are included in the regulatory definitions of critical habitat.

The river supplies the needs of an assemblage of species in addition to serving the needs of single species.

Climate also operates on a series of hierarchical scales. Regional climate in the central and northern Great Plains evinces a variety of changes that depend on the time scale used for analysis. Over a period of 5 or even 10 years, we do not see the complete range of temperature and rainfall conditions likely to be experienced over a century. Decades-long drought or wet periods are likely to be important in species survival and recovery, so short-term observations of less than a few years cannot illuminate the expected conditions that a recovery effort must face.

The various scales of scientific analysis with respect to threatened and endangered species in the Platte River Basin imply that decisions based on science should also recognize scale. Decisions concerning the Platte River Basin that are based on short-term multiyear data and a local perspective are not likely to benefit the long-term (multidecadal) viability of a species that operates on a continental or intercontinental scale. The costs of efforts to recover threatened or endangered species are often most obvious on a local scale, but the benefits are much more widely distributed.

The third thread is that water links the needs of human, wildlife, and habitat more than any other ecological process. Many of the risks to threatened and endangered species, and all the comprehensive solutions to the problem of recovery, require a refined understanding of hydrological processes. The hydrological system of the Platte River is highly interconnected, so solutions to the species issues that attempt to protect commodity values of water must also be interconnected, particularly between surface water and groundwater. Climatic changes create a changing backdrop for the more important human-induced changes in the hydrology of the basin. The committee is firmly convinced that upstream storage, diversion, and distribution of the river's flow are the most important drivers of change that adversely affect species habitat along the Platte River.

COMMITTEE'S FINDINGS

1. Do current central Platte habitat conditions affect the likelihood of survival of the whooping crane? Do they limit (adversely affect) its recovery?

Conclusions: The committee concluded that, given available knowledge, current central Platte habitat conditions adversely affect the likelihood of survival of the whooping crane, but to an unknown degree. The Platte River is important to whooping cranes: about 7% of the total whooping crane population stop on the central Platte River in any one year, and many, if not all, cranes stop over on the central Platte at some point in their lifetimes. Population viability analyses show that if mortality were to increase by only 3%, the general population would likely become unstable. Thus, if the cranes using the Platte River were eliminated, population-wide effects would be likely. Resources acquired by whooping cranes during migratory stopovers contribute substantially to meeting nutrient needs and probably to ensuring survival and reproductive success. Because as much as 80% of crane mortality appears to occur during migration, and because the Platte River is in a central location for the birds' migration, the river takes on considerable importance. The committee concluded that current habitat conditions depend on river management in the central Platte River, but the population also depends on events in other areas along the migratory corridor. If habitat conditions on the central Platte River—that is, the physical circumstances and food resources required by cranes—decline substantially, recovery could be slowed or reversed. The Platte River is a consistent source of relatively well-watered habitat for whooping cranes, with its water source in distant mountain watersheds that are not subject to drought cycles that are as severe as those of the Northern Plains. There are no equally useful habitats for whooping cranes nearby: the Rainwater Basin dries completely about once a decade, and the Sandhills are inconsistent as crane habitat, while the Niobrara and other local streams are subject to the same variability as the surrounding plains. Future climatic changes may exacerbate conflicts between habitat availability and management and human land use. If the quality or quantity of other important habitats becomes less available to whooping cranes, the importance of the central Platte River could increase.

Primary Sources of Scientific Information: The basis of the above conclusion is published documents that were available to other researchers and the public including the original listing document and recovery plan for the species and a review of knowledge about the cranes by the Interstate Task Force on Endangered Species (EA Engineering, Science and Technology, Inc. 1985). Other important contributions to knowledge include Allen (1952) and Austin and Richert (2001). The committee also reviewed and discussed critical comments presented in open sessions and written testimony exemplified by Lingle (G. Lingle, unpublished material, March 22, 2000) and Czaplewski et al. (M.M. Czaplewski et al., Central Platte Natural Resource District, unpublished material, August 22, 2003) that was critical of the research conducted by DOI agencies.

2. Is the current designation of central Platte River habitat as "critical habitat" for the whooping crane supported by existing science?

Conclusions: An estimated 7% of the wild, migratory whooping crane population now uses the central Platte River on an annual basis and many, if not all, cranes stop over on the central Platte at some point in their lifetimes. The proportion of whooping cranes that use the central Platte River and the amount of time that they use it are increasing (with expected inter-annual variation). The designation of central Platte River migratory stopover habitat as critical to the species is therefore supported because the birds have specific requirements for roosting areas that include open grassy or sandy areas with few trees, separation from predators by water, and proximity to foraging areas such as wetlands or agricultural areas. The Platte River critical habitat area is the only area in Nebraska that satisfies these needs on a consistent basis. However, some habitats designated as critical in 1978 appear to be largely unused by whooping cranes in recent years, and the birds are using adjacent habitats that are not so designated (Stehn 2003).

Habitat selection (to the extent that it can be measured) on multiple geographic scales strongly suggests that Nebraska provides important habitat for whooping cranes during their spring migration. Riverine, palustrine, and wetland habitats serve as important foraging and roosting sites for whooping cranes that stop over on the central Platte River. Whooping cranes appear to be using parts of the central Platte River that have little woodland and long, open vistas, including such areas outside the zone classified as critical habitat. In some cases the cranes appear to be using areas that have been cleared of riparian woodland, perhaps partly explaining their distribution outside the critical habitat area.

Primary Sources of Scientific Information: The basis of the committee's conclusion is published documents that were available to other researchers and the public including the original listing document, recovery plan, and declaration of critical habitat; and information in Howe (1989) and Austin and Richert (2001). The committee also considered commentary that was critical of the research conducted by DOI agencies exemplified by open sessions and written testimony presented by Lingle (G. Lingle, unpublished material, March 22, 2000), EA Engineering, Science and Technology, Inc. (1985) and Czaplewski et al. (M.M. Czaplewski et al., Central Platte Natural Resources District, unpublished material, August 22, 2003).

3. Do current central Platte habitat conditions affect the likelihood of survival of the piping plover? Do they limit (adversely affect) its recovery?

Conclusions: Reliable data indicate that the northern Great Plains population of the piping plover declined by 15% from 1991 to 2001. The census population in Nebraska declined by 25% during the same period. Resident piping plovers have been virtually eliminated from natural riverine habitat on the central Platte River. No recruitment (addition of new individuals to the population by reproduction) has occurred there since 1999. The disappearance of the piping plover on the central Platte can be attributed to harassment caused by human activities, increased predation of nests, and losses of suitable habitat due to the encroachment of vegetation on previously unvegetated shorelines and gravel bars.

The committee concluded that current central Platte River habitat conditions adversely affect the likelihood of survival of the piping plover, and, on the basis of available understanding, those conditions have adversely affected the recovery of the piping plover. Changes in habitat along the river—including reductions in open, sandy areas that are not subject to flooding during crucial nesting periods—have been documented through aerial photography since the late 1930s and probably have adversely affected populations of the piping plover. Sandpits and reservoir edges with beaches may, under some circumstances, mitigate the reduction in riverine habitat areas. Because piping plovers are mobile and able to find alternative nesting sites, changes in habitat may not be as severe as they would be otherwise, but no studies have been conducted to support or reject this hypothesis.

Primary Sources of Scientific Information: Corn and Armbruster (1993) demonstrated differences (including higher river invertebrate densities and catch rates) in foraging habitat between the river and sand pit sites; this suggests that riverine habitat areas are superior to the sand mines and reservoir beaches for the piping plover. Basic information sources include the listing document and recovery plan. Higgins and Brashier (1993) provide additional information on habitat conditions, survival, and recovery. The committee also considered commentary presented in open sessions and written testimony exemplified by Lingle (G. Lingle, unpublished material, March 22, 2000) and Czaplewski et al. (M.M. Czaplewski et al., Central Platte Natural Resources District, unpublished material, August 22, 2003) that was critical of the research conducted by DOI agencies.

4. Is the current designation of central Platte River habitat as "critical habitat" for the piping plover supported by the existing science?

Conclusions: The designation of central Platte habitat as critical habitat for the piping plover is scientifically supportable. Until the last several years, the central Platte supported substantial suitable habitat for the piping plover, including all "primary constituent elements" required for successful reproduction by the species. Accordingly, the central Platte River contributed an average of more than 2 dozen nesting pairs of plovers to the average of more than 100 pairs that nested each year in the Platte River Basin during the 1980s and 1990s. The critical habitat designation for the species explicitly recognizes that not all areas so designated will provide all necessary resources in all years and be continuously suitable for the species. It is also now understood that off-stream sand mines and reservoir beaches are not an adequate substitute for natural riverine habitat.

Primary Sources of Scientific Information: Data generated according to standard scientific methods in well-defined and well-executed scientific investigations support the critical habitat designation for the piping plover—including work by Ziewitz et al. (1992), Ducey (1983), and Faanes (1983)—as does the designation in the *Federal Register* (67: 57638 [2002]). The committee also considered commentary presented in open sessions and written testimony exemplified by Lingle (G. Lingle, unpublished material, March 22, 2000) and Czaplewski et al. (M.M. Czaplewski et al., Central Platte Natural Resources District, unpublished materials, August 10, 2001, and August 22, 2003) that was critical of the research conducted by DOI agencies.

5. Do current central Platte habitat conditions affect the likelihood of survival of the interior least tern? Do they limit (adversely affect) its recovery?

Conclusions: The committee concluded that current habitat conditions on the central Platte River adversely affect the likelihood of survival of the interior least tern—in much the same fashion as they affect the likelihood of survival of the piping plover—and that on the basis of available information, current habitat conditions on the central Platte River adversely affect the likelihood of recovery of the interior least tern. Reliable population estimates indicate that the total (regional) population of interior least terns was at the recovery goal of 7,000 in 1995, but some breeding areas, including the central Platte River, were not at identified recovery levels. The central Platte subpopulation of least terns declined from 1991 to 2001. The number of terns using the Platte River is about two-thirds of the number needed to reach the interior least tern recovery goal for the Platte. The interior tern is nesting in substantial numbers on the adjacent lower Platte River, but numbers continue to decline on the central Platte, reflecting declining habitat conditions there. The decline in the tern population on the central Platte River has been coincidental with the loss of numerous bare sandbars and beaches along the river. Control of flows and diversion of water from the channel are the causes of these geomorphic changes. Woodland vegetation, unsuitable as tern habitat, has colonized some parts of the central Platte River. Alternative habitats, such as abandoned sand mines or sandy shores of Lake McConaughy, are not suitable substitutes for Platte River habitat because they are susceptible to disturbance by humans and natural predators. The shores of Lake McConaughy are available only at lower stages of the reservoir, and they disappear at high stages.

Primary Sources of Scientific Information: The scientific underpinnings of these conclusions are extensive and substantial, including work by Smith and Renken (1990), Sidle and Kirsch (1993), Ziewitz et al. (1992), and Higgins and Brashier (1993), all of whom used sound, widely accepted, standard scientific methods. The committee also considered commentary presented in open sessions and written testimony exemplified by Lingle (G. Lingle, unpublished material, March 22, 2000) and Czaplewski et al. (M.M. Czaplewski et al., Central Platte Natural Resources District, unpublished material, August 22, 2003) that was critical of the research conducted by DOI agencies.

6. Do current habitat conditions in the lower Platte (below the mouth of the Elkhorn River) affect the likelihood of survival of the pallid sturgeon? Do they limit (adversely affect) its recovery?

Conclusions: Current habitat conditions on the lower Platte River (downstream of the mouth of the Elkhorn River) do not adversely affect the likelihood of survival and recovery of the pallid sturgeon because that reach of the river appears to retain several habitat characteristics apparently preferred by the species: a braided channel of shifting sandbars and islands; a sandy substrate; relatively warm, turbid waters; and a flow regime that is similar to conditions that were found in the upper Missouri River and its tributaries before the installation of large dams on the Missouri. Alterations of discharge patterns or channel features that modify those characteristics might irreparably alter this habitat for pallid sturgeon use. In addition, the lower Platte River is connected with a long undammed reach of the Missouri River, which allows access of the pallid sturgeon in the Platte River to other segments of the existing population. Channelization and damming of the Missouri River have depleted pallid sturgeon habitats throughout its former range, so the lower Platte may be even more important for its survival and recovery. The population of pallid sturgeon is so low in numbers, and habitat such as the lower Platte River that replicates the original undisturbed habitat of the species is so rare that the lower Platte River is pivotal in the management and recovery of the species.

Primary Sources of Scientific Information: Scientific studies supporting those conclusions are reported in numerous peer-reviewed publications, as exemplified by general research on the habitat of hatchery-derived pallid sturgeon in the lower Platte River by Snook (2001) and Snook et al. (2002). Carlson et al. (1985) and Kallemeyn (1983) provided useful background information. Additional investigations in the Missouri River system by Bramblett (1996) and Bramblett and White (2001) have results that are applicable to the lower Platte River. The committee also considered commentary presented in open sessions and written testimony exemplified by Czaplewski et al. (M.M. Czaplewski et al., Central Platte Natural Resources District, unpublished material, August 22, 2003) that was critical of the research conducted by DOI agencies.

7. Were the processes and methodologies used by the USFWS in developing its central Platte River instream-flow recommendations (i.e., species, annual pulse flows, and peak flows) scientifically valid?

Conclusions: The U.S. Fish and Wildlife Service (USFWS) used methods described in an extensive body of scientific and engineering literature. Reports of interagency working groups that addressed instream-flow recommendations cite more than 80 references that were in wide use and generally accepted in the river science and engineering community. The committee reviewed that information, as well as oral and written testimony critical of the research conducted by DOI agencies, and it concluded that the methods used during the calculations in the early 1990s were the most widely accepted at that time. Revisions were made as improved knowledge became available. Although the Instream Flow Incremental Method (IFIM) and Physical Habitat Simulation System (PHABSIM) were the best available science when DOI agencies reached their recommendations regarding instream flows, there are newer developments and approaches, and they should be internalized in DOI's decision processes for determining instream flows. The new approaches, centered on the river as an ecosystem rather than focused on individual species, are embodied in the concepts of the normative flow regime. Continued credibility of DOI instream-flow recommendations will depend on including the new approach.

The instream-flow recommendations rely on empirical and model-based approaches. Surveyed cross sections along the river provided DOI investigators with specific information on the morphology of the river and vegetation associated with the river's landforms. The portions of the cross sections likely to be inundated by flows of various depths were directly observed. Model calculations to simulate the dynamic interaction of water, geomorphology, and vegetation that formed habitat for species were handled with the prevailing standard software PHABSIM, which has seen wide use in other cases and has been accepted by the scientific community. The software was used by DOI researchers in a specific standard method, IFIM, which permits observations of the results as flow depths are incrementally increased.

The continuing DOI model developments, including the emerging SEDVEG model, are needed because of the braided, complex nature of the Platte River—a configuration that is unlike other streams to which existing models are often applied. The committee did not assess the newer models, because they have not yet been completed or tested, but it recommends that they be explored for their ability to improve decision making.

The committee also recognizes that there has been no substantial testing of the predictions resulting from DOI's previous modeling work,[1] and it recommends that calibration of the models be improved. Monitoring of the effects of recommended flows should be built into a continuing program of adaptive management to help to determine whether the recommendations are valid and to indicate further adjustments to the recommendations based on observations.

Primary Sources of Scientific Information: The literature used to support USFWS's methods ranged from basic textbook sources, such as Dunne and Leopold (1978) and Darby and Simon (1999), to specific applications exemplified by Simons & Associates, Inc. (2000) and Schumm (1998). The committee also considered the interagency working reports (Hydrology Work Group 1989; M. Zallen, DOI, unpublished memo, August 11, 1994) and oral and written testimony exemplified by Parsons (2003), Payne (1995; T.R. Payne and Associates, pers. comm., June 19, 2003), Woodward (2003), and Lewis (2003).

8. Are the characteristics described in the USFWS habitat suitability guidelines for the central Platte River supported by the existing science and are they (i.e., the habitat characteristics) essential to the survival of the listed avian species? To the recovery of those species? Are there other Platte River habitats that provide the same values that are essential to the survival of the listed avian species and their recovery?

Conclusions: The committee concluded that the habitat characteristics described in USFWS's habitat suitability guidelines for the central Platte River were supported by the science of the time of the original habitat description during the 1970s and 1980s and were consistent with accepted understanding of how the systems function. New ecological knowledge has since been developed. The new knowledge, largely from information gathered over the last 20 years, has not been systematically applied to the processes of designating or revising critical habitat, and the committee recommends that it be done.

The committee also concluded that suitable habitat characteristics along the central Platte River are essential to the survival and recovery of the piping plover and the interior least tern. No alternative habitat exists in the

[1]The committee did not consider USGS's in-progress evaluation of the models and data used by USFWS to set flow recommendations for whooping cranes.

central Platte that provides the same values essential to the survival and recovery of piping plovers and least terns. Although both species use artificial habitat (such as shoreline areas of Lake McConaughy and sandpits), the quality and availability of sites are unpredictable from year to year. The committee further concluded that suitable habitat for the whooping crane along the central Platte River is essential for its survival and recovery because such alternatives as the Rainwater Basin and other, smaller rivers are used only intermittently, are not dependable from one year to the next, and appear to be inferior to habitats offered by the central Platte River.

Primary Sources of Scientific Information: The committee relied on the following sources in reaching its conclusions: for whooping cranes, the original listing document, recovery plan, and declaration of critical habitat and Howe (1989), EA Engineering, Science and Technology, Inc. (1985), Austin and Richert (2001), and Lutey (2002); for interior least terns and piping plovers, the original listing documents, recovery plans, and declaration of critical habitat for the piping plover (Fed. Regist. 67 (176): 57638 [2002]), Smith and Renken (1990), Sidle and Kirsch (1993), Ziewitz et al. (1992), Ducey (1983), Faanes (1983), Higgins and Brashier (1993), Corn and Armbruster (1993), and Kirsch and Sidle (1999). The committee also considered commentary presented in open sessions and written testimony exemplified by Lingle (G. Lingle, unpublished material, March 22, 2000) and Czaplewski et al. (M.M. Czaplewski et al., Central Platte Natural Resources District, unpublished material, August 22, 2003) that was critical of the research conducted by DOI agencies.

9. *Are the conclusions of the Department of the Interior about the interrelationships of sediment, flow, vegetation, and channel morphology in the central Platte River supported by the existing science?*

Conclusions: The committee concluded that DOI conclusions about the interrelationships among sediment, flow, vegetation, and channel morphology in the central Platte River were supported by scientific theory, engineering practice, and data available at the time of those decisions. By the early 1990s, when DOI was reaching its conclusions, the community of geomorphologists concerned with dryland rivers had a general understanding of the role of fluctuating discharges in arranging the land forms of the channel, and DOI included this understanding in its conclusions about the river. In the early 1990s, engineering practice, combined with geomorphology and hydrology, commonly used IFIM and PHABSIM to make predictions and recommendations for flow patterns that shaped channels, and this resulted in adjustments in vegetation and habitat. In fact, despite some criticisms, IFIM and PHABSIM are still widely used in the professional community of river restorationists in 2004. In applying scientific theory and engineering practice, the DOI agencies used the most current data and made additional measurements to bolster the calculations and recommendations. Since the early 1990s, more data have become available, and the USBR has conducted considerable cutting-edge research on a new model (SEDVEG) that should update earlier calculations but is not yet in full operation (and was not reviewed by this committee).

Primary Sources of Scientific Information: Murphy et al. (2001) outline the basic understanding of sediment and vegetation dynamics. Sediment data are obtained by sampling sediment concentrations and multiplying the concentrations by discharges and duration. For flow, gaging records on the Platte River are 50 years in duration or longer, and they are in greater density than on many American rivers; the gages provide quality data on water discharge for the Platte River. Murphy and Randle (2003) review the analyses and other sources of knowledge about the flows that provide a sound basis for DOI decisions. In addition to the review by Murphy et al. (2001) concerning vegetation, several studies over the last 20 years have provided an explanation of vegetation dynamics that the committee found to be correct and that is the basis of DOI decisions. Early work by USFWS (1981a) and Currier (1982) set the stage for an evolution of understanding of vegetation change on the river that was later expanded by Johnson (1994). For channel morphology, there is a long history of widely respected research to draw on, including early geomorphologic investigations by Williams (1978) and Eschner et al. (1983), continuing with the reviews by Simons and Associates (2000), and culminating in recent work by Murphy and Randle (2003). The committee also considered commentary presented in open sessions and written testimony exemplified by Parsons (2003) and Lewis (2003) that was critical of the research conducted by DOI agencies.

10. What were the key information and data gaps that the NAS identified in the review?

Conclusions: The committee reached its conclusions for the preceding nine questions with reasonable confidence based on the scientific evidence available. However, the committee identified the following gaps in key information related to threatened and endangered species on the central and lower Platte River, and it recommends that they be addressed to provide improved scientific support for decision making.

• *A multiple-species perspective is missing from research and management of threatened and endangered species on the central and lower Platte River.* The interactions of the protected species with each other and with unprotected species are poorly known. Efforts to enhance one species may be detrimental to another species, but these connections remain largely unknown because research has been focused on single species. One approach is to shift from the focus on single species to an ecosystem perspective that emphasizes the integration of biotic and abiotic processes supporting a natural assemblage of species and habitats.

• *There is no systemwide, integrated operation plan or data-collection plan for the combined hydrological system in the North Platte, South Platte, and central Platte Rivers that can inform researchers and managers on issues that underlie threatened and endangered species conservation.* Natural and engineered variations in flows in one part of the basin have unknown effects on other parts of the basin, especially with respect to reservoir storage, groundwater storage, and river flows.

• *A lack of a full understanding of the geographic extent of the populations of imperiled species that inhabit the central Platte River and a lack of reliable information on their population sizes and dynamics limit our ability to use demographic models to predict accurately their fates under different land-management and water-use scenarios.* Detailed population viability analyses using the most recent data would improve understanding of the dynamics of the populations of at-risk species and would allow managers to explore a variety of options to learn about the probable outcomes of decisions. Continuation of population monitoring of at-risk bird species using the best available techniques, including color-banding of prefledged chicks and application of new telemetry techniques, is recommended.

• *There is no larger regional context for the central and lower Platte River in research and management.* Most of the research and decision making regarding threatened and endangered species in the Platte River Basin have restricted analysis to the basin itself, as though species used its habitats in isolation from other habitats outside the basin. There are substantial gaps in integrative scientific understanding of the connections between species that use the habitats of the central and lower Platte River and adjacent habitat areas, such as the Rainwater Basin of southern Nebraska and the Loup, Elkhorn, and Niobrara Rivers and other smaller northern Great Plains rivers.

The committee is confident that the central Platte River and lower Platte River are essential for the survival and recovery of the listed bird species and pallid sturgeon. However, in light of the habitat it provides and the perilously low numbers of the species, there is not enough information to assess the exact degree to which the Platte contributes to their survival and recovery.

• *Water-quality data are not integrated into knowledge about species responses to reservoir and groundwater management and are not integrated* *into habitat suitability guidelines*. Different waters are not necessarily equal, either from a human or a wildlife perspective, but there is little integration of water-quality data with physical or biological understanding of the habitats along the Platte River.

• *The cost effectiveness of conservation actions related to threatened and endangered species on the central and lower Platte River is not well known*. Neither the cost effectiveness nor the equitable allocation of measures for the benefit of Platte River species has been evaluated. The ESA does not impose or allow the implementing agencies to impose a cost-benefit test. Listed species must be protected no matter what the cost, unless the Endangered Species Committee grants an exemption. Cost effectiveness, however, is another matter. The ESA permits consideration of relative costs and benefits when choosing recovery actions, for example. USFWS has adopted a policy that calls for minimizing the social and economic costs of recovery actions, that is, of choosing actions that will provide the greatest benefit to the species at the lowest societal cost (Fed. Regist. 59: 3472 [1994]). In addition, persons asked to make economic sacrifices for the sake of listed species understandably want assurances that their efforts will provide some tangible benefit. In the Platte, the direct economic costs of measures taken for the benefit of species appear reasonably well understood. The biological benefits are another matter. For example, the costs of channel-clearing and other river-restoration measures are readily estimated. Their precise value for cranes is more difficult to estimate, although their general use is fairly well established.

The allocation of conservation costs and responsibility also has not been systematically evaluated. USFWS has concentrated its efforts to protect listed species in the Platte system on federal actions, such as the operation of federal water projects. That focus is understandable. Water projects with a federal nexus account for a large and highly visible proportion of diversions from the system. In addition, those actions may be more readily susceptible to regulatory control than others because they are subject to ESA Section 7 consultation. But some nonfederal actions also affect the species. Water users that depend on irrigation water from the federal projects may well feel that they are being asked to bear an inordinate proportion of the costs of recovering the system. A systematic inventory of all actions contributing to the decline of the species could help the parties to the cooperative agreement channel their recovery efforts efficiently and equitably. The National Research Council committee charged with evaluating ESA actions in the Klamath River Basin recently reached a similar conclusion (NRC 2004a).

• *The effects of prescribed flows on river morphology and riparian vegetation have not been assessed*. Adaptive-management principles require that the outcomes of a management strategy be assessed and monitored and that the strategy be adjusted accordingly, but there has been no reporting of the outcomes of the 2002 prescribed flow, no analysis of vegetation effects of managed flows, no measurement of their geomorphic effects, and no assessment of their economic costs or benefits.

- *The connections between surface water and groundwater are not well accounted for in research or decision making for the central and lower Platte River.* The dynamics of and connections between surface water and groundwater remain poorly known, but they are important for understanding river behavior and economic development that uses the groundwater resource. The effects of groundwater pumping, recently accelerated, are unknown but important for understanding river flows.
- *Some of the basic facts of issues regarding threatened and endangered species in the central and lower Platte River are in dispute because of unequal access to research sites.* Free access to all data sources is a basic tenet of sound science, but DOI agencies and Nebraska corporations managing water and electric power do not enter discussions about threatened and endangered species on the central and lower Platte River with the same datasets for species and physical environmental characteristics. USFWS personnel are not permitted to collect data on some privately owned lands. As a result, there are substantial gaps between data used by DOI and data used by the companies, and resolution is impossible without improved cooperation and equal access to measurement sites.
- *Important environmental factors are not being monitored.* Monitoring, consistent from time to time and place to place, supports good science and good decision making, but monitoring of many aspects of the issues regarding threatened and endangered species on the central and lower Platte River remains haphazard or absent. Important gaps in knowledge result from a lack of adequate monitoring of sediment mobility, the pallid sturgeon population, and movement of listed birds. Responses of channel morphology and vegetation communities to prescribed flows and vegetation removal remain poorly known because the same set of river cross sections is not sampled repeatedly. Groundwater may play an important role in flows, but groundwater pumping is not monitored.
- *Long-term (multidecadal) analysis of climatic influences has not been used to generate a basis for interpretation of short-term change (change over just a few years).* The exact interactions between climate and the system are poorly known because only short-term analyses of climate factors have been accomplished so far. In addition, the relative importance of human and climatic controls remains to be explicitly defined by researchers, even though such knowledge is important in planning river restoration for habitat purposes.
- *Direct human influences are likely to be much more important than climate in determining conditions for the threatened and endangered species*

of the central and lower Platte River. Potentially important localized controls on habitat for threatened and endangered species on the central and lower Platte River are likely to be related to urbanization, particularly near freeway exits and small cities and towns where housing is replacing other land uses more useful to the species. Off-road vehicle use threatens the nesting sites of piping plovers and interior least terns in many of the sandy reaches of the river. Sandy beaches and bars are inviting to both birds and recreationists. Illegal harvesting has unknown effects on the small remaining population of pallid sturgeon. In each of those cases, additional data are required to define the threats to the listed species.

SUMMARY

USFWS faces extraordinary challenges in trying to identify the habitat needs and the critical habitat for listed species on the central and lower Platte River. Lack of data, pressures of tight deadlines for research, lack of a well-defined adaptive-management strategy with effective monitoring, and competing uses for the river's water and landscape resources complicate decision making. Despite those challenges, the science that explains forms and processes of the ecosystems along the central and lower Platte River of Nebraska is sufficient to support many decisions about the management of threatened and endangered species that use the river's habitats. In all cases, enough is known about the physical environmental processes that control habitat change to make informed decisions for the survival of the whooping crane, piping plover, interior least tern, and pallid sturgeon. Our scientific knowledge is not yet adequate to contribute to decisions regarding the exact role of the central and lower Platte River in the recovery of the whooping crane and pallid sturgeon. Valid science supports critical habitat designations for the piping plover, but the scientific support of critical habitat designation for the whooping crane is weak. Valid science and engineering related to hydrology, geomorphology, sediment transport, and riparian ecology support the DOI instream-flow recommendations and explanations for the river-channel and vegetation changes. The committee found numerous gaps in knowledge that could inform management of threatened and endangered species along the central and lower Platte River, mostly focused on problems of scientific integration, overrestricted scales of analysis, lack of systemwide connections, and lack of standardized procedures for data collection.

Land, water, and life in the region surrounding the 100th meridian on the Platte River are highly changeable and precariously balanced. Human manipulations of hydrological conditions and land cover have far-reaching consequences for wildlife populations. Policy based on a desired constant, stable, and predictable set of environmental circumstances is unlikely to be successful. Policy that relies on scientific knowledge about change through time and over geographic space is the most likely avenue to success in the search for accommodation between economic vitality and diverse and sustainable populations of wildlife that are neither threatened nor endangered.

FISH AND WILDLIFE COORDINATION ACT REPORT: PLATTE RIVER RECOVERY IMPLEMENTATION PROGRAM

Fish and Wildlife Coordination Act Report:
Platte River Recovery Implementation Program

Final Report

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Final FWCA Report: Platte River Program

EXECUTIVE SUMMARY

This report analyzes the effects of the proposed Platte River Recovery Implementation Program (Program) on fish and wildlife resources within the mainstem Platte River in Nebraska, Wyoming and Colorado. Analysis relies extensively on output of the North Platte River Water Utilization Model (NPRWUM) developed by the U. S. Bureau of Reclamation. Letters of concurrence from state game and fish agencies are found in Appendix D.

In Nebrasaka, the analysis indicates that Program components will impact fish and wildlife resources of concern along the North and Central Platte Rivers. Program related impacts likely will be both beneficial and detrimental. Measures needed to avoid, minimize, and/or mitigate Program impacts have been identified for several resources of concern, including: 1) Lake McConaughy/Ogallala fisheries, 2) resources affected by channel restoration and flow consolidation activities, and 3) resources affected by wetland conversion. Identifying details of impacts will require monitoring and research during Program implementation for some resources, including: 1) sandhill crane, 2) waterfowl/waterbird species, and 3) the finescale dace and northern redbelley dace. As Program related impacts are identified, measures to avoid, minimize, and/or mitigate impacts will be provided as amendments to this report.

In Wyoming, analysis indicates that there likely will be significant impacts to the aquatic resources in the North Platte River episodically. Modeling predicts that over the 48-year period of record analyzed the fishery would be lost once at Seminoe Reservoir and lost twice at Pathfinder Reservoir from Program related impacts. A Morphoedaphic Index Analysis suggests that Seminoe could experience substantial impacts to fishery production particularly during years of low reservoir levels. Modeling for Pathfinder and its downstream fishery indicates temperatures should remain suitable for coldwater fish during critical years and showed little difference exists in temperatures of reservoir surface and bottom for the Program and Present Conditions. Modeling indicates a lower probability that the hypolimnion will contain adequate dissolved oxygen during the late summer suitable to coldwater fishes under the Program compared with Present Conditions, and that there would likely be an adverse effect on the fishery in Pathfinder and Seminoe Reservoirs due to stress related to low DO levels. Details of research, monitoring, and mitigation for Wyoming resources are provided.

In Colorado, the Tamarack projects will provide Colorado the opportunity to supplement flows to the Platte River system that will likely produce benefits for declining native species in Colorado as well as Program target species in Nebraska. Enhancing and/or maintaining habitat for native Colorado fish species during the annual April-September shortfall in the South Platte is presumed and should be a priority in evaluating potential resource impacts during the Program's first increment. The impact of a reach or landscape application of pumped-pond recharge systems on main-channel and tributary habitats and fish populations are the primary conservation concern, and should be evaluated on the reach-wide or larger scale. Recommendations concerning research, monitoring and other activities are provided.

INTRODUCTION

The Department of the Interior (DOI), in cooperation with the states of Nebraska, Colorado, and Wyoming, proposes to implement a program of research and management of water and lands in the Platte River basin: the proposed Platte River Recovery Implementation Program (Program). This Program will benefit the federally listed endangered whooping crane (*Grus americana*), least tern (*Sterna antillarum*), and pallid sturgeon (*Scaphirhynchus albus*), and threatened piping plover (*Charadrius melodus*), collectively the "target species," and designated critical habitat in the central Platte River in Nebraska (Cooperative Agreement 1997).

The Fish and Wildlife Coordination Act (FWCA; 48 Stat. 401 as amended; 16 U.S.C. 661 *et seq.*) provides a basic procedural framework for the orderly consideration of fish and wildlife conservation measures in Federal and federally permitted or licensed water development projects. According to Section 2 (a) of the FWCA, whenever any water body is proposed to be controlled or modified for any purpose by a Federal agency or by any public or private agency under a Federal permit or license, that Federal agency is required first to consult with the wildlife agency (i.e., Service or head of state fish and wildlife agency as specified under FWCA) with a view to the conservation of fish and wildlife resources in connection with that project.

This FWCA Report was prepared by the Service under authority and in accordance with requirements of Section 2(b) of the FWCA to assist the Service and BOR as the lead federal agencies, in coordination with respective state game and fish agencies, in the conservation of fish and wildlife resources in Nebraska, Wyoming, and Colorado. This report analyzes the effects of the Program, identified as Governance Committee (GC) Alternative in the Final Environmental Impact Statement for the Program, on fish and wildlife resources for each state within the mainstem Platte River. Where adverse effects are identified, mitigation recommendations are provided. Because this Program consists of many parts, including water management and conservation projects as yet undescribed, the Service and DOI will provide site-specific comments under authority of FWCA on all future activities carried out to further the objectives of the Program.

Specific mitigation and monitoring recommendations made at the end of this report are the product of Service biologists working in coordination with respective state fish and wildlife agency biologists. These recommendations are not part of the proposed Program being analyzed by this report. Recommendations are based on the best available scientific information available at the time during which this report was prepared. As stated in the *Discussion and Recommendations* section of this report, the Service strongly recommends an adaptive approach to research, monitoring, and mitigation associated with Program implementation. This approach is necessary to accommodate field logistics and unforeseen circumstances. This includes the possibility that mitigation recommendations may need to be modified based on new findings.

This report does not address the site-specific impacts associated with construction and implementation of individual land and water components of the Program. If an alternative is implemented, specific land and water actions will be required which may have local environmental and other impacts. These impacts will be addressed in a subsequent FWCA analysis and document. All elements of the Water Action Plan described below, for example, will undergo site-specific impact analysis and may subsequently be modified.

DESCRIPTION OF THE PROGRAM AREA

NEBRASKA

The area of impact includes river channel, wet meadow, accretion woodland, grassland, and cropland habitats. Specific impacts of the Program on these habitats will be discussed. Fertile, alluvial soils cover the broad, flat Platte River valley and overlie thick layers of deposited sand and gravel that contain the Ogallala aquifer. Features of the channel prior to development can be characterized as a wide, shallow, braided river. The bed form consisted of continually shifting sandbars, and the median diameter of sand grains was approximately 0.41mm. Peak flows are estimated to have been 15,000 to 45,000 cubic feet per second (cfs), averaging 16,000 cfs based on pre-1930 data (Simons and Associates 2000).

The elimination of wildfires and buffalo, and reductions in scouring flows have allowed woody vegetation to become established in significant portions of the river channel and floodplain which were active prior to settlement (Simons and Associates 2000). Despite controversy regarding the extent to which woody vegetation existed along the Platte River prior to settlement, areas which were known to be open, active channel, are now forested islands or inactive floodplain. After a thorough review of historical records, Simons and Associates (2000) concluded that some forested islands did exist prior to settlement, and to a lesser degree, the river banks would have had some woody vegetation also. However, they also pointed out that historical river widths were much greater, therefore even if some islands were forested, there would still have been extensive reaches of wide active channel. They further estimated that this vegetation would only have occupied 10 percent of the total channel width.

Accounts by early settlers included bank to bank measurements ranging from 5,280 to 10,566 feet (one to two miles). Bank to bank width 25 miles downstream of Grand Island in 1983 was documented to be 6,600 feet. Likewise, wide widths (~5,280 feet) also were documented just below the confluence of the North and South Platte rivers (Eschner et al. 1983, Simons and Associates 2000).

Flows are usually highest in the spring due to snowmelt and rainfall runoff, and decrease during summer due to upstream irrigation diversions and decreased runoff (Hurr 1983). Water in the alluvial aquifer is in hydrologic connection with the river when there are flows in the river. Groundwater levels are controlled by the presence and altitude of the adjacent river. Changes in river stage can change the direction of local groundwater flows. A high river stage correlates with groundwater flows perpendicular to the adjacent river channel, while groundwater flows are more parallel to the river when the river stage is low. Regardless of river stage, water flows from the river into the aquifer (Hurr 1983). Groundwater levels are generally lower beneath islands and adjacent land as a result of evapotranspiration by riparian vegetation, natural flow away from the Platte River to other rivers, and from groundwater withdrawals by wells adjacent to the river (Hurr 1983).

The principal wetland resources within the affected area are riverine and associated floodplain wetlands. Current physical restoration efforts such as those conducted by the Service's Partners for Fish and Wildlife program attempt to reverse degradation by means of physically clearing vegetation. This and similar restoration efforts aimed at physically turning the clock back with heavy machinery are likely to continue.

Due to low moisture levels and less favorable soil characteristics, grasses on the upland prairies tend toward short and midgrass species compared to the taller grasses of the lowland prairies. Predominant species are blue grama (*Bouteloua gracilis)* and buffalo grass *(Buchloe dactyloides)* with some little bluestem *(Andropogon scoparius)*, western wheatgrass *(Agropyron smithii),* sedges *(Carex spp.),* downy brome *(Bromus tectorum)*, and six-week fescue *(Festuca octoflora)* (USFWS 1989).

WYOMING

The North Platte River Basin is the largest drainage basin in Wyoming, covering more than 22,000 square miles, while the South Platte River Basin is represented by small tributaries in Laramie and Albany counties (U.S. Geological Survey 2000). The headwaters of the North Platte River originate along the Continental Divide within the Medicine Bow Mountains of northern Colorado. Elevation ranges from over 12,000 feet on Medicine Bow Peak to less than 4,100 feet where the North Platte River leaves Wyoming and flows into Nebraska.

Climate in the North Platte River basin is continental, with highly variable temperature and precipitation on a seasonal, elevational and topographical basis. The mountains receive high precipitation (often over 40 inches) in the form of winter snows, while the surrounding plains receive 12-18 inches of precipitation annually. Wind is common and occasionally strong.

Important sub-drainages include the Medicine Bow, Sweetwater, and Laramie Rivers. The North Platte River is impounded by several large federal water projects (Table 1) that provide water for agriculture, industrial and municipal supply, flood storage, instream flow for fish and wildlife, and recreational uses. Additionally, there is one trans-basin diversion in Wyoming: the Cheyenne Stage II Water Supply Project that diverts water from the Little Snake River in the Colorado River Basin into the North Platte Basin via the Encampment River.

Table 1. Construction and storage capacity of water development on the North Platte River in Wyoming, Upstream to Downstream (U.S. Department of Interior, 1981).

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Reservoir	Construction Dates	Storage in Acre-Feet
Seminoe (Kendrick Project)	1936-39	1,017,280
Kortes (PSMB)[1]	1946-51	4,700, all active[2]
Pathfinder (North Platte Project)	1905-09	1,016,000
Alcova (Kendrick Project)	1936-39	184,295
Gray Reef (PSMB)	1959-61	1,800, all active
Glendo (PSMB)	1954-58	789,000 - some restorage
Guernsey (North Platte Project)	1925-27	73,810

[1] Pick-Sloan Missouri Basin Project
[2] *Active* means large pool fluctuations occur daily or weekly for power or re-regulation functions rather than seasonally for irrigation or flood storage

Native plant communities are found throughout the drainage. Upland vegetation includes alpine tundra, high elevation conifer, low elevation conifer, sagebrush grassland, and shortgrass prairie. Wetland types include seasonal playas, scrub-shrub, palustrine emergent wetlands, and wet meadows often associated with extensive cottonwood and willow stands along riparian corridors. Irrigation allows cultivation of large areas, predominantly native hay and alfalfa upstream of Casper, with increasing amounts of row crops downstream. The North Platte valley below Guernsey Reservoir and the Laramie River valley near Wheatland benefit from the large irrigation facilities on the North Platte River, producing a large percentage of Wyoming's corn, sugar beets, and dry beans. Dry land wheat farming occurs in Platte, Goshen, and Laramie counties. Major cities and towns in the Platte River Basin include Casper, Cheyenne, Laramie, Douglas, Torrington, Wheatland, Saratoga, and Rawlins.

COLORADO

The South Platte River originates along the Continental Divide in the Front Range of the Rocky Mountains around the valley of South Park, Colorado. It flows generally northeastward from its headwaters through the Denver metropolitan area continuing northeast through Colorado, and into the State of Nebraska near the town of Julesburg in Sedgwick County, Colorado. The elevation of the river ranges from more that 14,000 feet to 3,450 feet where the South Platte leaves Colorado and flows into Nebraska.

The climate in the South Platte River basin is continental with highly variable seasonal temperatures and precipitation. The mountains receive the majority of the precipitation, often in the form of winter snowpack (often over 40 inches), while the lower reaches receive an average of 13-19 inches of precipitation (Berry 1959).

Native plant communities found throughout the drainage include alpine tundra, high and low elevation conifer, sagebrush grassland and shortgrass prairie. Along the lower reaches, open and closed cottonwood stands, mixed cottonwood stands, willow stands, wetlands, and salt meadows are common along the river.

Tamarack Ranch State Wildlife Area (TRSWA) and Pony Express State Wildlife Area (PESWA), where the footprint of a major component of the Program in Colorado will be, are located in extreme northeastern Colorado in the valley of the South Platte River. The surface geology is dominated by sedimentary rocks of the Tertiary age including the White River Formation (sandstone and claystone), Ogallala Formation (sands and gravels), and Arikaree Formation (sandstone) (Madole 1995). The valley bottom is characterized by recent alluvium associated with the South Platte River, while uplands immediately adjacent to the river exhibit sand dunes and sand sheets (Madole 1995). Stabilized and semi-stabilized dunes dominate the area. The elevation at TRSWA ranges from 3660 feet along the river to 4000 feet in the uplands.

The vegetation in the State Wildlife Areas is a shortgrass prairie association bordering on riparian woodland. Shortgrass prairie species at the site include: blue grama, sideoats grama, western wheatgrass, big and little bluestem, switch grass, Indian ricegrass, prairie sandreed, needle-and-thread, low sage, prickly pear, narrow-leaf yucca, thistle, Russian thistle (non-native), sand cherry, milkweed, sunflower, evening-star, and other forbs (Colorado Division of Wildlife 1998).

PROPOSED ACTION: Platte River Recovery Implementation Program

Long Term Goal

The Program's long-term goal is to improve and maintain the associated habitats. This goal includes: (1) improving and maintaining migrational habitat for whooping cranes, and reproductive habitat for least terns and piping plovers; (2) reducing the likelihood of future listings of other species found in this area; and (3) testing the assumption that managing flow in the Central Platte River also improves the pallid sturgeon's lower Platte River habitat.

First Increment Objectives

DOI and the states commit to achieving the following objectives by the end of the First Increment of the Program:

(1) Improving the occurrence of Platte River flows in the Central Platte associated habitats relative to the present occurrence of species and annual pulse target flows (hereinafter referred to as "reducing shortages to the target flows") by an average of 130,000 to 150,000 acre-feet per year at Grand Island, through reregulation and water conservation/supply projects. DOI and the states agree that the FWS' target flows are subject to Program Adaptive Management and peer review and may be modified by FWS accordingly. DOI and the states have agreed, however,

that during the First Increment, species and annual pulse target flows serve as an initial reference point for determining periods of excess and shortage in the operation of Program reregulation and water conservation/supply projects.

(2) Protecting, restoring where appropriate, and maintaining at least 10,000 acres of habitat in the Central Platte River area between Lexington and Chapman, Nebraska. The Governance Committee may agree to undertake, fund or give credit for land activities outside this area to provide biological benefits to the target species.

Program Elements

In order to achieve the objectives for the First Increment, the Program has three elements: (1) increasing flows in the Central Platte River during relevant time periods through re-regulation and water conservation/supply projects; (2) enhancing, restoring, and protecting habitat lands for the target species; and (3) accommodating new water related activities in a manner consistent with long-term Program goals.

The signatories to the Cooperative Agreement agreed to three primary components for the Program's first element involving the increase in flows to the Central Platte River: (1) flow regulation, (2) a Water Action Plan, and (3) modifications to the Kingsley Environmental Account (EA) management. The flow regulation component involves one element contributed by each of the three states; the Water Action Plan involves eight elements for Nebraska, four elements for Wyoming, and one element for Colorado; and EA management modifications include pulse flows.

Flow Regulation

As part of the Cooperative Agreement, each state will contribute one element towards meeting water supply goals: the Pathfinder Dam Modification, the Lake McConaughy Environmental Account, and the Tamarack River Re-regulation Plan. Together, these projects provide approximately 70,000 af of improvement in target flows to the habitat area.

1) *Pathfinder Enlargement*: Restore the original storage capacity of Pathfinder Reservoir in Wyoming and dedicate a portion of this storage capacity to the Program. Pathfinder Dam is located on the North Platte River about 3 miles below the confluence with the Sweetwater River and about 47 miles southwest of Casper, Wyoming. Pathfinder Dam was completed in 1909 and is operated by the U.S. Bureau of Reclamation (USBR). Since construction, accumulated sediment has reduced the reservoir's original storage capacity from 1,070,00 to 1,016,507 af– a loss of 53,493 af. The Pathfinder Dam Modification Project would raise the dam and restore this lost storage capacity. This restored capacity would be filled with water as indicated under the existing 1904 storage right for Pathfinder Reservoir with the exception that, other than the

Kendrick Project (Seminoe storage), regulatory calls could not be placed on existing water rights upstream of Pathfinder Reservoir to fill this space.

The Pathfinder Modification Project will serve both environmental and municipal uses. An environmental account of 34,000 af of storage space will be operated for endangered species and habitat that support these species in central Nebraska in accordance with conditions described in the Cooperative Agreement. This storage space will yield approximately 25,000 af of storage on an average annual basis for program environmental purposes. A municipal account of 20,000 af of storage space will provide municipal water to North Platte communities in Wyoming through contracts between the municipalities and the state of Wyoming.

2) *Kingsley Environmental Account*: Establish and operate an environmental water account in Lake McConaughy, Nebraska. The Kingsley EA is a space in Lake McConaughy that accrues water for release for Program purposes. Water for the EA will accrue from all three states including water from Wyoming's Pathfinder Modification Project Environmental Account. All three states contribute additional waters through the Water Action Plan.

Water from the Pathfinder Environmental Account will be moved downstream to the Kingsley EA from late in the irrigation season to October 1 to avoid lost storage opportunity due to the state's one-fill rule, and benefit from the gaining nature of the river between Guernsey Dam and Lake McConaughy in that season. Because of the interrelated nature of the North Platte Project operations, this water is likely to be low in the system, in Glendo or Guernsey, by the time it is released to the Kingsley EA rather than in Pathfinder itself.

Management of the EA waters is the responsibility of the Service. Each year the Service will develop an annual operating plan describing the anticipated approach to releasing waters from the EA to benefit the target species downstream. The Service will be advised by an EA Committee comprised of representatives from the Nebraska Power Districts (District), involved federal and state agencies, and environmental groups. Releases from the EA are coordinated with the Districts' operation of Lake McConaughy.

EA releases will vary with conditions on an annual and short-term basis. This is because the estimated target flow shortages and the amount of water available in the EA can vary from month to month. However, the EA is operated generally to improve attainment of target flows within operational and institutional constraints and in a manner that will avoid or minimize impacts to other fish and wildlife resources of the North Platte River. Actual construction and operation of the Pathfinder Modification will require future project-specific National Environmental Policy Act (NEPA) review, and the Service will have the opportunity, under the authority of FWCA, to provide more detailed mitigation recommendations based on review of the detailed site-specific plan.

3) *Tamarack Plan (Phase I)*: Develop a groundwater recharge and river re-regulation project along the South Platte River within the approximate 40 mile length above the Colorado-

Nebraska State line. Major components of the Tamarack Plan will be constructed on the TRSWA and the PESWA, which are owned by the Colorado Division of Wildlife (CDOW). In addition to the project features constructed on the State Wildlife Areas, other components of the Tamarack Plan will be constructed on private property. During Phase I, the Tamarack Plan would divert an average of approximately 30,000 af per year of the South Platte flows for re-timing of riverflows to offset shortages. Colorado would coordinate operation of the Tamarack Plan in consultation with the Lake McConaughy EA Manager. The Tamarack Phase I project is credited under the Cooperative Agreement with reducing shortages to target flows at Grand Island by 10,000 af on an average annual basis.

<u>Water Action Plan</u>

The purpose of the Water Action Plan (WAP) is to provide 50,000 to 70,000 af of the first increment goal of 130,000 to 150,000 af of target flow improvements through water conservation and supply options. It is recognized by the members of the WAP Committee that some changes to the plan may be required prior to implementation. For example, some projects may be found, upon more detailed study, to be infeasible. The states have committed to providing substitute projects, if necessary, to meet the overall goals of the WAP. As project specific actions are proposed and environmental impacts disclosed, the Service reserves the right under FWCA to provide site specific analyses and mitigation recommendations.

Nebraska Component of WAP

1) Off-stream Reservoir in Central Platte: Six possible sites have been identified for offstream storage reservoirs located between Brady and Lexington, Nebraska. Excess flows from the Central Nebraska Public Power and Irrigation District (CNPPID) canal would be stored and later released back to the Platte during times advantageous to federally listed species. Ideally, target flows would be improved by a total of 14,000 af, half of which will be used by the state of Nebraska to offset future depletions.

2) Water Leasing in Lake McConaughy: Willing farmers with water storage rights in Lake McConaughy would have the opportunity to lease some of their water to the Program. Ideally, storage rights would be obtained to yield an improvement in target flows of 7,000 af.

3) Water Management Incentives in Lake McConaughy: Incentives would include paying willing farmers with water storage rights in Lake McConaughy to adopt water conservation measures (e.g., fallow farming and improving irrigation technology). The goal is an improvement in target flows of 7,000 af.

4) Groundwater Management in the Groundwater Mound: Additional groundwater management in the high groundwater area south of the Central Platte River. Possibilities include: 1) pumping water from the mound into tributaries to the Platte; 2) paying willing farmers to dry-land farm every other year and using their reservoir storage in Lake McConaughy for the Program; 3) paying willing farmers to use groundwater instead of their storage in Lake McConaughy, which

would then be allocated to the Program; and 4) using water from CNPPID canals to recharge the groundwater mound in the fall and winter, then pumping this water from the mound during the irrigation season.

5) Dry Creek/Fort Kearny, Nebraska,Cutoffs: Two options include: 1) a cutoff from Lost Creek to North Dry Creek, and 2) a cutoff from Lost Creek to the Fort Kearney Improvement Project area. An estimated 2,200 af of water could be released annually from Funk Lagoon to the Platte River habitat area.

6) Dawson and Gothenburg Canal Groundwater Recharge: The Dawson and Gothenburg Canals divert water from the Central Platte just upstream of the habitat area. This option involves diverting river flows into the canals outside of the irrigation season, when river flows exceed target flows. The water would then be returned to the river over the course of several years--approximately 9 years, thereby accruing benefits to the Program during the first increment. The diversions would be approximately 14,000 and 19,000 af to the Dawson and Gothenburg Canals, respectively. This would provide an estimated additional 2,600 af per year to target flows, of which 1,600 af would be allocated to the Program.

7) Central Platte Power Interference at Central and Nebraska Public Power District (NPPD) Canals: This option involves paying the Districts to modify scheduled water releases- typically timed to meet irrigation and hydropower demands- to shift some return flows from hydropower during periods of excess water availability to target flows. This could improve target flows by and estimated 1,400 af.

8) Net Controllable Conserved Water from CNPPID: Includes various conservation measures to reduce total diversions of CNPPID from the Platte River based on an agreement with the National Wildlife Federation and a grant agreement with USBR. Conservation measures include: 1) revised operations for Elwood Reservoir to minimize seepage; 2) pipeline installation, earth compaction, membrane lining and other canal improvements; and 3) on-farm irrigation system improvements. An estimated 5,000 af annually could be made available to the Program.

Wyoming Component of WAP

1) Pathfinder Modification Municipal Account: The modification to Pathfinder Dam to restore the original storage capacity of the reservoir yields an additional 34,000 af of storage space for a Program environmental account, and a 20,000 af storage space for a state of Wyoming municipal water supply account. The municipal account is intended for supplying North Platte communities as their water needs increase. The account provides a firm annual water yield of 9,600 af. Currently, the demand for additional municipal water is less than 9,600 af. Under this element, the state of Wyoming would sell to the Program an average of 4,800 af annually.

2) Glendo Reservoir Storage: The state of Wyoming would make available to the Program an average of 2,650 af annually from Wyoming's share of Glendo Reservoir storage that is not currently under long-term contract.

3) Wyoming Water Leasing: The state of Wyoming would establish an incentive program for Wyoming irrigators to make temporary lease of their storage rights to the Program. The goal for this element is to lease approximately 16,500 af annually. The Program would obtain control of the amount corresponding to consumptive use of this water, or approximately 8,200 af. Participants in the leasing program would change over time. Waters would likely come from several of the Wyoming North Platte River reservoirs.

4) La Prele Reservoir Water Leasing: The Panhandle Eastern Pipeline Company (PEPL), which holds rights to 5,000 af of storage space in La Prele Reservoir, would lease the space to the Program. The average annual yield from this space is estimated at 1,865 af.

Colorado Component of WAP

Tamarack Plan (Phase III): Expansion of the Tamarack Plan involving a mix of several projects. The potential projects include groundwater recharge management on public and private lands and acquisition of water previously developed by private individuals and ditch and reservoir companies from approximately Ft. Morgan, Colorado, to the Nebraska State line. The actual location of Phase III facilities as of the date of this FWCA report have not been determined. However, most activities would likely occur within three miles of the South Platte River. Contributions toward meeting target flows are estimated at 17,000 af annually. Physical actions would be similar to those employed under Phase I: pumping of water from alluvial wells near the river and piping these waters to recharge ponds; or diverting additional water into existing canals to increase groundwater recharge.

<u>Land Restoration and Management</u>

Habitat protection and management are divided into two general categories: habitat complexes and non-complex habitat. Some of the lands acquired or managed by the Program will already approximate the habitat characteristics described in tables 3-1 and 3-2 in the Platte River Recovery Implementation Program Final Environmental Impact Statement (FEIS). In these cases, little restoration will be required, and management will focus on protecting and maintaining those habitat qualities, through efforts such as controlling disturbance factors, controlling weeds and other invasive plants, promoting desirable plant communities, and other measures.

Where Program lands do not approximate the desired habitat qualities, efforts will be undertaken, within the resources of the Program and within the capacities of the specific lands, to restore habitat to more closely approximate the characteristics in tables 3-1 and 3-2.

Habitat complexes along the Central Platte River would meet needs of the whooping cranes, terns, and plovers, as described in chapter 2, "History of Habitat Use and Habitat Trends for the Target Species." Habitat complexes include areas of wide and long unobstructed channel, with unvegetated sandbars providing adequate roost security for whooping cranes and nesting habitat for terns and plovers. Habitat complexes also include wet meadow areas near the river for crane foraging, loafing, and courtship. Complexes include lands that, while they are not channel roost area or wet meadows, provide important "buffer" from other sources of disturbance (e.g., roads, dwellings). Characteristics for each component are summarized from the Land Action Plan in table 3-1.

Non-complex habitat is land that, while not approximating the characteristics summarized in table 3-1, provides demonstrable benefits to the species. These habitats include gravel mine sandpits that are, or could be, managed as nesting areas for terns and plovers, and small wet meadows or wetlands that may provide foraging or roosting habitat for cranes. Characteristics are summarized in table 3-2.

1) *Channel Restoration*

Restoration of channel habitat includes both clearing vegetation from islands and banks and lowering the elevation of cleared islands to improve open view in the channel and to return island sand back to the river. Vegetation clearing and discing on banks and islands to improve sight distance across and along the river and to create roosting and nesting opportunities. Lowering elevation of vegetated islands to improve sight distance and create sandbars. Sand from these islands is moved back into the river channel to help offset the downcutting of the river in the habitat reach. Moving river sand from islands back into the river channel to offset ongoing erosion of the channel and support formation of new sandbars.

2) *Flow Consolidation*

Flow consolidation raises the streampower in the main channel and shifts the plan form closer to a braided condition. It is estimated that this restoration approach can convert an anastomosed reach to a sustainable braided reach for a distance of several miles, and the braided river would have a width ranging from 600 to 800 feet. Several different approaches to converging flows in the overwide river corridor could be used. Two methods are low sand dikes (approximately 3 feet) constructed either perpendicular to the river at approximately 1 mile spacing, or as levees parallel to the river but set-back a distance to create, at most, a reduction to one-half the existing river corridor.

3) Nonchannel Restoration

Nonchannel restoration activities include removing trees and shrubs, seeding with native plant species, restoring swales and sloughs, and augmenting water supplies for wet meadows from existing drains or wells. Habitat maintenance activities include haying, grazing, and prescribed burns. Other actions to reduce disturbance include but are not limited to screening roads, and relocating structures and access points.

4) Non-complex Habitat
Non-complex habitat enhancement activities would include controlling vegetation to maintain open sandy areas, controlling predators to reduce predation of nests, and reducing human disturbance.

ADDITIONAL ELEMENTS OF THE RECOVERY IMPLEMENTATION PROGRAM

Kingsley EA management includes vegetation clearing pulse flows. Vegetation clearing pulse flows require release of a short duration flow with the purpose of scouring new seedling vegetation from the river channel to help maintain a more open channel providing river roost and nest habitat. The goal is to produce, combined with natural flows, a 2-3 three day flow at Lexington, Nebraska, of 8,000 to 10,000 cfs in late May or early June. The aim is to have pulse flows on an annual basis if possible.

The Program contains the following elements:

- Willing buyer, Willing seller/lessor: No condemnation of land or water rights will occur.

- Incremental Approach: The Program will be implemented incrementally. Only the first increment of the initial 13 years is under review at this time.

- Water Sources: The three initial State projects (Pathfinder Modification, Lake McConaughy Environmental Account, and Tamarack Phase I) provide the basic water supply of an estimated average annual supply of 80,000 af. The Water Action Plan contains thirteen water supply and conservation projects and activities to supply an additional average of 50,000 to 70,000 af per year of improvement toward meeting target flows.

- Tracking and Accounting: Methods of tracking and accounting of Water will be implemented by each state.

- New Depletions: Each state will develop and implement means to track and offset effects of new and expanded (post-July 1, 1997) water-related activities resulting in water depletions to species and annual pulse flow targets.

- Water development: Any water development by any Program would be managed to improve habitat conditions for the target species.

- Land Habitat: Provisions for land acquisition to achieve habitat goals for the target species. Cottonwood Ranch and the Wyoming Property are two tracts that have already been designated for inclusion in the Program.

- Pallid Sturgeon: Program includes a process to provide benefits for the pallid sturgeon during the first increment.

- Program would utilize the Adaptive Management process to guide Program implementation.

- Program would utilize the Integrated Monitoring and Research Plan (IMRP)

- All land management will be in accordance with a "Good Neighbor Policy" and other policies.

- Program land interests primarily upstream of Kearney, where little suitable habitat remains. Therefore, emphasis in the Program is placed upon habitat restoration.

- Restoration efforts in the channel will include both clearing of vegetation from islands and banks, and lowering the elevation of cleared island to improve open view and return sand back to the river. Sand augmentation and flow convergence are components of this alternative.

- Measures will be taken to increase the safe channel capacity of the North Platte River at North Platte to 3,000 cfs.

- To reduce conflicts between Environmental Account releases and irrigation water moving through this reach in the summer, water leasing in Nebraska will be focused downstream of North Platte to reduce peak irrigation demand by 500 cfs.

- The capacity to create short-term pulse flows in the habitat area is increased by using various facilities in the CNPPID and NPPD system (Lake Maloney, Johnson Lake, and Plum Creek Lake) to store and release a 2-day pulse from the Jeffery and Johnson-2 canal returns.

- Within the river channel, a roughly 500 acres of wooded islands would be cleared and leveled to create potential roost and nest sites for the target avian species.

Methods

North Platte River Water Utilization Model

Analysis of Program aquatic impacts relies extensively on output of the North Platte River Water Utilization Model (NPRWUM) as modified to describe the effects of the Program. This model was first developed by the USBR Wyoming Area Office to study the effects of North Platte Reservoir operation on the target species in Nebraska.

Output includes elevation and outflow at mainstem North Platte River reservoirs in Wyoming and Nebraska, as well as flow data at several gages throughout the Platte Basin. Model output for the Program and the Present Condition were provided by the Platte River Program EIS Office, Lakewood, Colorado. The model employs a monthly time step, providing output in terms of average monthly values. This places constraints on the types of comparisons that can be made between fish and wildlife resources with and without the Program.

For input, USBR used a 48-year period of record from 1947 to 1994. Comparisons were made to the Present Condition model run, applying the hydrology for the period of record to all current water uses on the system. Importantly, this differs markedly from the historical condition because significant water development has occurred since 1947. Therefore, comparisons between historical conditions and the Present Condition regarding fish and wildlife response must be made with caution.

Resource Categorization

The Service's mitigation Policy (46 FR 7544-7663) provided guidance to determine the value of important fish and wildlife habitats which could be affected by the Program, and to recommend mitigation measures to offset identified adverse effects. The policy allows federal action agencies and private and state entities to anticipate Service recommendations and plan for mitigation measures early, avoiding delays and ensuring equal consideration of fish and wildlife resources with other objectives. The policy provides guidance for Service personnel but variations appropriate to individual circumstances are permitted.

The Service has prioritized mitigation measures in the following order of preference: 1) avoidance, 2) minimization, and 3) restoration of impacts. For definitions, see the Council on Environmental Quality's National Environmental Policy Act Regulations (40 CFR 1508.20). Consistent with this policy, the Service designated habitats as one of four Resource Categories for which there are planning goals and guidelines in the policy:

Resource Category 1 - habitat has high value for evaluation species and is unique and irreplaceable on a national or eco-regional basis. Mitigation goal is no loss of existing habitat value.

Resource Category 2 - habitat has high value for evaluation species and is relatively scarce or becoming scarce on a national or eco-regional basis. Mitigation goal is no net loss of in-kind habitat value.

Resource Category 3 - habitat has high to medium value for evaluation species and is relatively abundant on a national basis. Mitigation goal is no net loss of habitat value while minimizing loss of in-kind habitat value.

Resource Category 4 - habitat has medium to low value for evaluation species. Mitigation goal is to minimize loss of habitat value.

Surface Cover Types

Surface cover type acreages were obtained in the central Platte River using aerial photographs taken in 1998 which included all lands within 3.5 miles on both sides of the river from River Mile 254.0 to River Mile 150.0. A river-centered flight line was flown west to east to capture the entire seven-mile-wide Platte River corridor between Lexington and Chapman, Nebraska. The flight line was flown and photos taken on August 19 and 24, 1998, at 1:24,000-scale. Platte River flows at the time of aerial photography was between 325 (cfs) at the Overton, NE gauge and 1,030 cfs at the Grand Island, NE gauging station. Color-infrared digital and hardcopy orthophotos were specially produced for this project.

A field survey was conducted during the summer of 1999, and focused on describing the non-agricultural vegetation sufficiently to meet the National Vegetation Classification Standard (NVCS) (Butler 1999, TNC-ESRI 1994). Methods used to classify the vegetation of the Central Platte River valley were based on a modification of the standards presented in Field Methods for Vegetation Mapping (TNC-ESRI 1994). Modifications were necessary because of limited access to potential sample sites, as most of the study corridor lies on private land. Vegetation classification involved two levels of intensity for collection of mapping data, they are: 1) observation points, and 2) sample plots. All data points obtained for vegetation type descriptions also served as accuracy assessment points because they were collected independently of the photo-interpretation and digital transfer efforts.

Field surveys began in the first week of June, 1999. This allowed the field investigator to simultaneously record typical vegetation types and assess the variability in the plant communities across larger areas. A second survey was conducted during the middle of July, 1999. To facilitate the logistics of conducting the field survey, the project area was divided into 13 bridge segments. Plot data, observation point data, and accuracy assessment point data were collected from selected random points within each bridge segment. A total of 200 random points were generated for each bridge segment; however, access to these points was a significant challenge. Access to areas was often limited due to land ownership, high flows of the Platte River, and high rainfall in the project area. With due considerations to access, the field investigator made every attempt to record data and accuracy assessment data on cultivated land by reviewing the 1998 records provided by the Farm Service Agency in each county of the project area.

Observation points were used to become familiar with plant community characteristics, plant community ranges of variation, and to field check preliminary classification. Observation points also provided an opportunity to crosswalk the 1998 Central Platte River vegetation classification with the NVCS, i.e., verify the presence or absence of plant associations currently listed versus those not currently listed. Sampling observation points included basic information on habitat and vegetation composition and structure. Specific information recorded included UTM coordinates (using NAD83 datum), dominant species cover data, and brief environmental characteristics. Limitations of observation point data included no measurement of delineation of the sampling area, and cover was estimated only for the common species in each stratum. In addition, the name of plant communities located within 50 meters of the observation point was recorded.

The procedure for classifying vegetation followed guidelines set forth in the Vegetation Classification Standard (FGDC 1997) which was developed from the Standardized Vegetation Classification System (TNC-ESRI 1994). The national system contains seven classification levels with the two finest being the alliance and association (community) levels. Associations were separated from alliances using floristic composition and are named by the most dominant and/or indicator species.

The actual interpretation of aerial photography involved three basic steps. First, all photos were initially interpreted into broad land-cover and land-use classes based solely on standard photo-interpretation signature characteristics of tone, texture, color, pattern, topographic position, size, and shadow. Second, field note overlays and observation point locations were used, if available, to refine the preliminary delineation into the appropriate map units. Using the broad interpretation and site-specific data points, the final interpretation into map units was preformed. Finally, to ensure completeness and accuracy, digital transfer specialists reviewed each interpreted photo for consistency and recommended further review and/or changes where necessary.

Based on final EIS results, the following land cover types could be modified as a result of Program land management activities:

Agricultural Lands

The largest areas of use (almost 60 percent) in the are irrigated agricultural land. The majority of agricultural lands are irrigated row crops, including corn (*Zea mays*) and soy beans (*Glycine max*). Smaller acreages in the agricultural lands classification are used to irrigate alfalfa (*Medicago sativa*) and exotic grasses for hay and dry-farmed winter wheat (*Triticum aestivum*).

Bottomland Grasslands

Bottomland grasslands occupy about 10 percent of the study area on lower terraces of the Platte River valley from high, dry areas to lower, moist areas. On drier sites, tall grass prairie communities support big bluestem (*Andropogon gerardii*), little bluestem (*Schizachyrium scoparium*), and western wheatgrass (*Pascopyrum smithii*). Moister sites are dominated by switchgrass (*Panicum virgatum*), prairie cordgrass (*Spartina pectinata*), redtop (*Agrostis spp.*), Kentucky bluegrass (*Poa pratensis*) and Indiangrass (*Sorghastrum nutans*).

The lowest and wettest sites within the bottomland grasslands community type form a mosaic with the tall grasses mixed with wetlands occupying old channels, depressions, deep swales, cut-off oxbow, slowflowing streams, and pond margins. These areas are commonly called "wet meadows." Wet meadows have a combination of wetland and upland plant species. Lower areas may contain sedges (*Carex spp*.), spikerushes (*Eleocharis spp*.), and smartweed (*Polygonum spp*.). Often, a fringe of tall prairie grasses and wetland shrubs is present, which includes prairie cordgrass, switchgrass, sandbar and peachleaf willow (*Salix exigua* and *S. amygdaloides*), and leadplant (*Amorpha spp*.). Wetland species include both broad and narrow-leaved cattails (*Typha latifolia* and *T. angustifolia*); softstem, river, and three-square bulrush (*Scirpus validus*, *S. fluviatalis*, and *S. pungens*); sedges; spikerush; reed-canarygrass (*Phalaris arundinacea*); and smartweed (*Polygonum spp*.). These wetland habitats are commonly grazed by cattle in the Central Platte valley.

Woodlands

Riparian woodlands are one of the common habitats of the Central Platte River valley, occupying islands, terraces, and tributary drainages along the length of the corridor. In mature riparian stands, eastern cottonwood trees 20-35 meters tall provide up to 60 percent of the ground cover. In a few stands, the mature eastern cottonwood trees were estimated to be nearly 50 meters tall. Shorter-statured green ash (*Fraxinus pennsylvanica*), eastern red cedar (*Juniperus virginiana*), peachleaf and black willow (*Salix amygdaloides* and *S. nigra*), slippery elm (*Ulmus rubra*), red mulberry (*Morus rubra*), hackberry (*Celtis spp*.), and Russian-olive (*Elaeagnus angustifolia*) trees form a subcanopy and contribute 30 to 60 percent additional ground cover.

Riparian woodland understory shrubs, ranging from 1-5 meters tall, include rough-leaved dogwood (*Cornus drummondii*), sapling eastern red cedar and green ash trees, chokecherry (*Prunus virginiana*), Arkansas rose (*Rosa arkansana*), false indigo (*Amorpha fruiticosa*), prickly ash (*Zanthoxylum americanum*), and coralberry (*Symphoricarpos orbiculatus*). They provide up to 50 percent additional vegetation cover. The lianas, wild grape (*Vitis riparia*), and Virginia creeper (*Parthenocissus quinquefolia*) are also present in some locations.

Herbaceous riparian woodland understory species form a dense layer of up to 80-percent cover and include the following grasses: switchgrass, Kentucky bluegrass, smooth brome (*Bromus inermis*), Canada and Virginia wildrye (*Elymus canadensis* and *E. virginiana*), prairie cordgrass, redtop, orchardgrass (*Dactylis glomerata*), reed canarygrass, and the annual Japanese brome (*Bromus japonicus*). Common forbs and grasslike plants include sedges, Nuttall sedge (*Carex nutallii*), common and western ragweeds (*Ambrosia artemisiifolia* and *A. psilostachya*), field mint (*Mentha arvensis*), fog fruit (*Phyla lanceolatum),* smooth horsetail (*Equisetum laevigatum*), dandelion (*Taraxacum officianale*), northern bedstraw (*Galium aprine*), hemp (*Cannabis sativa*), catnip (Nepeta cataria), dogbane (*Apocynum cannabinum*), mullein (*Verbascum thapsus*), common curly dock (Rumex crispus), white avens (Geum canadense), stinging nettle (Urtica dioica), poison ivy (Toxicodendrom rydbergii), goldenrod (Solidago spp.), white and yellow sweetclover (*Melilotus alba* and *M. officianalis*), black medic (*Medicago lupulina*), marsh-elder (*Iva annua*), musk thistle (*Carduus nutans*), and showy milkweed (*Asclepias speciosa).*

Naturally occurring upland woodlands are rare in the study area. They are dominated by eastern red cedar, which are present in scattered stands with some dense pockets of trees. These stands occupy low hills, ridges, and the margins of ephemeral drainages or draws, and are typically distributed on north facing aspects. Included in the upland woodlands are stands of trees planted as shade trees or windbreaks around farmsteads and within agricultural fields. These stands often include eastern cottonwood (*Populus deltoides*), boxelder (*Acer negundo*), and green ash, but may also have introduced species including Russian-olive, Siberian elm (*Ulmus pumila*), Lombardy popular (*Populus lombardii*), ponderosa pine (*Pinus ponderosa*), blue spruce (*Picea pungens*), and honey locust and black locust (*Gleditsia triacanthos* and *Robinia pseudoacacia*).

Shrublands

Shrublands are common on islands in the Platte River and along shorelines immediately adjacent to the river. These shrublands are dominated by either sandbar willow or rough-leaf dogwood. Sandbar willow most often occupies newly exposed or recently deposited sand sites and forms fairly dense stands with little or no understory. Rough-leaf dogwood shrublands occur adjacent to, or intermixed with, woodlands and forests on drier sites. False indigo, black willow, peach-leaf willow, and American elm (*Ulmus americana*) can also be a component of the shrublands along the Platte River. Typically, these shrublands are characterized by a high density of tall and short shrubs. Green ash, eastern cottonwood, and red mulberry trees are often a small, but conspicuous component of the canopy or subcanopy layer. Kentucky bluegrass is the most common understory herbaceous species.

Herbaceous Riparian Wetlands

Herbaceous riparian wetlands occur adjacent to the river and on vegetated islands. These areas are dominated by wetland grasses and forbs, which are present in very dense stands. Typically associated with these habitats are common reedgrass (*Phragmites australis*), reed-canarygrass, smooth brome, threesquare bulrush, smooth horsetail, wild licorice (*Glycyrrhiza lepidota*), cocklebur (*Xanthium strumarium*), yellow- and white-sweetclover, and sandbar willow.

<u>North Platte River Without Implementation of Program</u>

River Otter Without Program

River otter *(Lutra canadensis)* are native to Nebraska and the Platte River, although unregulated trapping led to its disappearance from Nebraska sometime in the early 1900's. For approximately the next 75 years there were few sightings, and in 1977 an otter was confirmed along the Republican River in Furnas County, Nebraska. Infrequent reports of river otters from the Republican River basin continued, and these otters are believed to have been transients rather than from an established population. In 1986 the river otter was listed as a threatened species under the Nongame and Endangered Species Conservation Act for the State of Nebraska.

The Nebraska Game and Parks Commission (NGPC) management goal for this species is to restore a self-sustaining statewide population. Between August 1986 and March 1991, wild caught otters from thriving populations in other states were released at seven locations in Nebraska, including the North Platte River above Lake McConaughy and the Platte River near Kearney. With legal protection as a State threatened species and continued availability of habitat, river otters are expected to expand into their former range throughout Nebraska.

The habitat of the river otter along the North Platte and Platte rivers consists of forested rivers and streams with sloughs and backwaters. Marshes and beaver ponds are also frequented. Otters are denning animals, but rarely dig their own dens and typically use those of beaver and other animals. River otter are opportunistic, and will forage on a variety of animals; although the majority of their food is in the form of fish and some crayfish. The slower swimming rough fish are taken more readily than faster game fish. As a result, the diet of river otters in the area affected by the analyzed GC Alternative likely consists largely of common carp (*Cyprinus carpio*) and channel catfish (*Ictalurus punctatus*).

Several discharge parameters were evaluated in the North Platte Basin:

- Percent Change in Average Seasonal Flows Above McConaughy during October through March – 1,363 cfs for the Present Condition
- Percent Change in Average Seasonal Flows Above McConaughy during April through September – 1,438 cfs for the Present Condition
- Months Average Monthly Flows Above McConaughy Less Than 500 cfs – Present conditions. The present conditions estimate that 29 months within the 48-year period will average less than 500 cfs at the Lewellen Gage.

The months of October through March represent the winter seasonal flow period while April through September represent the summer seasonal flow. It is anticipated that flows that fall below 500 cfs in the reach above Lake McConaughy will impact the otter's forage fishery.

Sandhill Crane Without Program

The North Platte and Platte Rivers, and adjacent lands in central Nebraska, provide important spring habitat resources for sandhill cranes migrating from southern wintering sites to northern breeding grounds. Historically (before water development began in the late 1800s), cranes likely used most of the area from Lewellen on the North Platte (where a few thousand birds still congregate each spring at the upper end of Lake McConaughy) to Chapman (Krapu et al. 1987). Sandhill cranes no longer use the North Platte and Platte Rivers between North Platte and Lexington, Nebraska. Folk and Tacha (1991) documented what they believed to be substantial reductions in sandhill crane use of the North Platte River Valley between 1980 and 1989. These researchers believed reductions in use were highly associated with declining habitat quality.

Present conditions (hydrology period of record 1947 to 1994) are used as the standard of comparison. It is assumed that existing conditions reflect the system's responses to the magnitude and frequency of flows and sediment transport in the North Platte River. Existing relationships between discharge and channel depth, and channel width, are the product of these responses. The analysis relies on discharge, as represented by current and simulated hydrology conditions, to provide insight into future habitat conditions at sites along the North Platte River (Refer to Chapter 4 of the FEIS for a comprehensive description of the sandhill crane affected environment and present conditions).

Several discharge parameters were evaluated in the North Platte Basin:

- Median monthly flow at Lewellen during February, March, and April—believed important in providing roosting depth availability: February = 68.7 kaf, March = 72.1 kaf, April = 73.3 kaf.
- Median monthly flow at Lewellen during May, June, and July—believed important in maintaining channel width by preventing cottonwood establishment: May = 59.9 kaf, June = 64.4 kaf, July = 51.7 kaf.
- Kingsley Dam total annual spill—believed important in maintaining channel configuration in the Sutherland to North Platte reach. The Present Condition average annual spill is 169.1 kaf.
- Frequency of spills from Kingsley Dam—important for the reasons identified above. Reservoir spills occur during 60% of the years modeled for the Present Condition.
- Annual flow at North Platte, Nebraska—believed important in maintaining channel configuration. The current average annual discharge of the North Platte River is 391.9 kaf.
- Median monthly flow at North Platte during February, March, and April—believed important in providing roosting depth availability: February = 21.5 kaf, March = 24.9 kaf, April = 23.4 kaf.
- Median monthly flow at North Platte during May, June, and July—believed important in maintaining channel width by preventing cottonwood establishment: May = 24.7 kaf, June = 33.5 kaf, July = 91.1 kaf.

Lake McConaughy Fish Community Without Program

The North Platte River from the Nebraska-Wyoming border to Lake McConaughy is a seasonal coldwater stream. Rainbow trout *(Oncorhynchus mykiss)* were once stocked in Lake McConaughy, and have produced a self-sustaining population which now migrates upstream from Lake McConaughy to spawn in tributary creeks of the North Platte River. Adults return to the lake after spawning while young remain in the tributary streams for one year before migrating downstream to Lake McConaughy. During the summer, the trout in the lake survive by seeking the cooler water below the thermocline. Striped bass *(Morone saxatilis)* also seek the cooler waters of the thermocline and prey on rainbow trout. The thermocline serves as an important refugia for many fishes; and the thermocline can be destroyed if reservoir levels fluctuate too quickly. The rate at which levels are dropped has a greater influence than the degree of the fluctuation on the integrity of the thermocline.

White bass *(Morone chrysops)* are the most abundant sport fish in Lake McConaughy, although walleye *(Stizostedion vitreum)* are considered to be the most important game fish due to their popularity with anglers. Striped bass, channel catfish *(Ictalurus punctatus),* and wipers (white bass x striped bass hybrid) are also of recreational importance to anglers, although to a lesser extent. Lake Ogallala anglers tend to specifically target rainbow trout (NGPC Creel Surveys).

The primary prey fish in Lake McConaughy are the gizzard shad *(Dorosoma cepedianum)*, rainbow smelt *(Osmerus mordax)*, spottail shiner *(Notropis hudsonius)*, emerald shiner *(N. atherinoides)*, and the alewife *(Alosa pseudoharengus)*. Of these, only the emerald shiner is native to this area. The gizzard shad are considered to be the most important of the prey fish, and the walleye population is closely tied to the health of the gizzard shad population in the lake. During the winter, gizzard shad depend on the spring fed warm water refugia near the mouths of Loner man Creek, Otter Creek, Otter Creek Bay, and Lemoyne Bay. Therefore, winter drawdown could be detrimental to the gizzard shad population if refugia become inaccessible. The elevation at which this starts to become a factor is not known. Gizzard shad spawn in June, so flushing from the system during releases would not be an issue.

Walleye spawn in shallow water along the shoreline where aquatic and submerged wetland vegetation is available from mid-April mid-May. Years with higher lake levels, which provide larger areas of submerged vegetation, while lower elevations provide smaller areas of submerged vegetation. In addition, small-mouth bass spawn near the shoreline using rock rip-rap. If reservoir elevations drop with the implementation of the GC Alternative, the questions are how much, how rapidly, and how this could impact fisheries. An EA release would be expected to occur in April and May for the arrival of the whooping cranes in the central Platte River and to create/augment a spring pulse. In addition to spawning issues, flushing must also be considered. Most walleye are stocked as the young of the year (yoyo), and may be flushed out of the lake during elevation drawdown. Fisheries staff from the NGPC recommended stable to rising water levels during this time frame in Lake McConaughy.

The NGPC has observed a decline in the recruitment of white bass and walleye in Lake McConaughy subsequent to the stocking of 30,000 alewife *(Alosa pseudoharengus)* from 1986-1988. Alewives are not known to exceed 6 inches in the Great Lakes (Becker 1983), and would be expected to average 4-5 inches in Lake McConaughy. Alewife were stocked with the intention of supplementing the prey base for walleye and other sport fish. However, in laboratory experiments alewives preyed heavily on larval walleyes from hatching to about 16 mm in length (Brooking et al. 1998). Brooking et al. (1998) also noted that avoidance behavior by larval walleyes was first observed at 16-19 mm in length, where some larvae did survive the first strike of an alewife. Alewife gape size is approximately twice that of the body height of larval walleye; and the survival chances for walleye stocked in lakes with alewives would be greater if walleye are greater than 16 mm in length (Brooking et al. 1998). The NGPC currently stocks walleye in Lake McConaughy which range from 25-50 mm in length, and white bass which were stocked as larvae.

Primary production is critical to the sport fisheries in Lake McConaughy since it supports the prey fish upon which the sport fish survive. Primary production includes phytoplankton and zooplankton which the small prey fish consume. Water level fluctuations would not be expected to negatively affect primary production

The indicators evaluated for Nebraska fisheries and recreation are:

- McConaughy littoral habitat
- McConaughy walleye reproduction
- McConaughy walleye retention
- McConaughy white bass reproduction
- McConaughy smallmouth bass reproduction
- McConaughy channel catfish reproduction
- McConaughy gizzard shad reproduction
- McConaughy gizzard shad overwintering
- McConaughy contributions to Ogallala trout survival

<u>Littoral Habitat:</u> Strictly speaking, the term littoral refers to that area of a water body where aquatic vegetation supporting light reaches the bottom. For the purposes of this document, the term is used in a near context fashion. For the purposes of this document, littoral habitat is defined to be that habitat where light reaches the bottom, and where the bottom lies above the thermocline. That reservoir habitat that does not meet these criteria is defined by this document as open water habitat.

The amount of littoral habitat present in the reservoir is a general indicator of the total carrying capacity of the reservoir. Many fish species in the reservoir use both the littoral and open water habitat at different times and for different life processes. Others are use primarily one habitat or the other. Of the species investigated in this report, channel catfish and smallmouth bass are considered to be littoral habitat dependent, gizzard shad are considered to be open water dependent, and walleye and white bass use both habitat types. Using a detailed digital-elevation model of the reservoir recently developed by USGS, the area of littoral habitat (quantitatively defined as area where the reservoir is <65 feet deep in June, <55ft. deep in July, and <45ft. deep in August) was calculated on one-foot contours. This was then analyzed with outputs from the Platte River Hydrology Model to determine the amount of littoral habitat that would be present under the different alternatives (Figures 1-3).

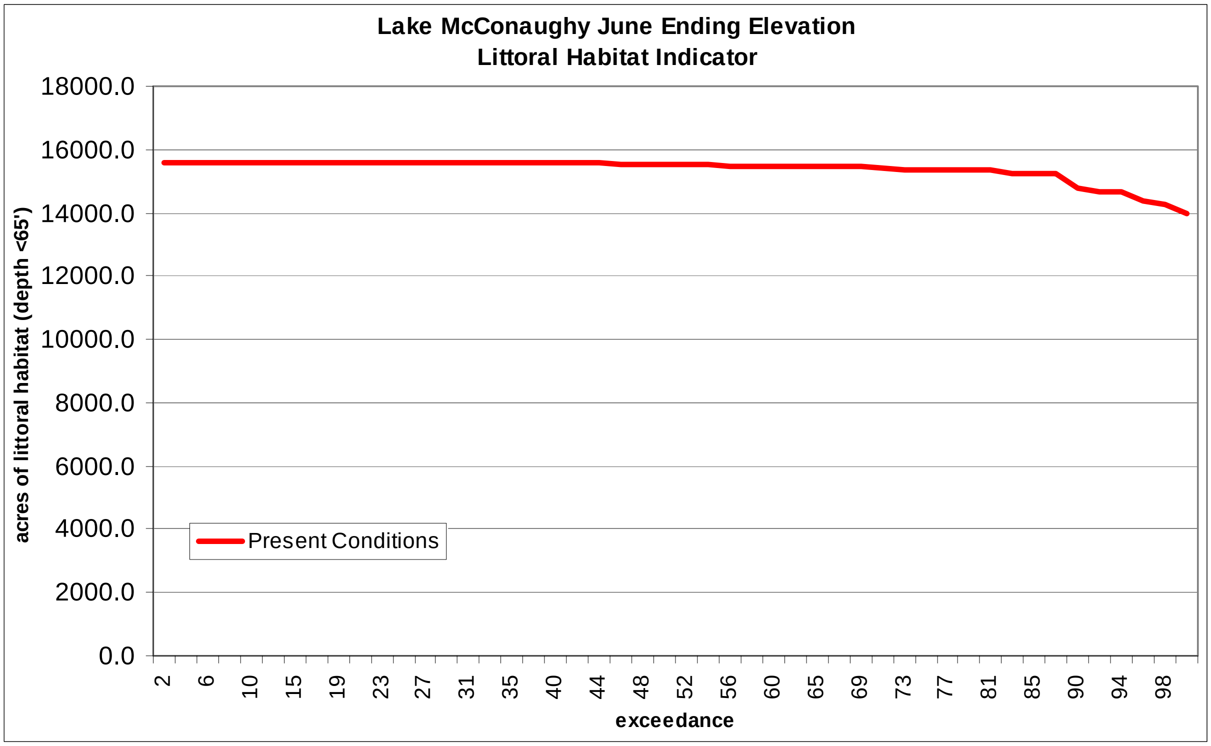


Figure 1. Littoral Habitat Indicator for Present Conditions in June Elevations.

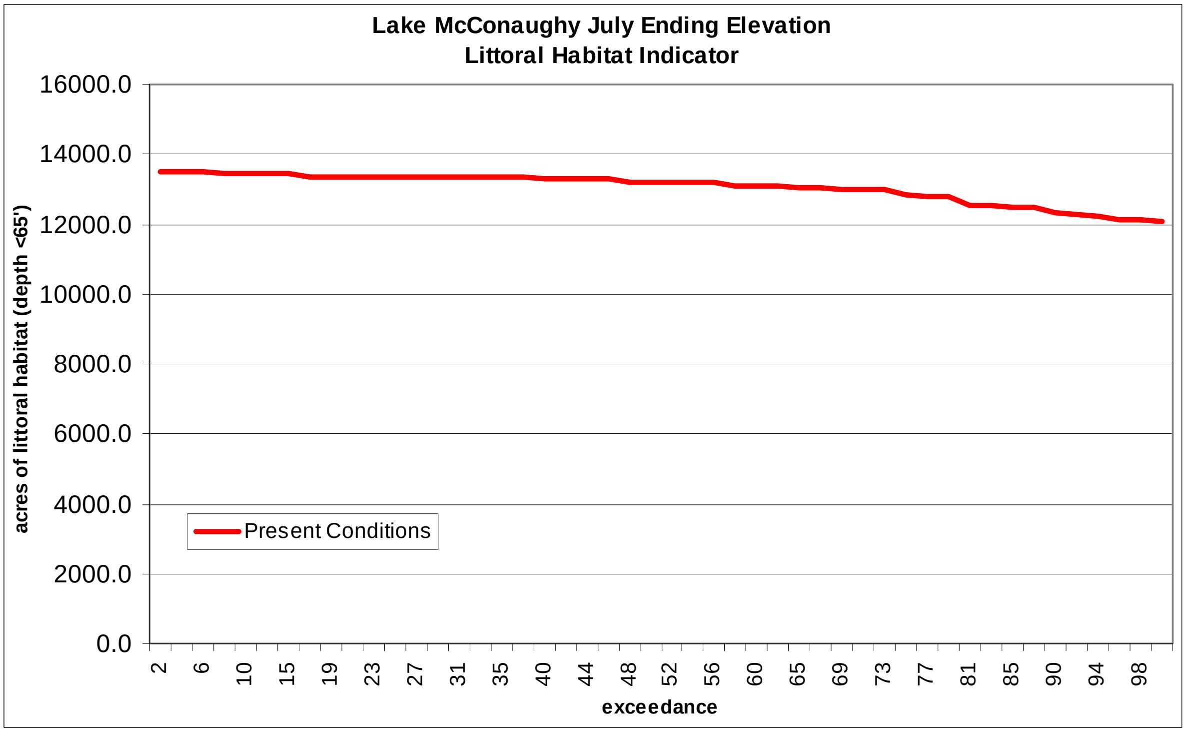


Figure 2. Littoral Habitat Indicator for Present Conditions in July Elevations.

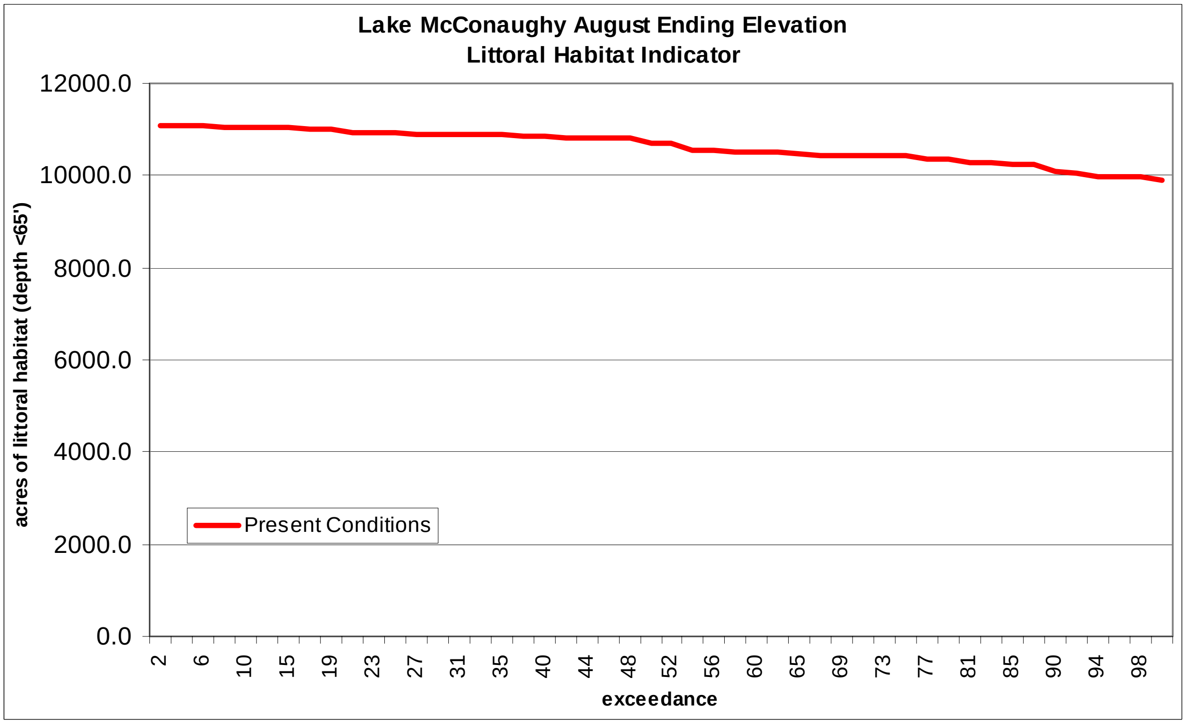


Figure 3. Littoral Habitat Indicator for Present Conditions in August Elevations.

<u>Lake McConaughy Walleye Reproduction:</u> Walleye are one of the better understood resources in Lake McConaughy in terms of the effects of lake levels on the resource. Walleye spawn in shallow water along the shoreline of the lake between mid-April and mid-May, with timing depending largely on temperature conditions in the lake, and by extension, spring weather patterns. Because they spawn in shallow water, the conditions most favorable to successful reproduction are stable or rising water levels during this time frame. Declining water levels can lead to stranding and subsequent desiccation of eggs above the water line. As a result, the indicator used is the trend in water level in April and May.

Natural reproduction of walleye in Lake McConaughy currently accounts for approximately 25% of the total annual walleye recruitment in the reservoir. The remaining 75% of recruitment is through hatchery augmentation. The NGPC observed a decline in the recruitment of walleye in Lake McConaughy subsequent to the stocking of 30,000 alewife *(Alosa pseudoharengus)* from 1986-1988. Alewife were stocked with the intention of supplementing the prey base for walleye and other sport fish. However, in laboratory experiments alewives preyed heavily on larval walleyes from hatching to about 16 mm in length (Brooking et al. 1998). As a result, the NGPC currently stocks walleye in Lake McConaughy which range from 25-50 mm in length to account for this predation.

As a result, when attempting to translate the data presented herein on the total walleye population in the reservoir, differences from Present Conditions should be viewed to be of secondary significance to hatchery augmentation (Figures 4 and 5).

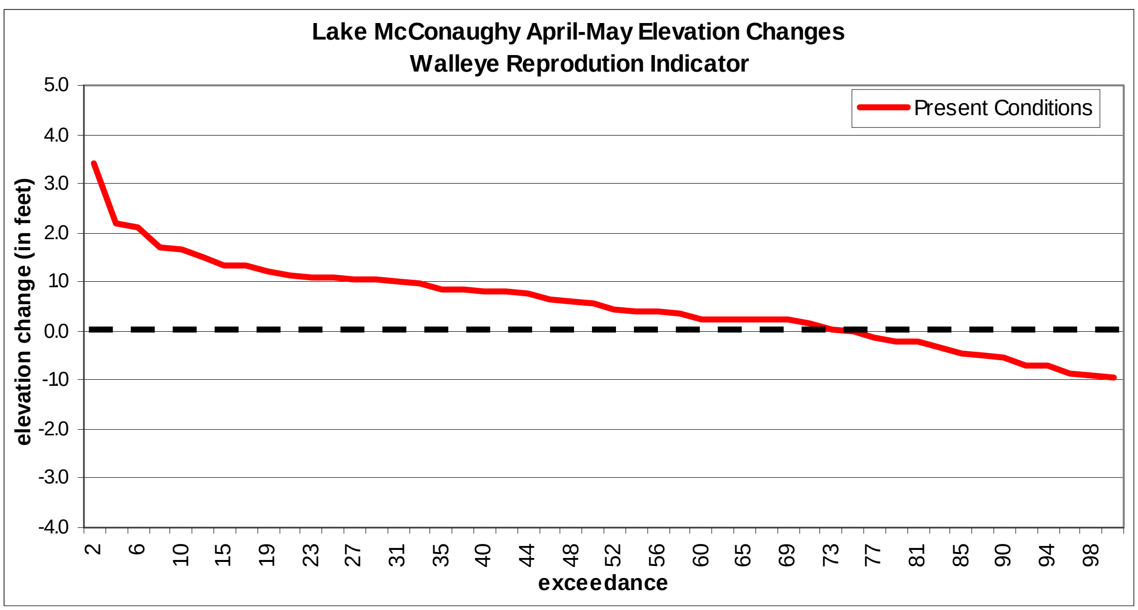


Figure 4. Walleye Reproduction Potential Under Present Conditions for April-May Elevations.

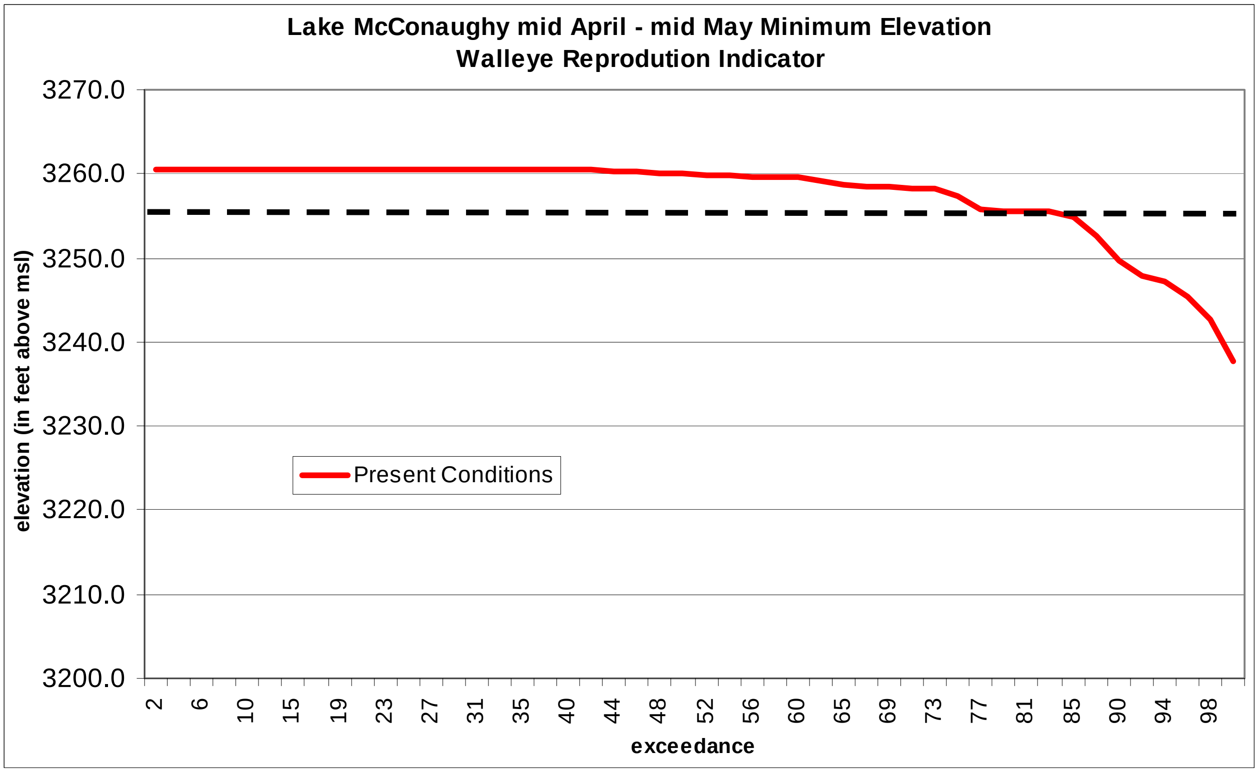


Figure 5. Walleye Reproduction Potential Under Present Conditions for April-May Minimum Elevations.

Beyond reproduction, retention of larval walleye plays an important role in recruitment to the adult walleye population. NGPC biologists believe significant numbers of larval walleye can be flushed from the reservoir with large May and June releases, particularly in those years when the reservoir is operating at lower levels. As the pulse flow objectives for the GC Alternative involve substantial releases from the reservoir during these months, total May and June reservoir outflows were also analyzed (Figures 6 and 7).

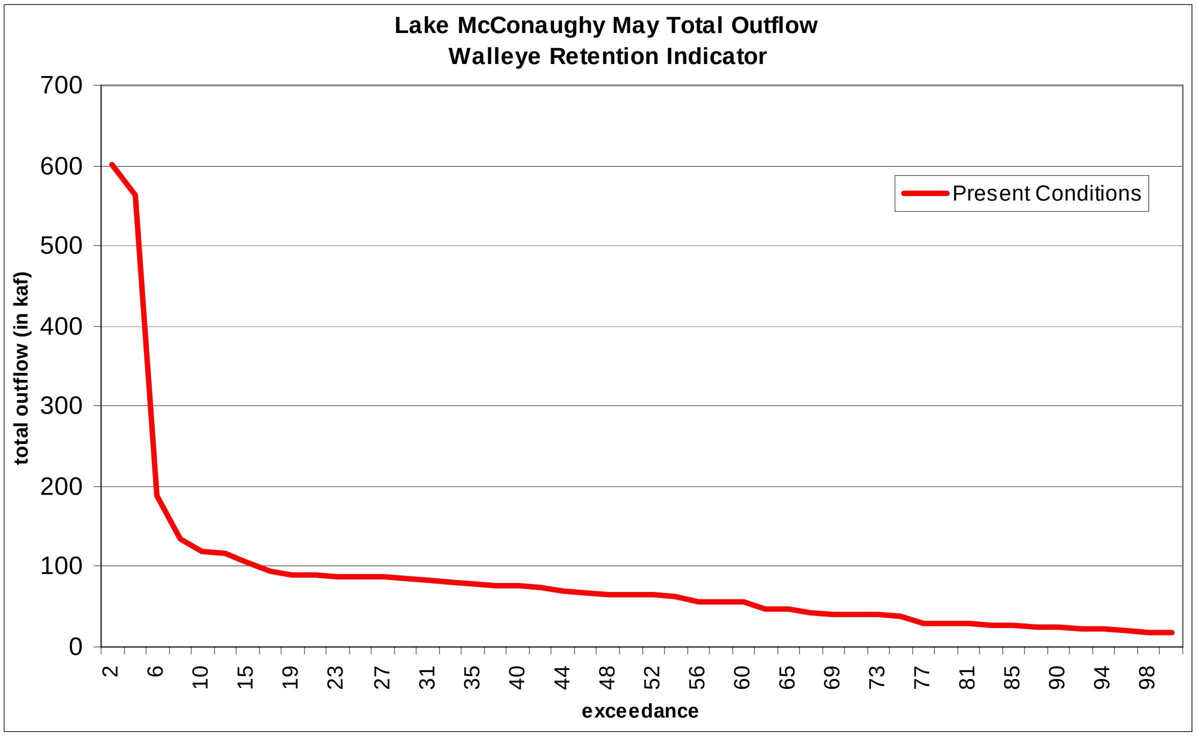


Figure 6. Walleye Retention Indicator Under Present Conditions for May.

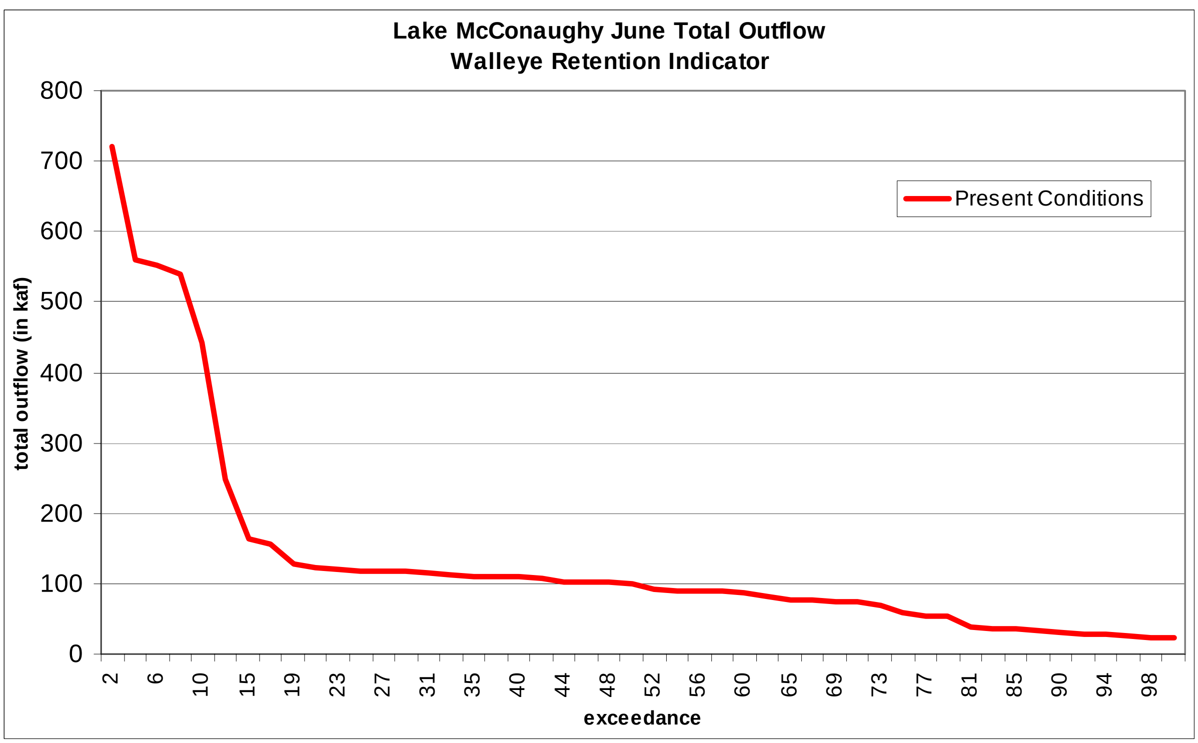


Figure 7. Walleye Retention Indicator Under Present Conditions for June.

Lake McConaughy White Bass Reproduction: As white bass spawn largely in the North Platte River rather than the reservoir, they are not subject to the same adverse impacts as walleye. Under Present Conditions, white bass reproduction is optimized in approximately 12% of years (Figure 8).

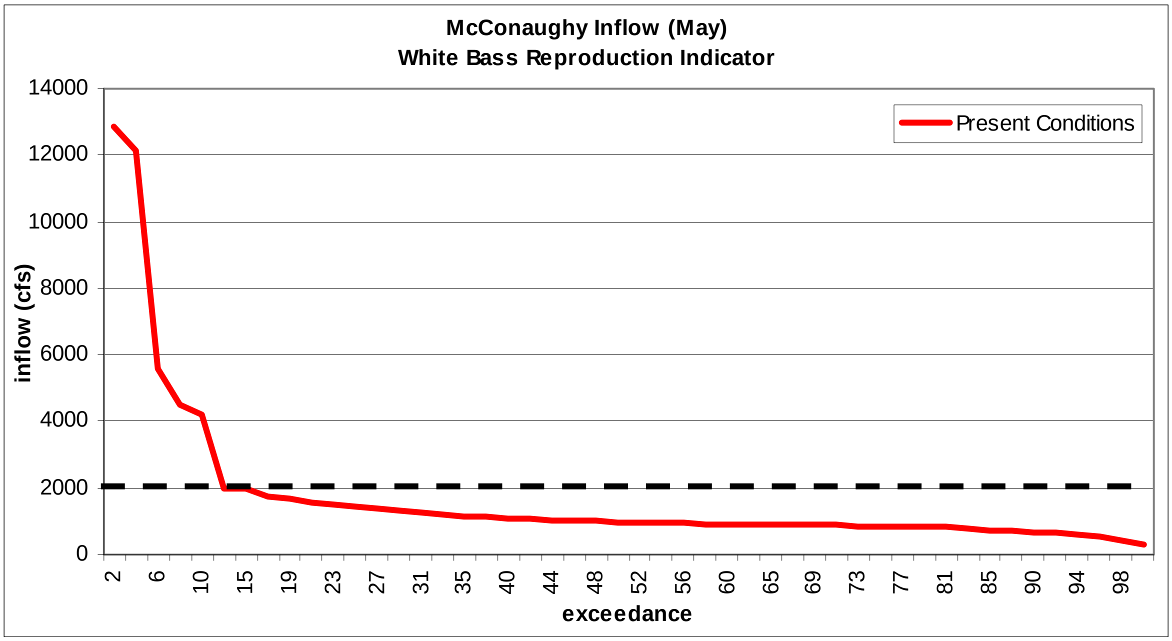


Figure 8. White Bass Reproduction Potential Under Present Conditions.

Lake McConaughy Smallmouth Bass Reproduction: Smallmouth bass spawn in the shallow rocky shorelines and areas of rip-rap of the reservoir, particularly in Lemoyne Bay, on the reservoir's north side. As a result they are subject to the same types of effects as walleye. Present conditions are conducive to successful smallmouth bass reproduction in approximately 82% of years (Figure 9). Additional information has been recently produced by the NGPC on rocky habitat availability. This information, when combined with typical smallmouth bass spawning depth (<15 feet) (Figure 10), allows a more accurate interpretation of how spawning habitat availability is likely to be affected by the GC Alternative.

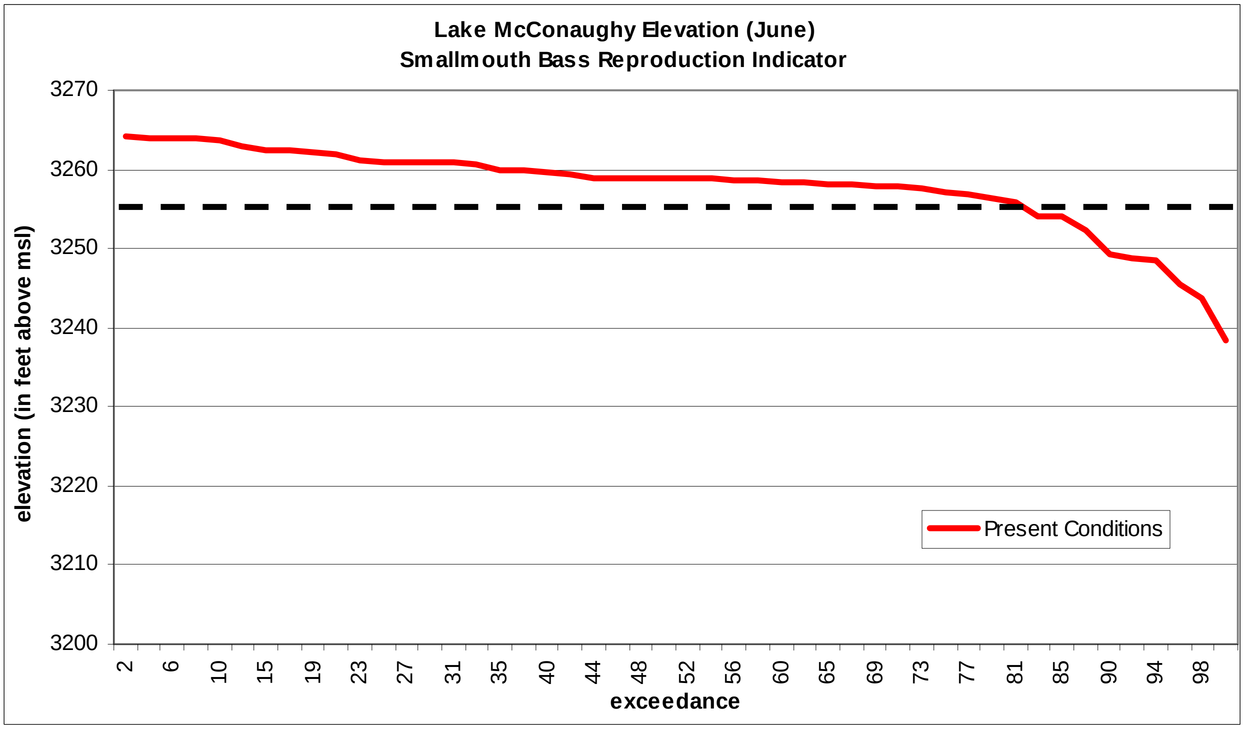


Figure 9. Smallmouth Bass Reproduction Potential Under Present Conditions.

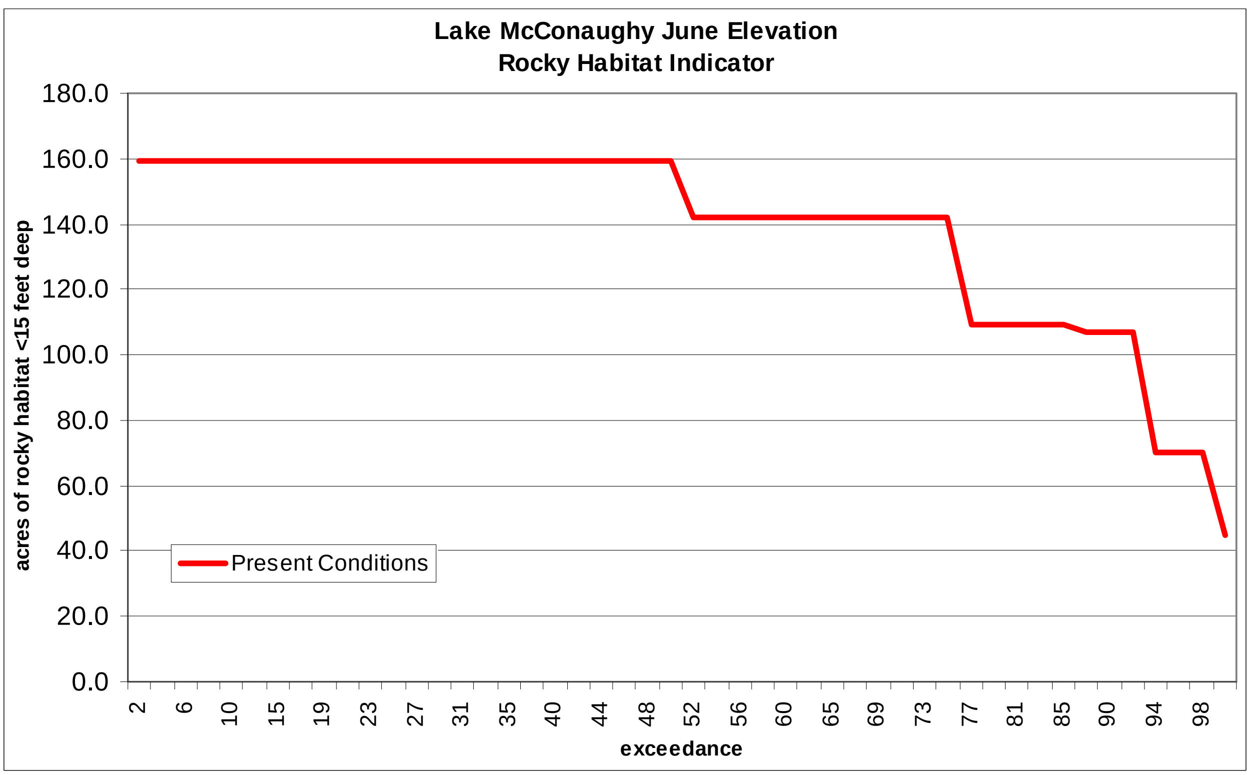


Figure 10. Rocky Habitat Indicator Under Present Conditions.

<u>Lake McConaughy Channel Catfish Reproduction:</u> Channel catfish reproductive needs are similar to those of white bass, in that they spawn largely in the North Platte River above the reservoir, rather than in the reservoir itself. Channel catfish spawning may be triggered not only by total river flow into the reservoir in the spring, but also by the relative change in river flow (i.e., rising river conditions). Therefore, average river flow for the months of April, May and June are analyzed, as well as trends in river conditions from March to April, and from April to May (Figures 11-15).

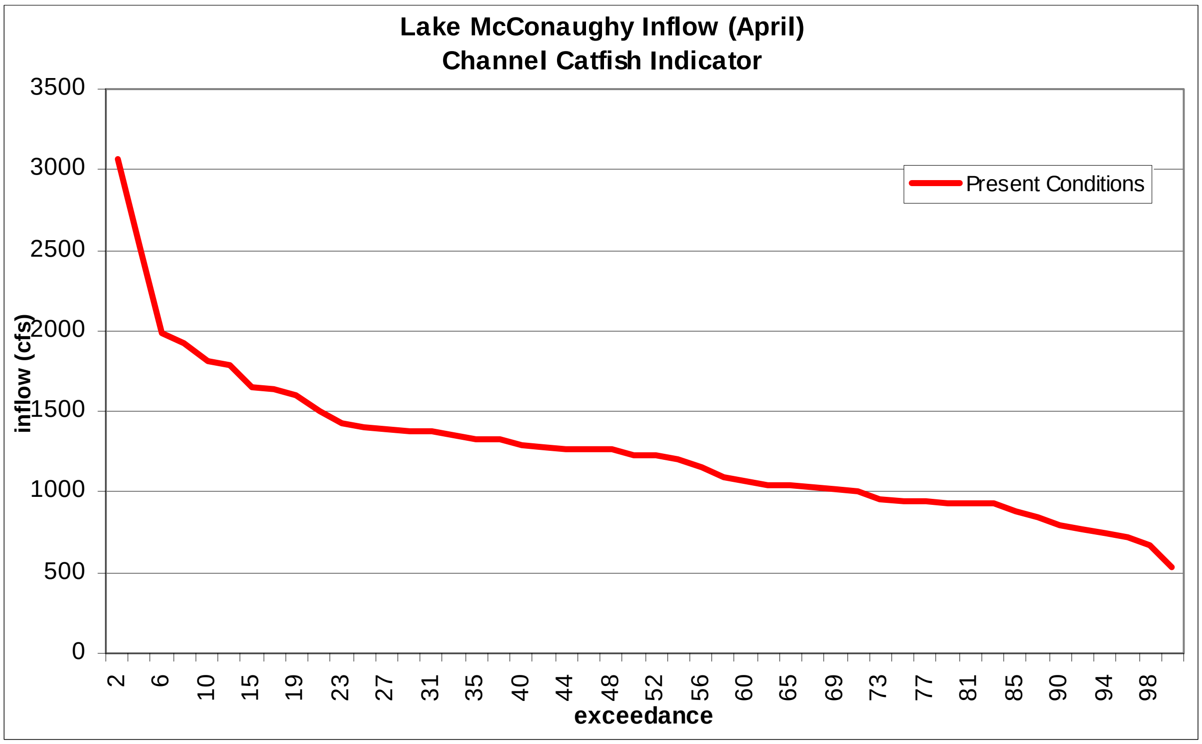


Figure 11. Channel Catfish Reproduction Potential Under Present Conditions for April.

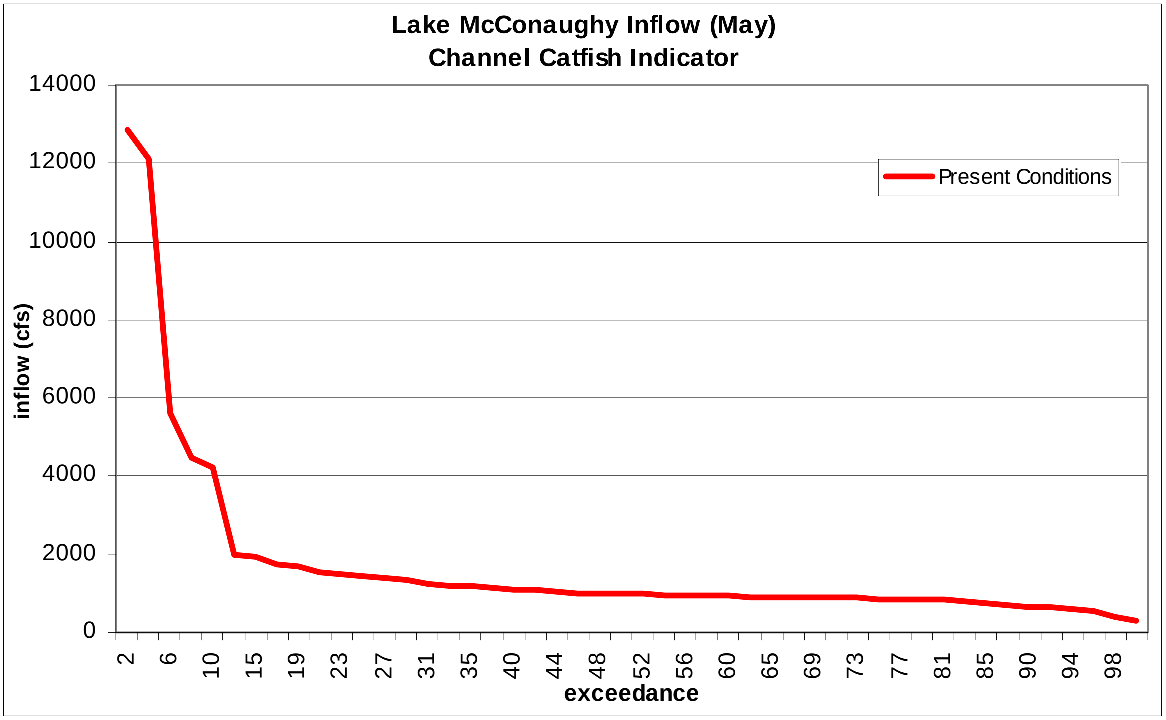


Figure 12. Channel Catfish Reproduction Potential Under Present Conditions for May.

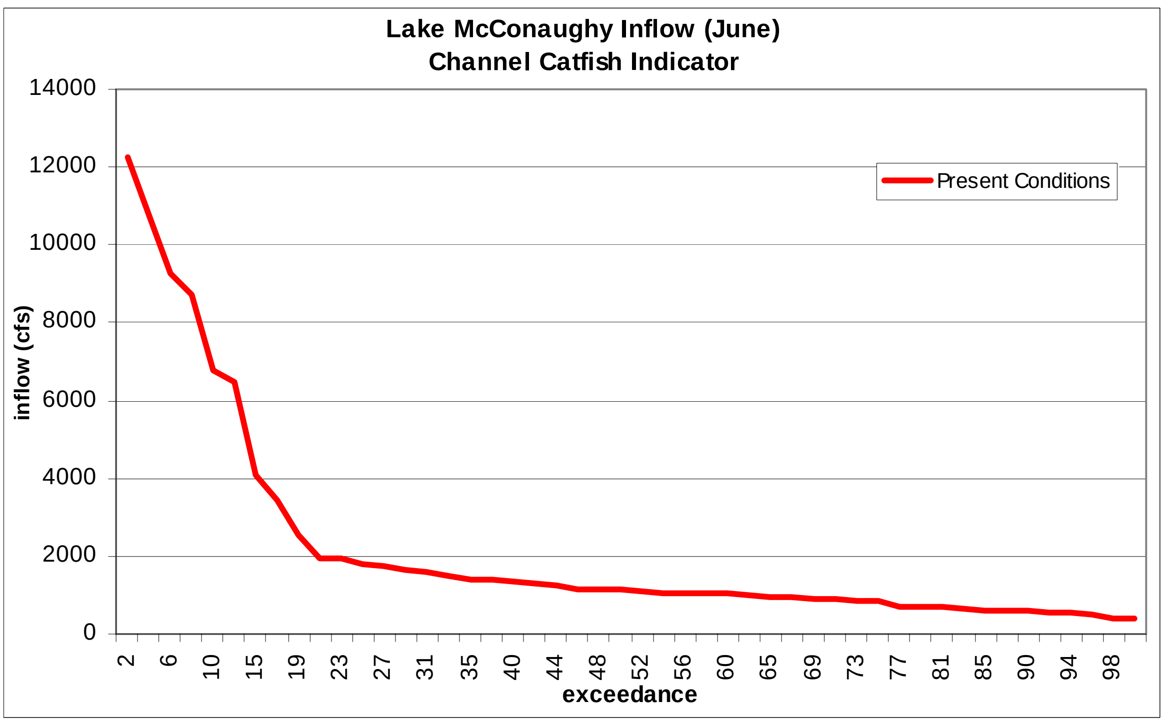


Figure 13. Channel Catfish Reproduction Potential Under Present Conditions for June.

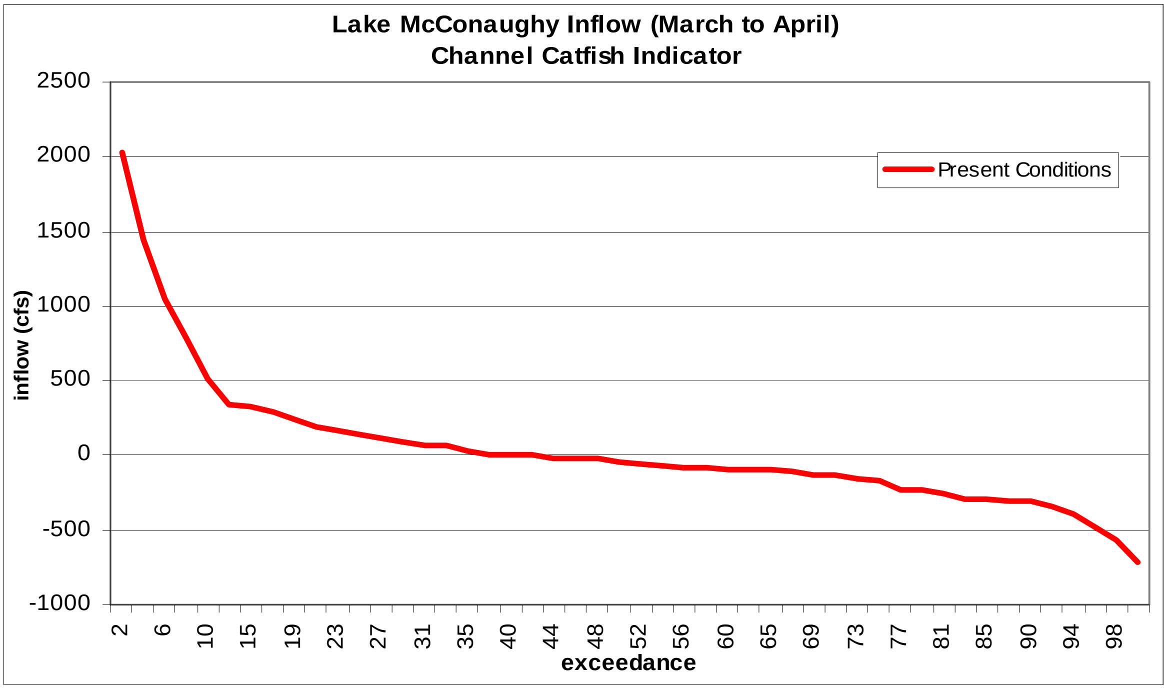


Figure 14. Channel Catfish Reproduction Potential Under Present Conditions for March - April.

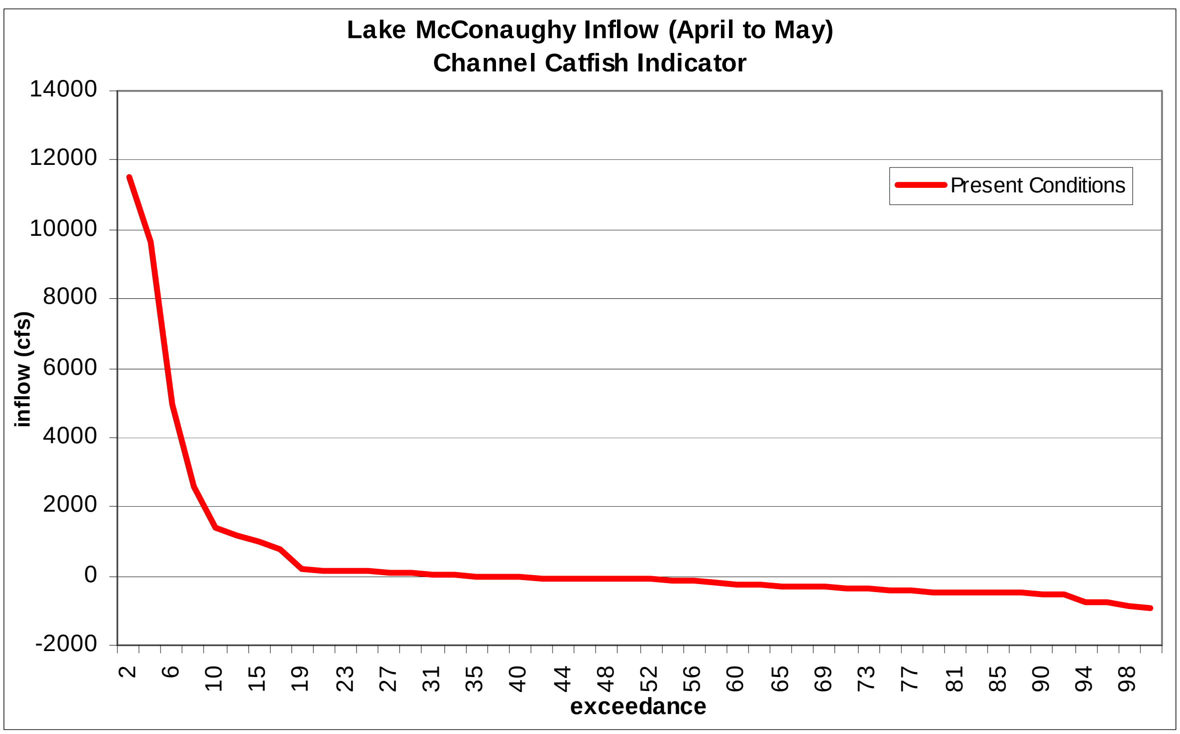


Figure 15. Channel Catfish Reproduction Potential Under Present Conditions for April-May.

<u>Lake McConaughy Gizzard Shad Reproduction:</u> Factors controlling gizzard shad recruitment in Lake McConaughy are not entirely clear, although it is evident that reservoir elevations during the spawning season play a major role. Elevations greater than 3250 ft. above msl appear to optimize spawning habitat. As a result, that elevation is used as an indicator in the June reservoir elevation analysis. Under Present Conditions, this occurs in approximately 88 percent of years (Figure 16).

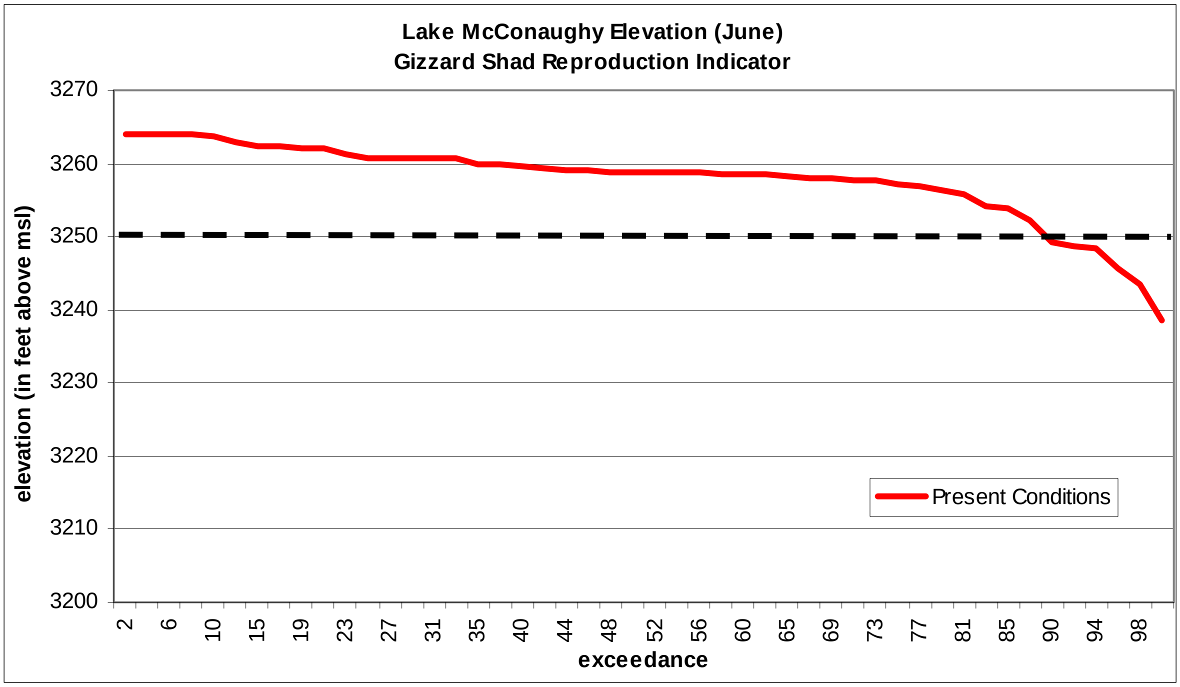


Figure 16. Gizzard Shad Reproduction Potential Under Present Conditions.

Lake McConaughy Gizzard Shad Overwintering: Gizzard shad overwinter survival is also strongly influenced by reservoir water surface elevations. Lake McConaughy lies at the extreme northern end of the species range. As such, they are particularly susceptible to freezing conditions, and thermal refugia, such as sheltered stream mouths, offer protection. When reservoir elevations drop below a certain threshold (generally below about 3,240 feet above msl), these stream mouths are not able to provide the sheltered thermal refugia used by a large part of the population for winter survival. It is unclear to what extent these refugia sustain the population, and to what degree the ability of them to provide refugia may remain below this threshold. As a result, the results of this analysis provide a fairly strong indicator of the effects of the GC Alternative on winter survival of gizzard shad, but cannot be considered a prediction. Under Present Conditions, reservoir levels remain above the 3.240 ft elevation in 90% of years (Figure 17).

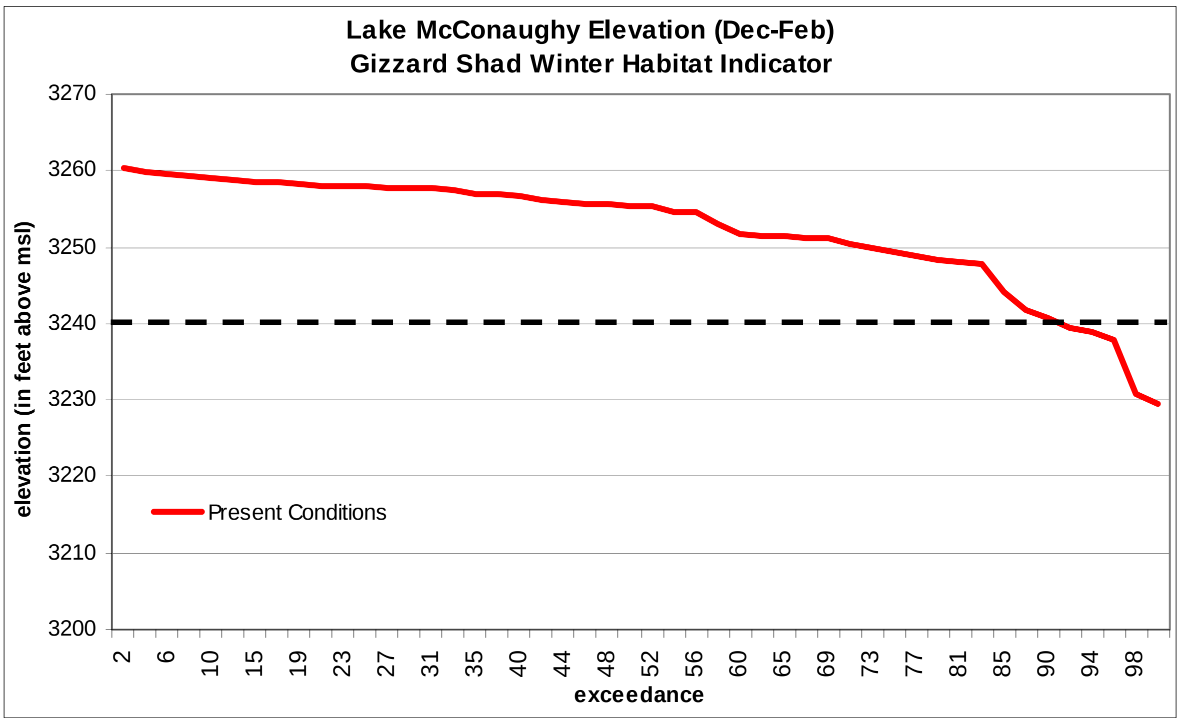


Figure 17. Gizzard shad overwintering potential under present conditions.

Lake Ogallala Trout Fisheries Support: The hydro intake through which the majority of water released through Kingsley Dam is drawn, is located very low on the dam face. As a result, the water drawn into that intake is deep water under most reservoir conditions, and is generally cold, and low in oxygen. As the reservoir surface elevation declines over the course of the summer, the water being drawn into the intake gets incrementally warmer. Under low reservoir conditions, the temperature of this water can reach levels that cause stress in the trout fishery resident in Lake Ogallala. Similarly, at particularly high reservoir elevations, the water taken into the hydro tends to be very low in oxygen. Analyses were performed on information collected by CNPPID on dissolved oxygen, recorded at the buoy line near the upper end of Lake Ogallala, and temperature, recorded within the intake. These analyses show that no clear correlation between reservoir level in McConaughy and dissolved oxygen at the buoy line exists. This is almost certainly due to the controlling influence of CNPPID's operations relative to their regulatory requirements. A very clear correlation does exist between temperature and reservoir elevation on a monthly basis. As a result, it was possible to predict the reservoir elevation that would result in water temperature reaching levels at which the trout fishery in Lake Ogallala would experience stress (defined as 18C) on a monthly basis (Figures 18 through 22).

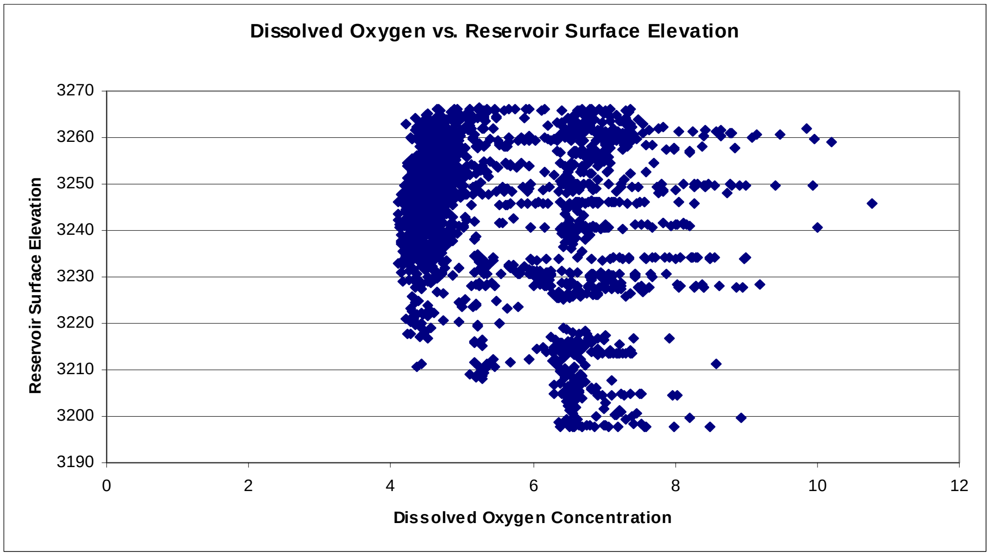


Figure 18. Dissolved Oxygen Concentration for All Months.

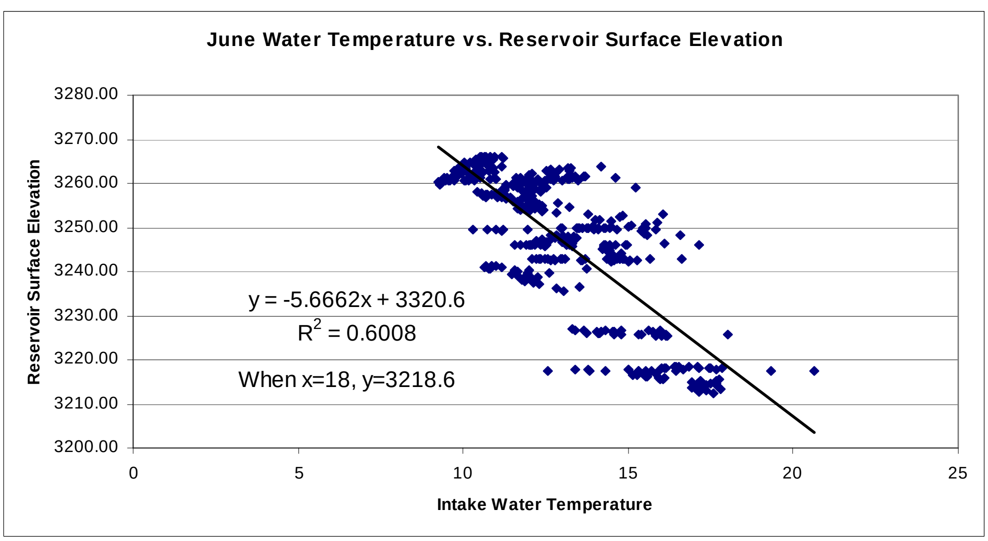


Figure 19. June Water Temperature Compared with Lake McConaughy Surface Elevations.

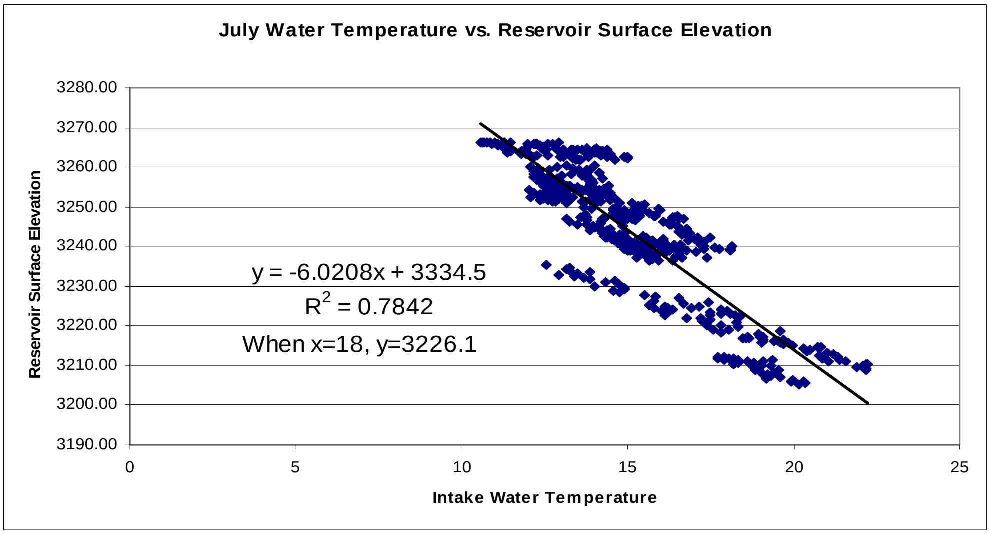


Figure 20. July Water Temperature Compared with Lake McConaughy Surface Elevations.

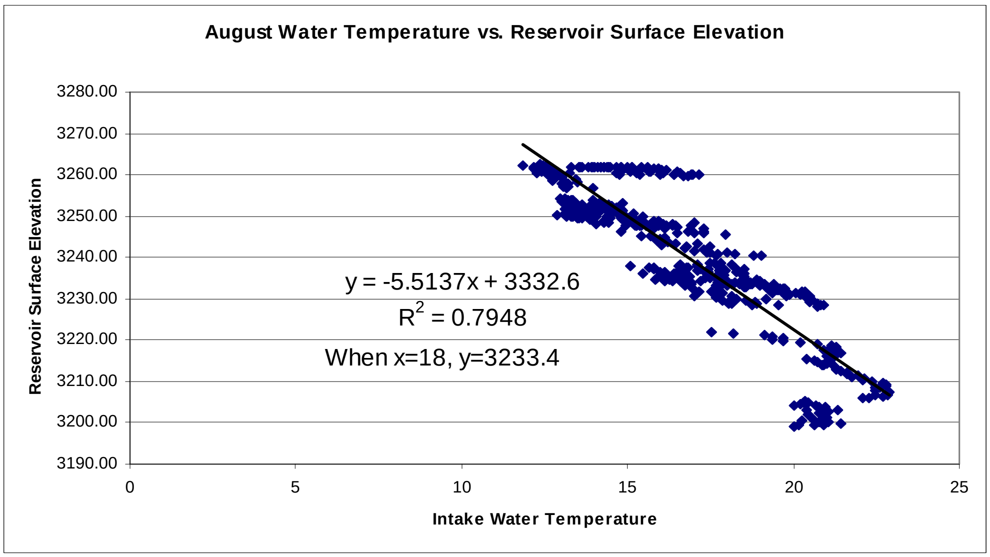


Figure 21. August Water Temperature Compared with Lake McConaughy Surface Elevations.

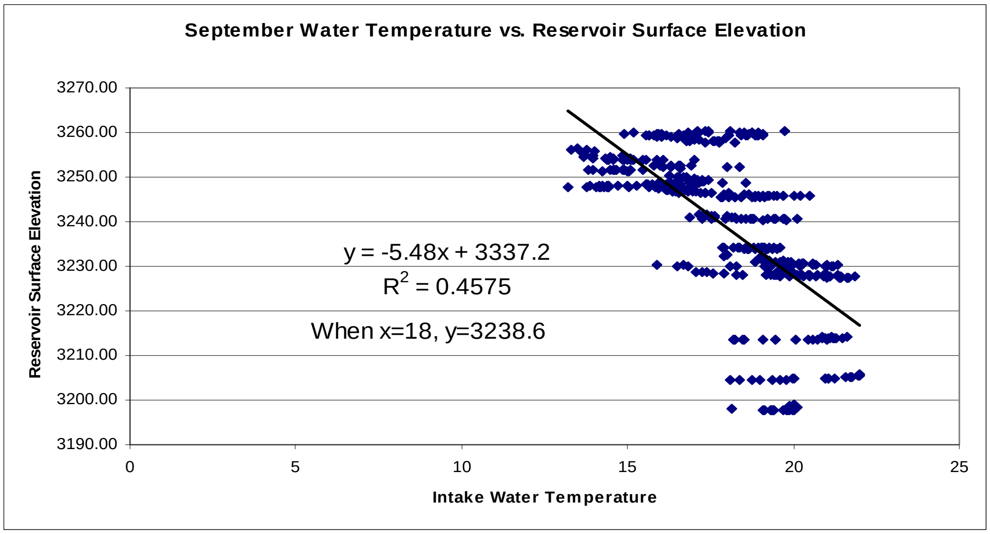


Figure 22. June Water Temperature Compared with Lake McConaughy Surface Elevations.

Given these relationships, it is possible to estimate the change in frequency of occurrence of stressful conditions for the trout fishery in Lake Ogallala resulting from low water surface elevations in Lake McConaughy. Summer water levels in Lake McConaughy are summarized in Figures 23 through 26.

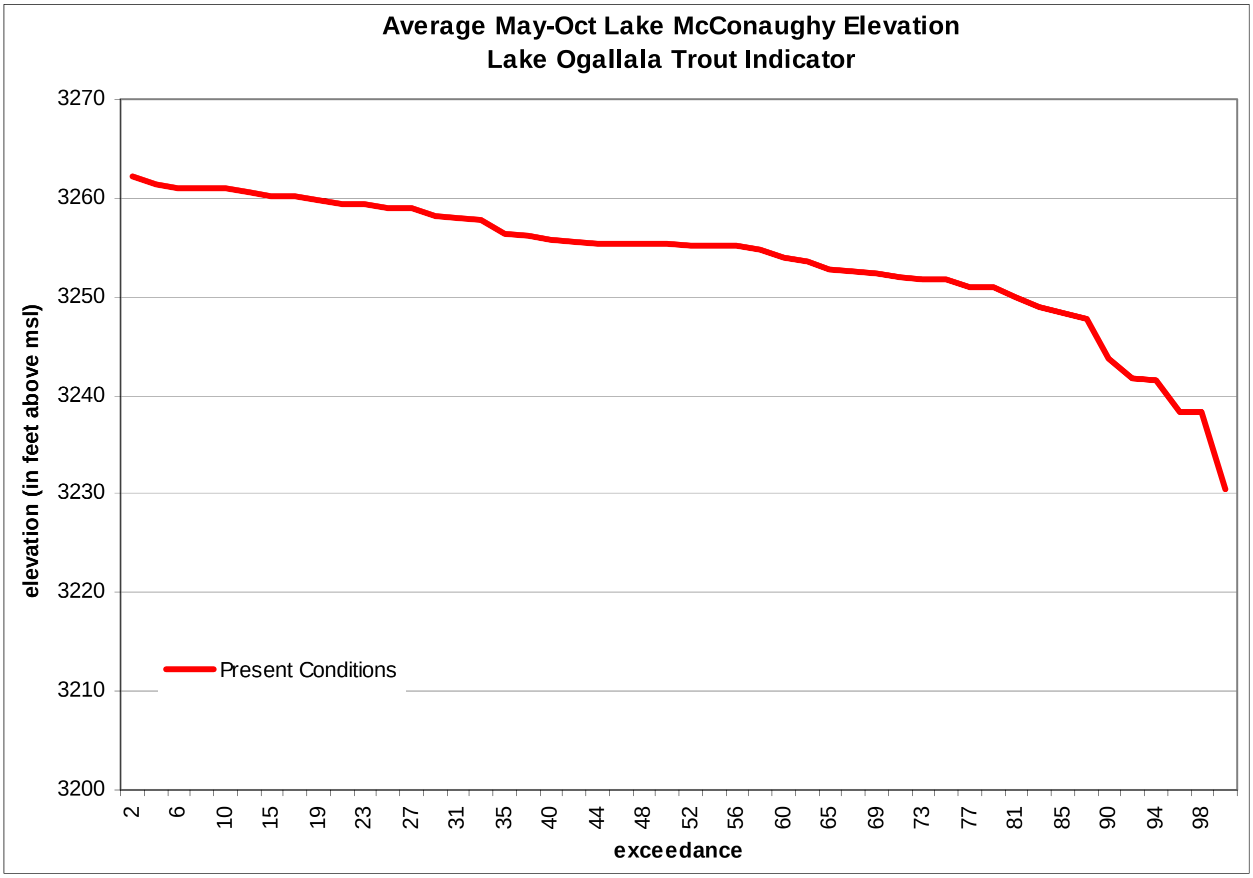


Figure 23. Lake Ogallala Trout Indicator for Present Conditions in May to October.

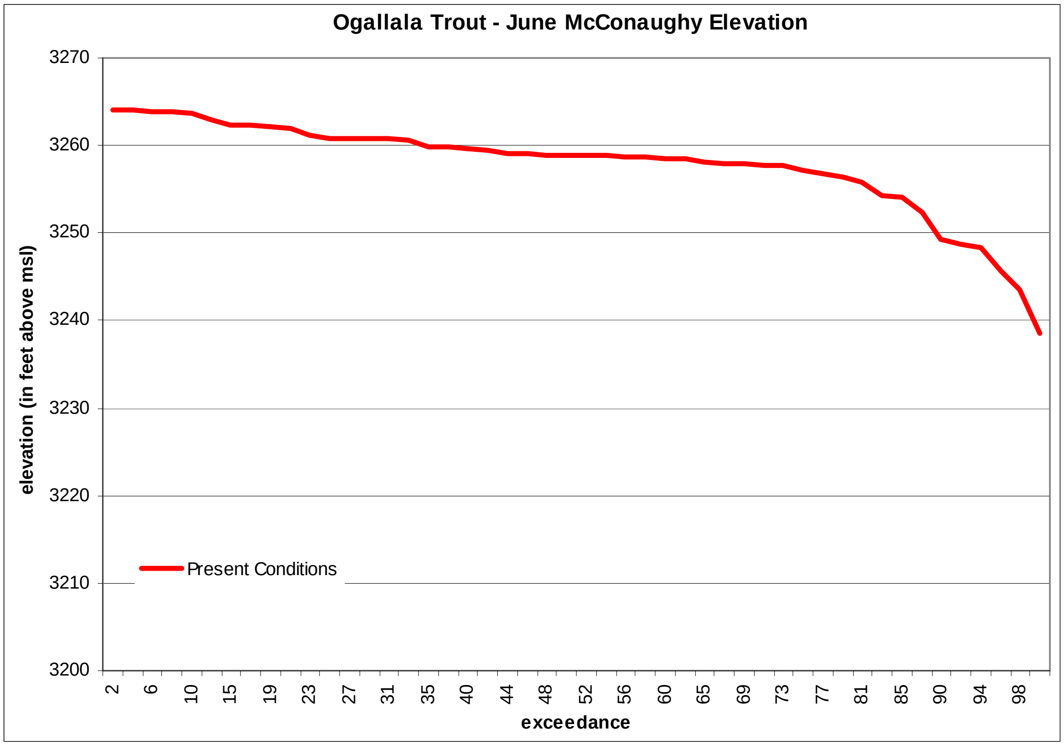


Figure 24. Lake Ogallala Trout Indicator for Present Conditions in June.

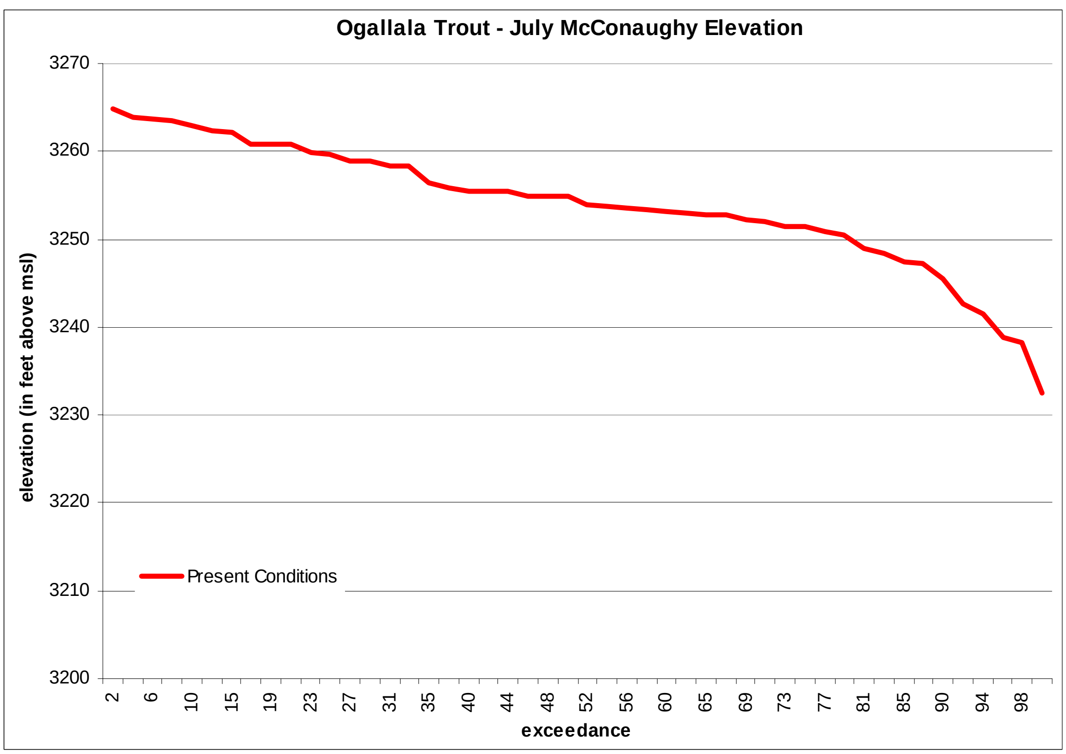


Figure 25. Lake Ogallala Trout Indicator for Present Conditions in July.

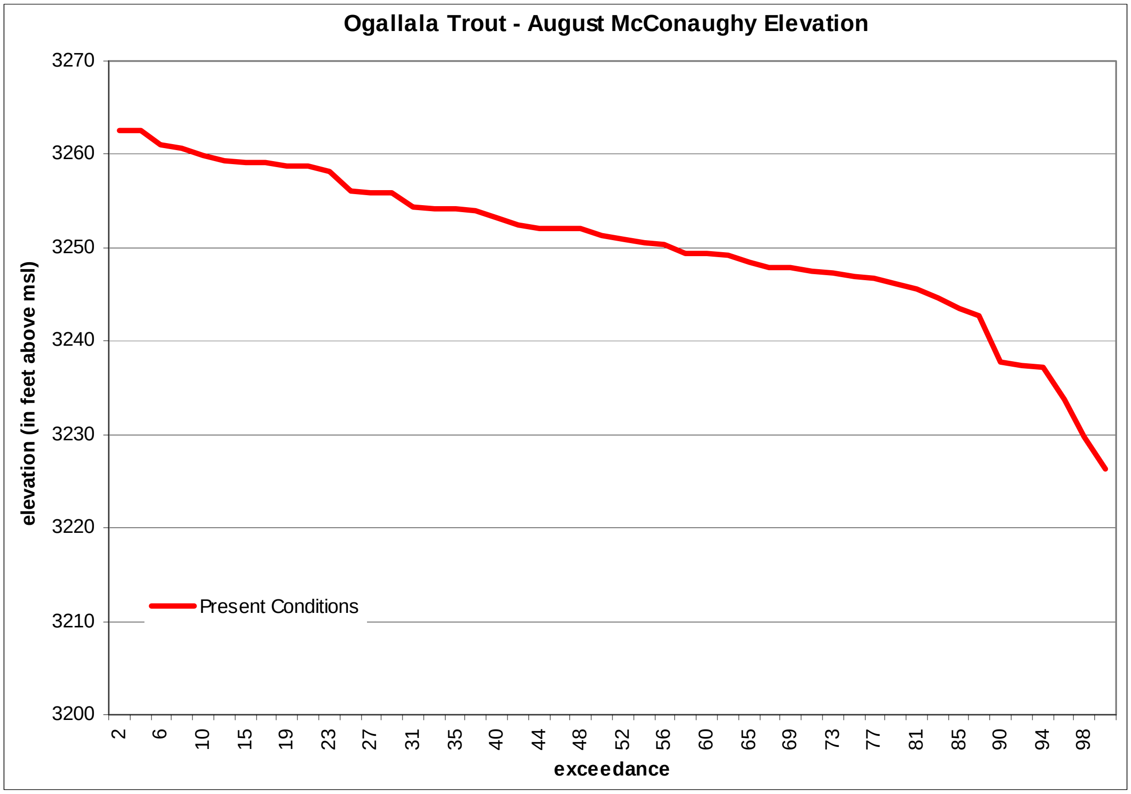


Figure 26. Lake Ogallala Trout Indicator for Present Conditions in August.

Finescale Dace and Northern Redbelly Dace

The finescale dace *(Phoxinus neogaeus)* and the northern redbelly dace *(Phoxinus eos)* are both protected as threatened species by the Nebraska Nongame and Endangered Species Conservation Act. Isolated populations have been documented in the North Platte River. These fish are usually found together in Nebraska; therefore these species will be discussed together in this section. Habitat for these two dace includes clear brooks, ponds, and marshes sustained by springs and seeps. Threats to the species focus on habitat loss, and include ground water pumping, dams, fertilizer runoff, and stream diversion (Madsen 1985). Habitat degradation through increased turbidity from livestock and agricultural cultivation up to the streambank without the use of protective buffers can also render the habitat unsuitable. Stocking and introduction of predaceous and non-native species threatens the native dace with range restrictions and elimination from some streams.

Spawning for both species takes place from April to June, with the northern redbelly continuing to spawn into August. The northern redbelly dace releases eggs into filamentous algae, while the finescale dace releases its eggs over the stream substrate. Female dace can produce up to several thousand eggs in the spawning season. Eggs hatch in four to ten days, and the young which survive into adulthood reach sexual maturity in one to two years.

The finescale dace has a short intestine which typifies a carnivorous species, and is a stout-bodied fish with a large mouth. Diet studies have confirmed the finescale dace as being carnivorous, consuming relatively large hard prey such as fingernail clams, snails, and other invertebrates. The northern redbelly dace on the other hand is largely herbivorous, feeding primarily on algae and to a lesser degree, insects and zooplankton.

Identification can be difficult since these species are very similar in appearance; and hybridization further complicates identification. The NGPC data show that hybrids are in greater abundance than either of the parental species, and reproductive status of hybrids is not well understood.

Both species have been found in the North Platte River, from Kingsley Dam to the city of North Platte, Nebraska both historically and in recent years. Due to their specific habitat preferences, connection of the river to spring-fed backwaters and side-channels may be important to both species. This would provide access to these types of habitats, as well as an access corridor between habitats. The present condition for the two dace species are represented by monthly average volume of water passing the North Platte gage along the North Platte River (Figure. 27).

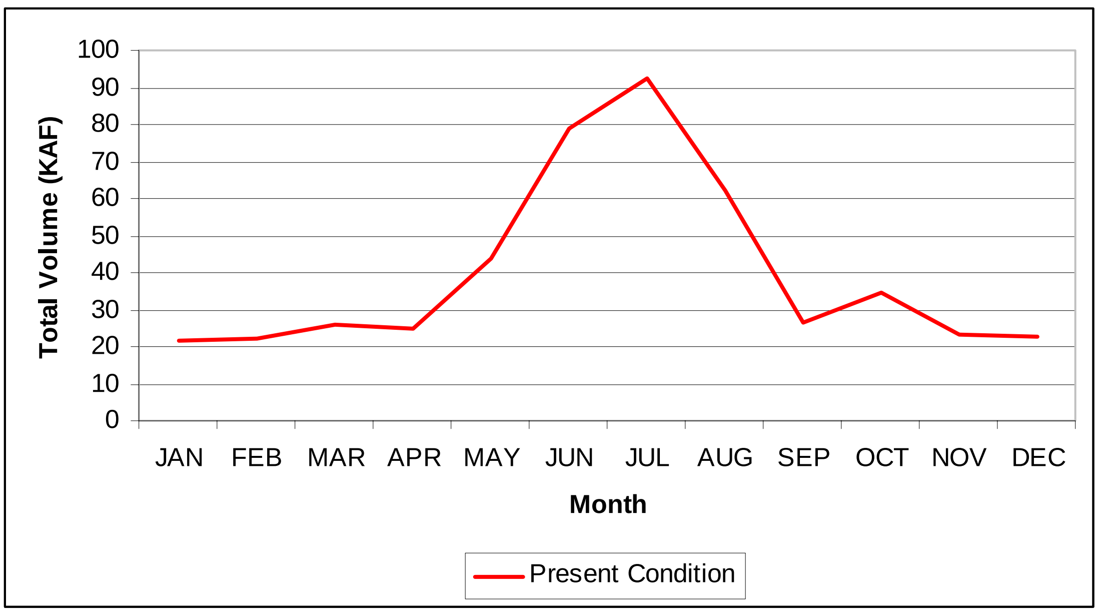


Figure 27. Average Monthly Volumes Passing the North Platte Gage along the North Platte River.

North Platte River Resources With Implementation of Program

River Otter With Program

The GC Alternative is anticipated improve conditions for the river otter compared to the Present Condition.

- Percent Change in Average Seasonal Flows Above McConaughy during October through March – No Change from Present Condition
- Percent Change in Average Seasonal Flows Above McConaughy during April through September – Increase of 58 cfs from Present Condition (4% increase)
- Average Monthly Flows Above McConaughy Less Than 500 cfs – The GC Alternative estimates that 30 months within the 48-year period will average less than 500 cfs at the Lewellen Gage. This is slightly above the 29 months identified for present conditions.

Sandhill Crane With Program

Several components of discharge were evaluated under this alternative in the North Platte River Basin. At the Lewellen gauge (used to represent flows at the Clear Creek Wildlife Management Area), all spring roosting flows for GC Alternative would be less than median flows for those months under the Present Condition. All channel maintenance flows under the GC Alternative is expected to be less than the Present Condition although decreases in spring roosting and channel maintenance flows are relatively small when compared to the present condition.

- Median monthly flow at Lewellen during February, March, and April — believed important in providing roosting depth availability. February = 68.4 kaf (a -0.3 kaf change from Present Condition), March = 71.7 kaf (a -0.4 kaf change from Present Condition), April = 70.4 kaf (a -2.9 kaf change from Present Condition).
- Median monthly flow at Lewellen during May, June, and July — believed important in maintaining channel width by preventing cottonwood establishment. May = 59.3 kaf (a -0.6 kaf change from Present Condition), June = 62.2 kaf (a -0.2 kaf change from Present Condition), July = 50.6 kaf (a -1.1 kaf change from Present Condition).

Average volume of spills from Kingsley Dam would be decreased by about 44 percent (74 kaf) and the frequency of spills reduced to 29% occurrence for modeled years. North Platte River average median discharge at North Platte, Nebraska, would be reduced by less than one percent. Mean monthly crane roosting (spring) and channel maintenance (summer) flows in the Sutherland to North Platte reach would be similar to the Present Condition under the GC Alternative, while May flows would be somewhat higher than the Present Condition. June and July flows would be less than under the Present Condition.

- Kingsley Dam total annual spill — Average annual spill is 95.3 kaf compared to 169.1 kaf for the Present Condition.
- Frequency of spills from Kingsley Dam — GC Alternative reservoir spills are predicted to occur for 29% of the years modeled compared to 60% for the Present Condition.
- Median flow at North Platte, Nebraska — The current average median discharge of the North Platte River is 391.9 kaf for the GC Alternative compared to 388.9 kaf for the Present Condition.

- The median monthly flow during February, March, and April for the GC Alternative is 22.0 kaf, 24.6 kaf, and 23.1 kaf respectively which is a -0.5 kaf, -0.3 kaf, and -0.3 kaf change from the Present Condition.
- The median monthly flow during May, June, and July for the GC Alternative is 24.5 kaf, 30.9 kaf, and 87.3 kaf respectively which is a -0.2 kaf, -2.6 kaf, and -3.8 kaf change from the Present Condition.

At the system scale, conditions would remain similar to Present Conditions above Lake McConaughy. It is unlikely that changes in discharge would produce a measurable response in sandhill crane roosting habitat at the Clear Creek Wildlife Management Area and the channel immediately west.

The Sutherland to North Platte reach of the North Platte River would likely experience changes under the Governance Committee Alternative. Spring and early summer flows (February-May) would be similar to Present Conditions, with June and July flows somewhat reduced. Median annual flows would also be reduced under the Governance Committee Alternative.

Significant reductions in Lake McConaughy spill volume would also occur. Reduced June and July flows, reduced average annual discharge passing North Platte, and a reduction in the frequency and magnitude of spills from Kingsley Dam, indicate the possibility of further establishment of woody vegetation. Woody vegetation establishment would result in channel narrowing and perhaps deeper flow during the spring roosting period. These factors are consequences of management actions under the proposed action alternatives and may result in reductions of roosting suitability within this reach. Reduced spills from Lake McConaughy may exacerbate the channel narrowing processes within this reach (Refer to Chapter 5 of the FEIS for a comprehensive description of the sandhill crane environmental consequences).

Lake McConaughy With Program

Lake McConaughy Littoral Habitat: The GC Alternative results in an average reduction from Present Conditions of approximately 2% in June, 3% in July, and 2% in August over all conditions analyzed (Figures 28 – 30). It is likely that these small reductions in littoral habitat area will be reflected by similar small reductions in carrying capacity of fisheries in the reservoir. In an over-exploited fishery, this level of reduction could prove problematic for anglers. However, in an under- to fully-exploited fishery, such as McConaughy, this would be expected to have little effect on concentration of fish (and hence, the likelihood of catching fish), only a slight reduction in total biomass in the fisheries. This factor may also be offset to some degree by the increased inter-annual fluctuation in reservoir levels leading to increases in reservoir productivity through repeated establishment and inundation of shoreline vegetation.

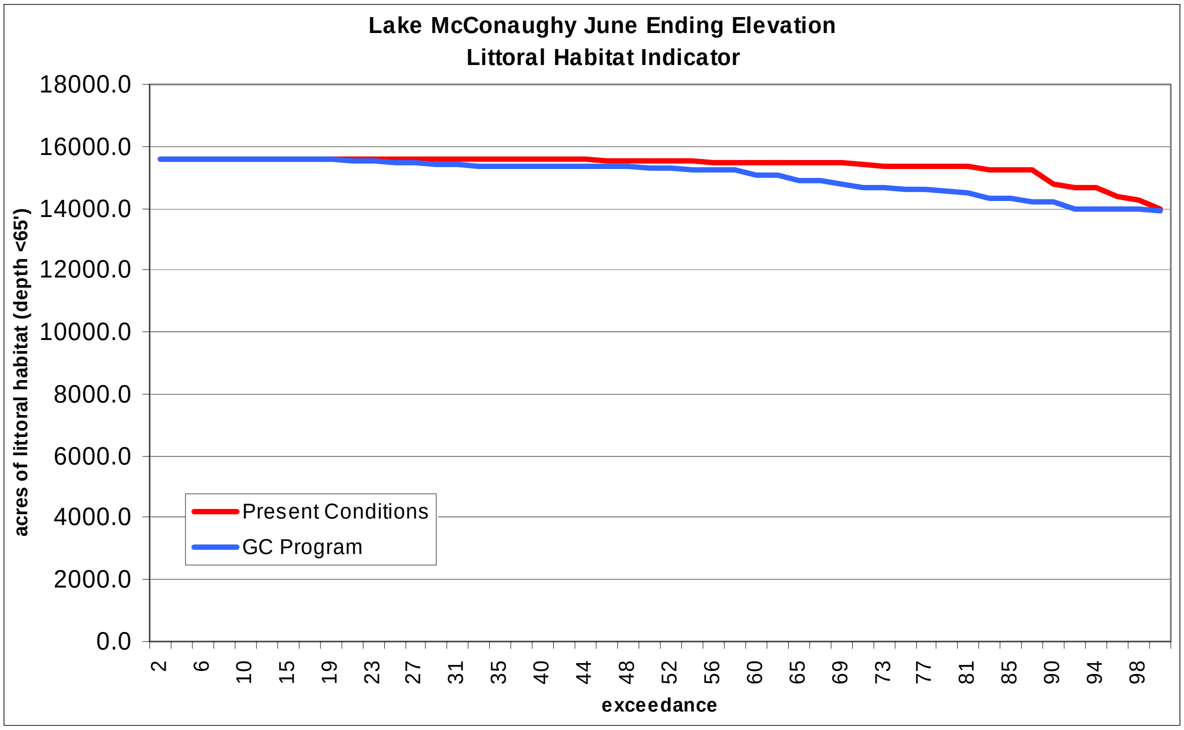


Figure 28. Littoral Habitat Indicator for the GC Alternative in June.

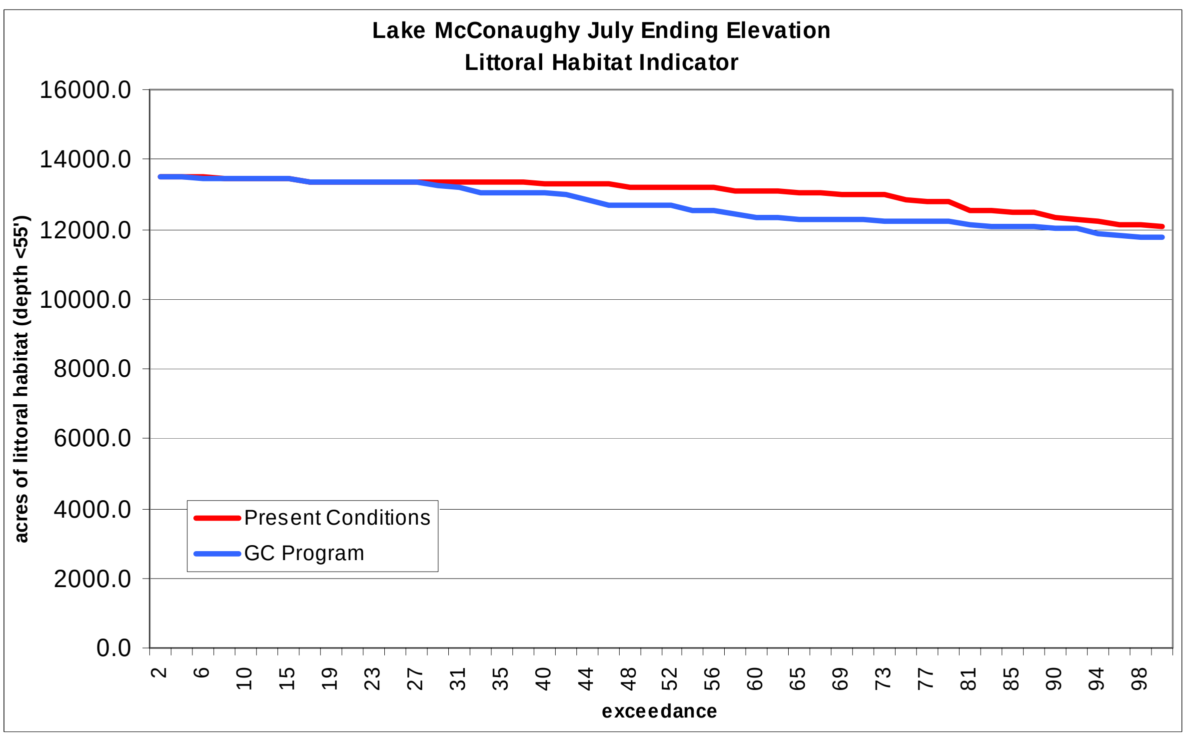


Figure 29. Littoral Habitat Indicator for the GC Alternative in July.

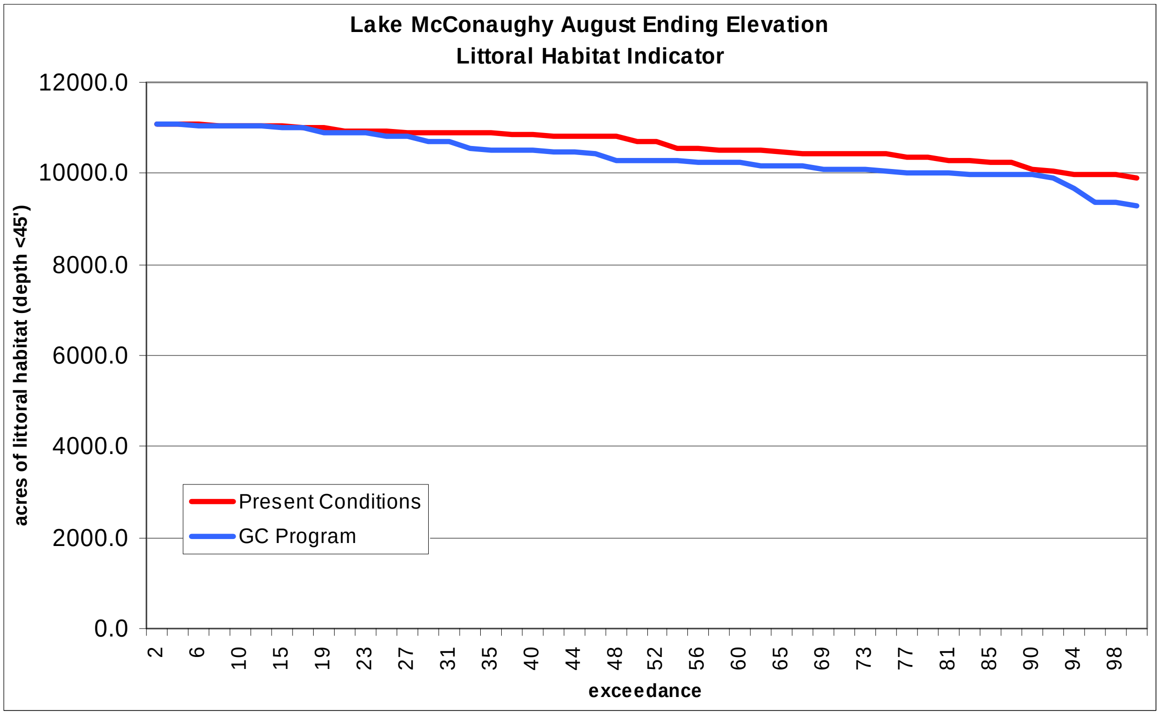


Figure 30. Littoral Habitat Indicator for the GC Alternative in August.

<u>Lake McConaughy Walleye Reproduction:</u> Natural walleye reproduction is anticipated to be significantly impacted. Under Present Conditions, reservoir elevations in April and May are conducive to successful walleye spawning in approximately 75% of years. Under the GC Alternative this is reduced to approximately 40% of years (Figure 31). While declining lake levels in April and May are undesirable for walleye spawning, what is currently not clear is the level of decline that would significantly affect recruitment. This is particularly important in that, while declining lake levels will occur during the spawning period in the majority of years under the GC Alternative, the extent of these declines will be relatively low in most years. For example, lake levels will decline in 60% of years, but will only decline more than 1 foot in approximately 15% of years.

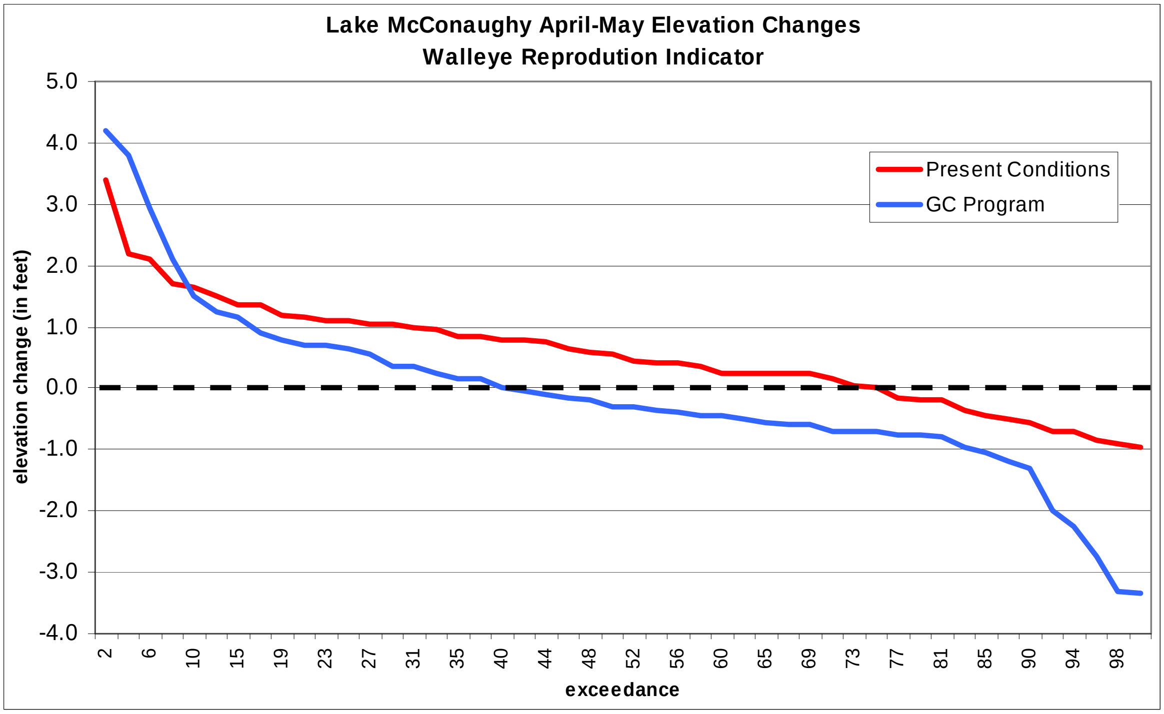


Figure 31. Walleye Reproduction Potential Under the GC Alternative for April-May Elevations.

Along with elevation change, minimum elevation relative to a benchmark (3255 ft above msl) at which walleye reproduction would be considered good has been evaluated. This analysis shows that good conditions for walleye reproduction occur in approximately 85% of years under Present Conditions, and approximately 50% of years under the GC Alternative (Figure 32).

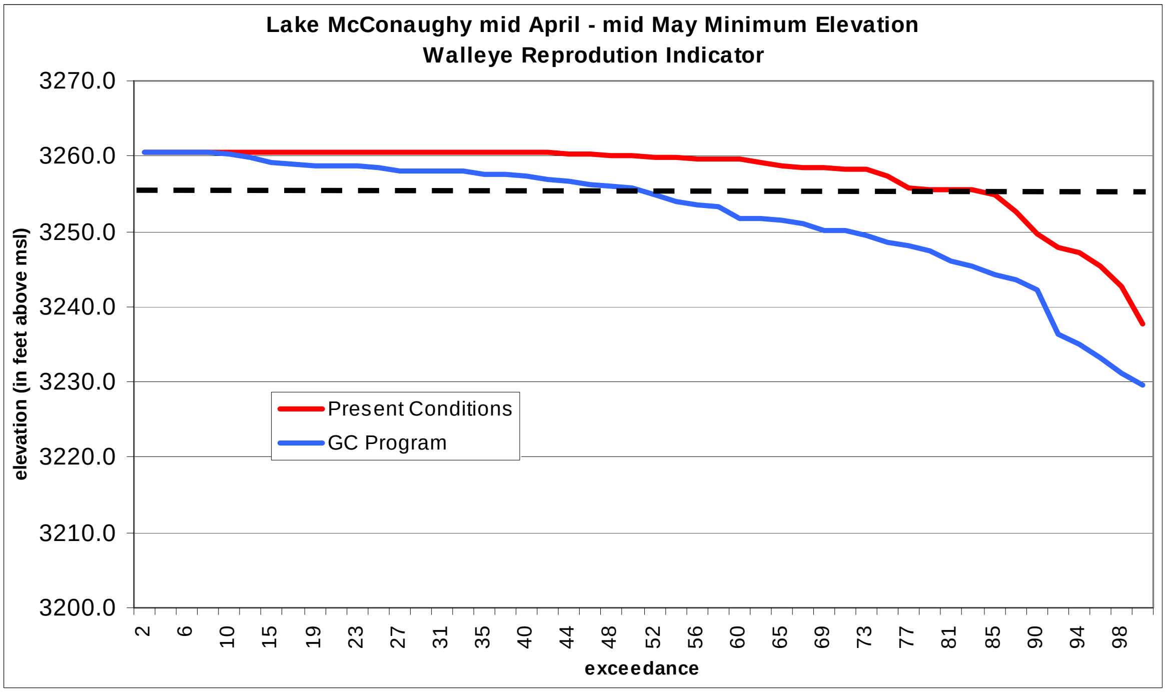


Figure 32. Walleye Reproduction Potential Under the GC Alternative for April-May Minimum Elevations.

These graphs show that total outflow from the reservoir is increased by approximately 17%, averaged across all conditions in May (Figure 33), and decreased by approximately 2%, averaged across all conditions in June (Figure 34).

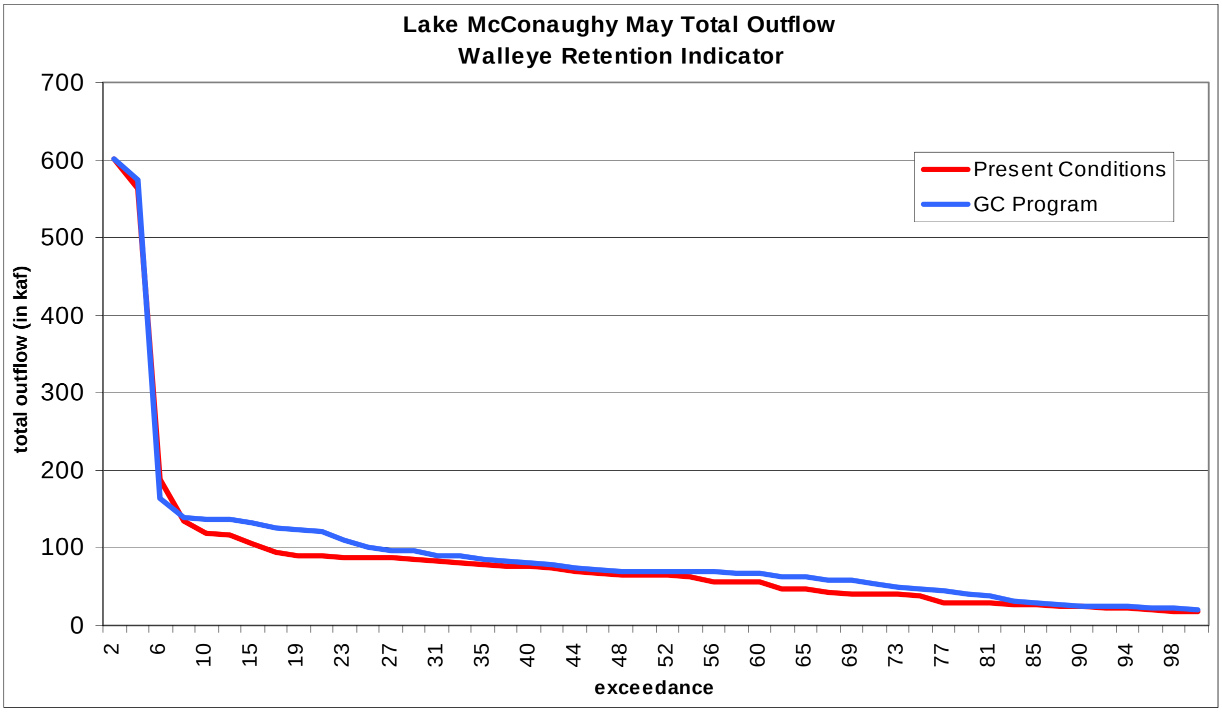


Figure 33. Walleye Retention Indicator Under the GC Alternative for May.

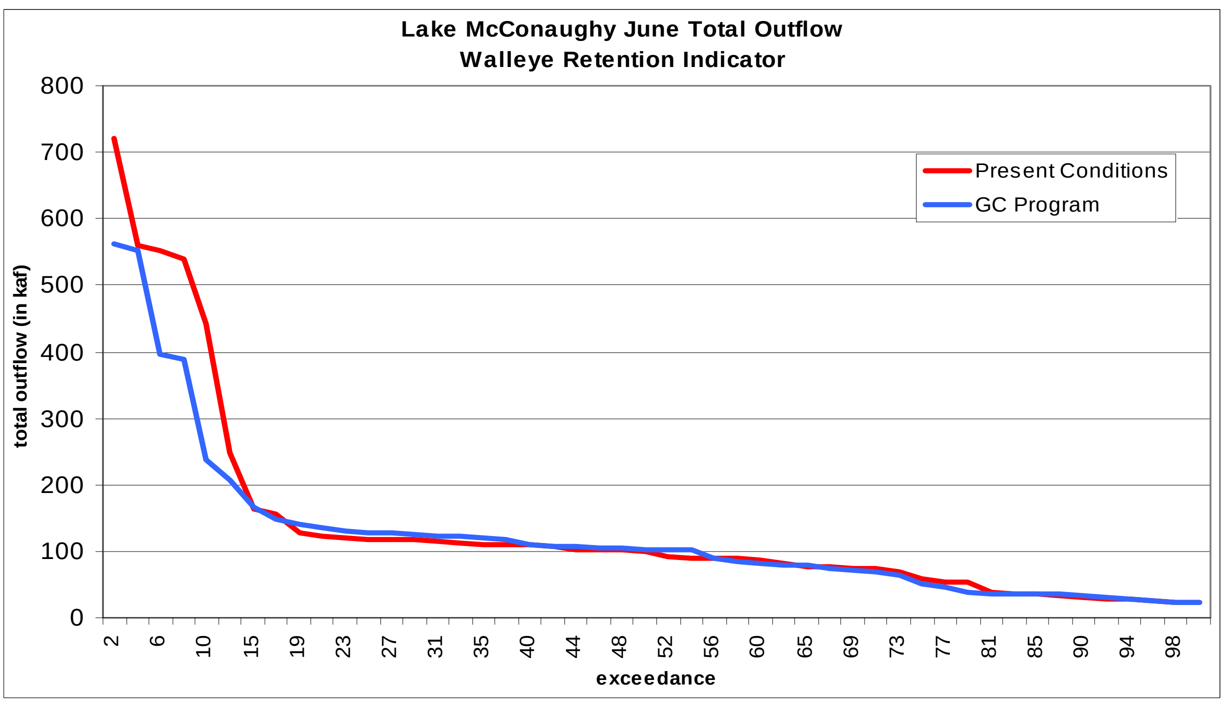


Figure 34. Walleye Retention Indicator Under the GC Alternative for June.

All of these analyses combined indicate that, if no additional factors external to the GC Alternative act to influence the current level of successful natural production, *and* the absolute worst-case scenario is realized (i.e., any decline in water levels results in a total loss of recruitment resulting from natural reproduction, and retention is reduced by approximately 17% in the remaining successful years), then hatchery production would need to be increased by approximately 19% from current levels. This increase, if the worst-case scenario should come to pass, would maintain the total number of walleye in the reservoir. However, there would be additional effects on the age structure of the population, resulting in a more uneven year-class distribution, as individual year classes are impacted by GC Alternative operations more than others.

Lake McConaughy White Bass Reproduction: Under the GC Alternative it declines very slightly, to approximately 11% of years (Figure 35). As this analysis evaluates only the one known factor, out of an indeterminate number of unknown factors influencing white bass recruitment in the reservoir, it is not known at this time what, if any, effects the GC Alternative will have on white bass recruitment in the reservoir.

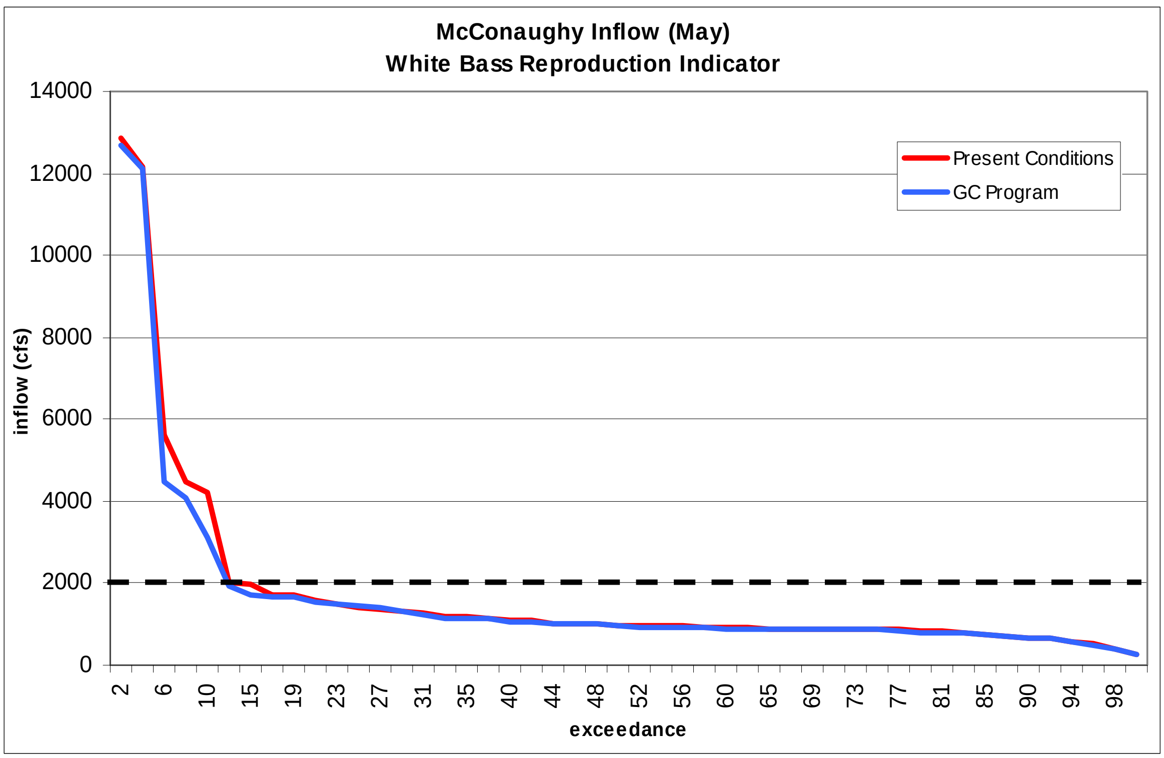


Figure 35. White Bass Reproduction Potential Under the GC Alternative.

Lake McConaughy Smallmouth Bass Reproduction: Present Conditions are conducive to successful smallmouth bass reproduction in approximately 82% of years. The GC Alternative reduce the occurrence of these conditions to 37% of years (Figure 36).

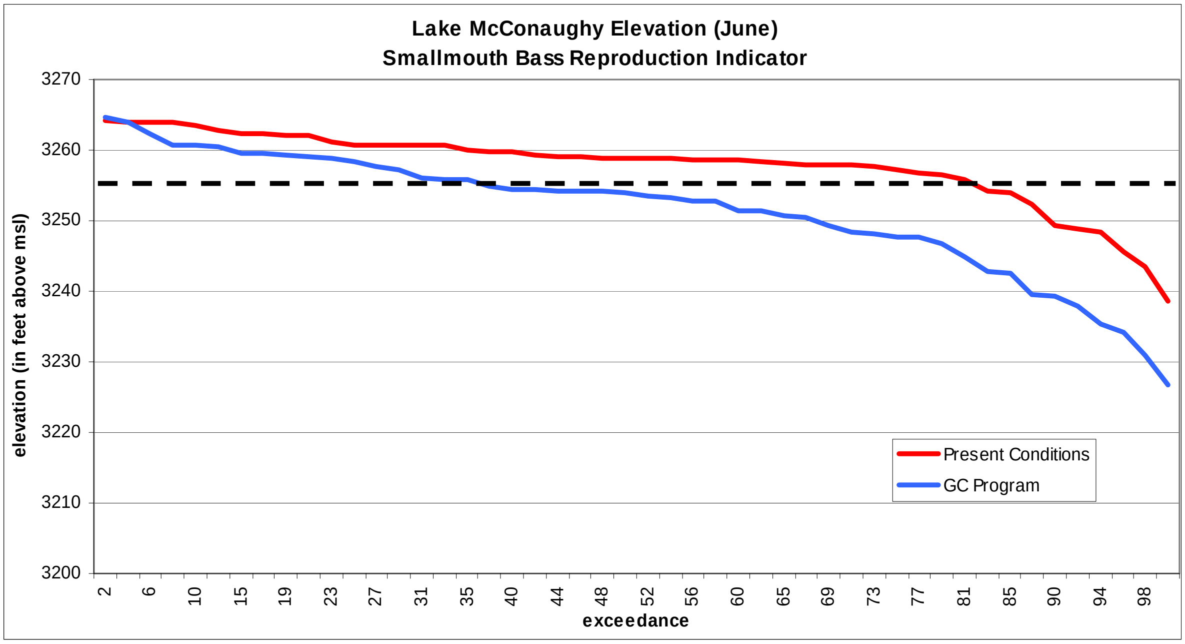


Figure 36. Smallmouth Bass Reproduction Potential Under Present Conditions the GC Alternative.

Using this second analysis, a decline in the availability of smallmouth bass spawning habitat of approximately 21% is seen across all conditions (on average), under the GC Alternative, with the majority of losses occurring in the 50% of years with the lowest overall June reservoir elevations (Figure 37). This will likely result in a more uneven year class distribution of smallmouth bass in the reservoir, with years that would have resulted in good smallmouth bass production under Present Conditions largely still resulting in good production under the GC Alternative, and years where production would have been poorer under Present Conditions, considerably poorer still under the GC Alternative.

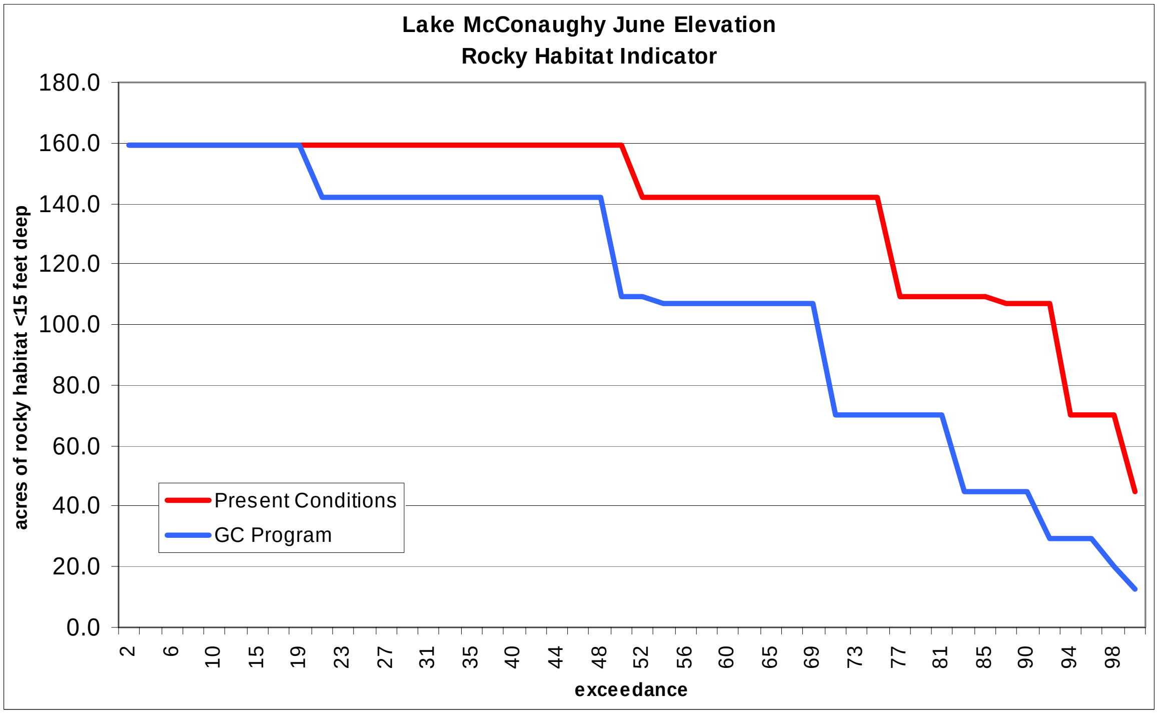


Figure 37. Rocky Habitat Indicator Under the GC Alternative

<u>Lake McConaughy Channel Catfish Reproduction:</u> The analyses appear to indicate that in terms of average inflows in the months of April, May, and June, the GC Alternative will result in an average 3% to 4% decline (Figures 38 – 40). In terms of trends in river flow, little change is indicated in the tendency for a rising river, which would help trigger channel catfish staging/spawning (Figures 41 – 42). However in those years with a strongly rising river (i.e., those years providing the strongest spawning cues), the magnitude of the rise is somewhat reduced. The overall impact of these changes will likely be small, and easily sustained by a healthy channel catfish population.

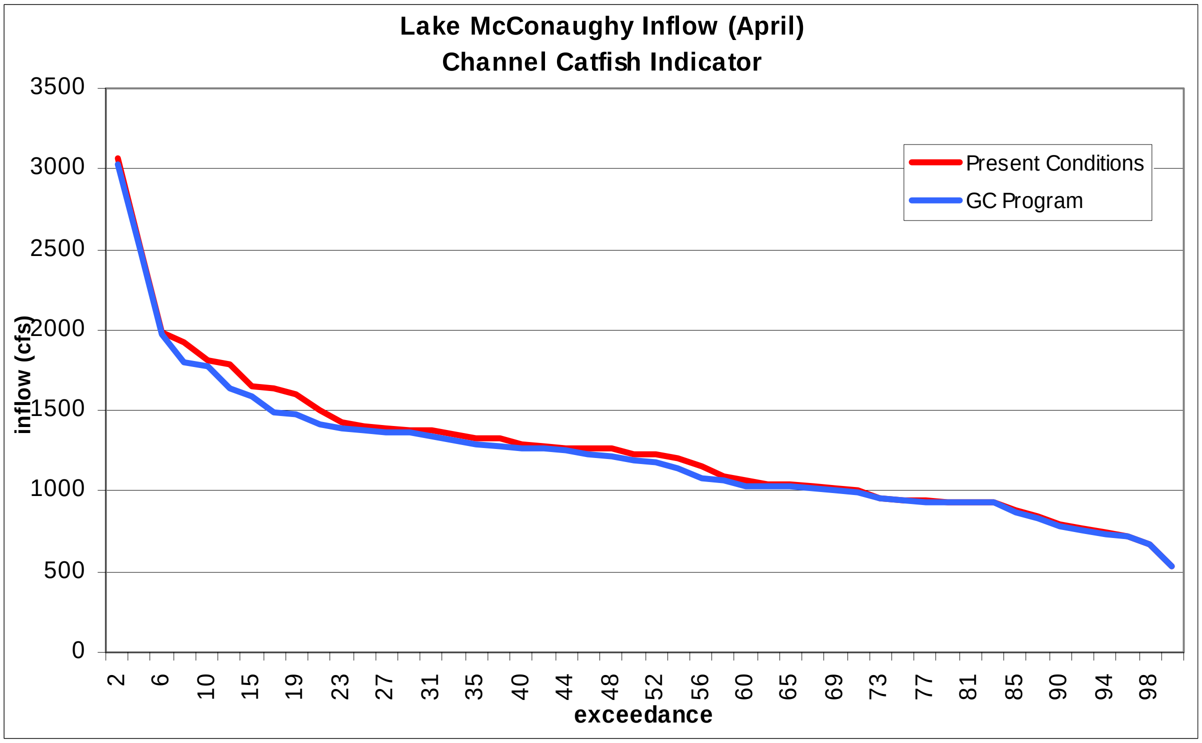


Figure 38. Channel Catfish Reproduction Potential Under the GC Alternative for April.

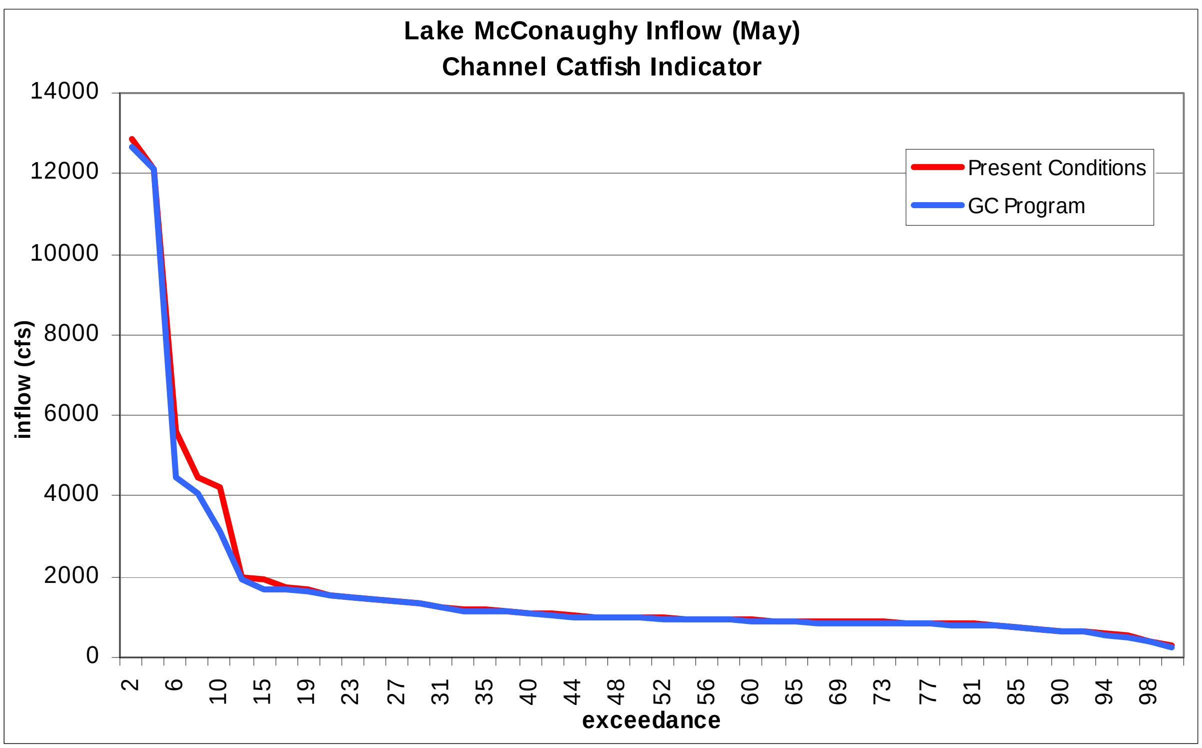


Figure 39. Channel Catfish Reproduction Potential Under the GC Alternative for May.

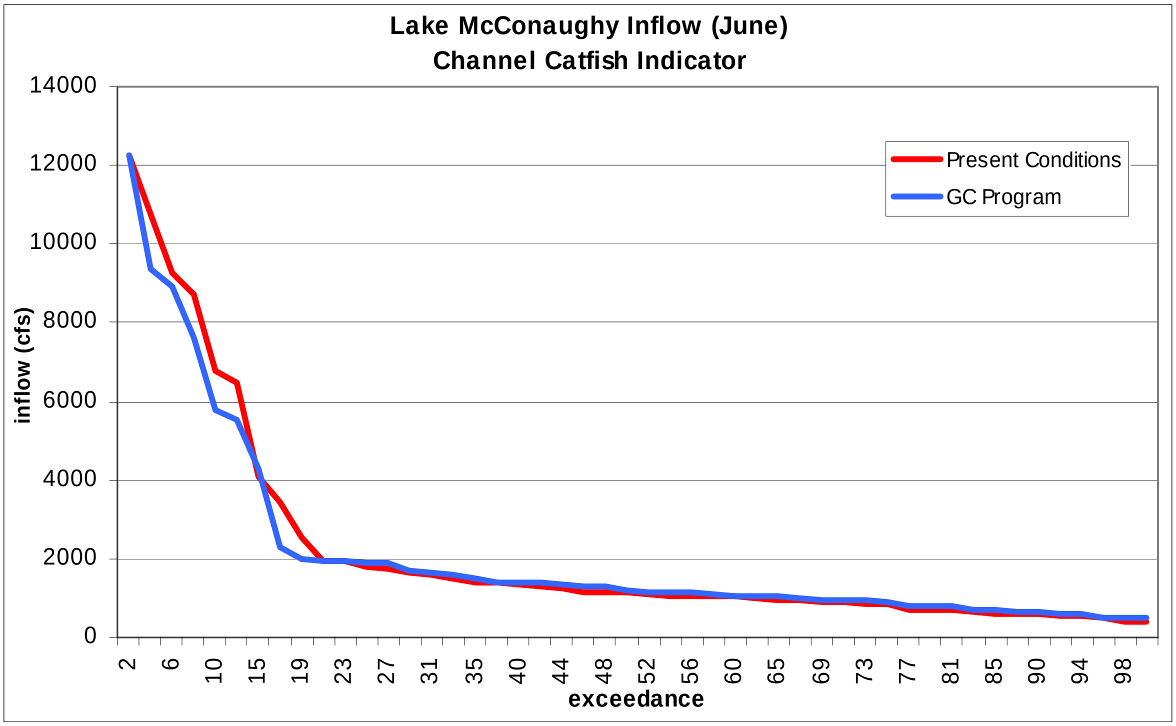


Figure 40. Channel Catfish Reproduction Potential Under the GC Alternative for June.

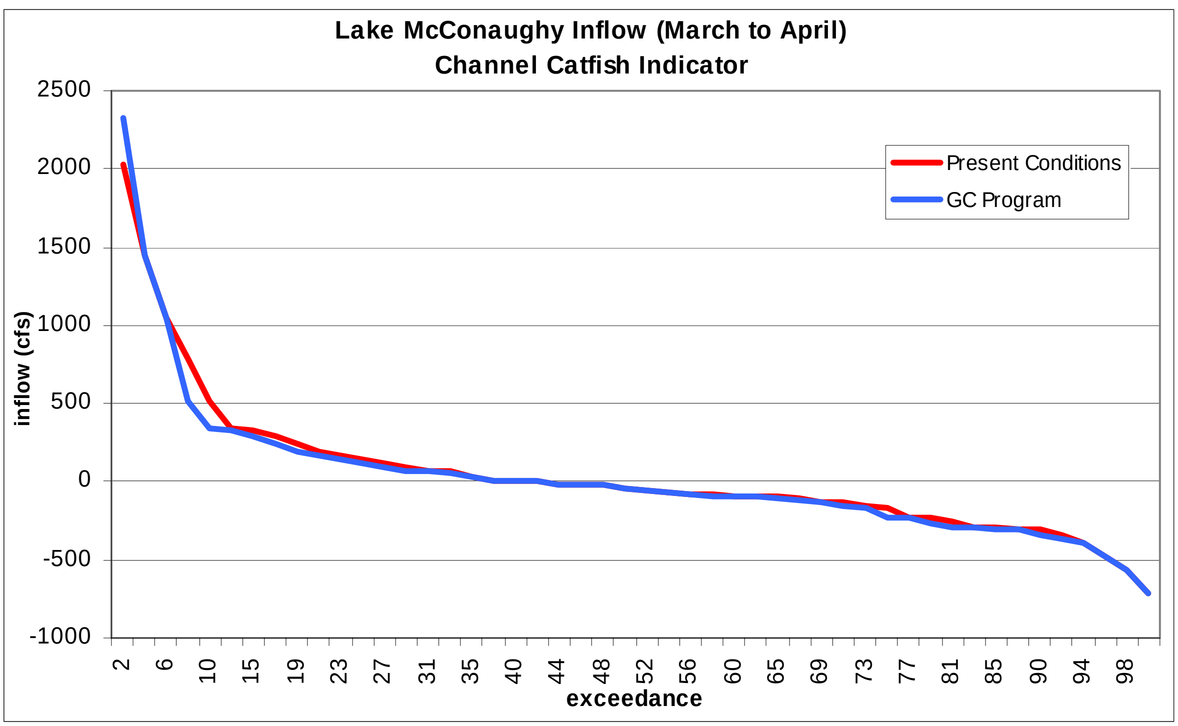


Figure 41. Channel Catfish Reproduction Potential Under the GC Alternative for March to April.

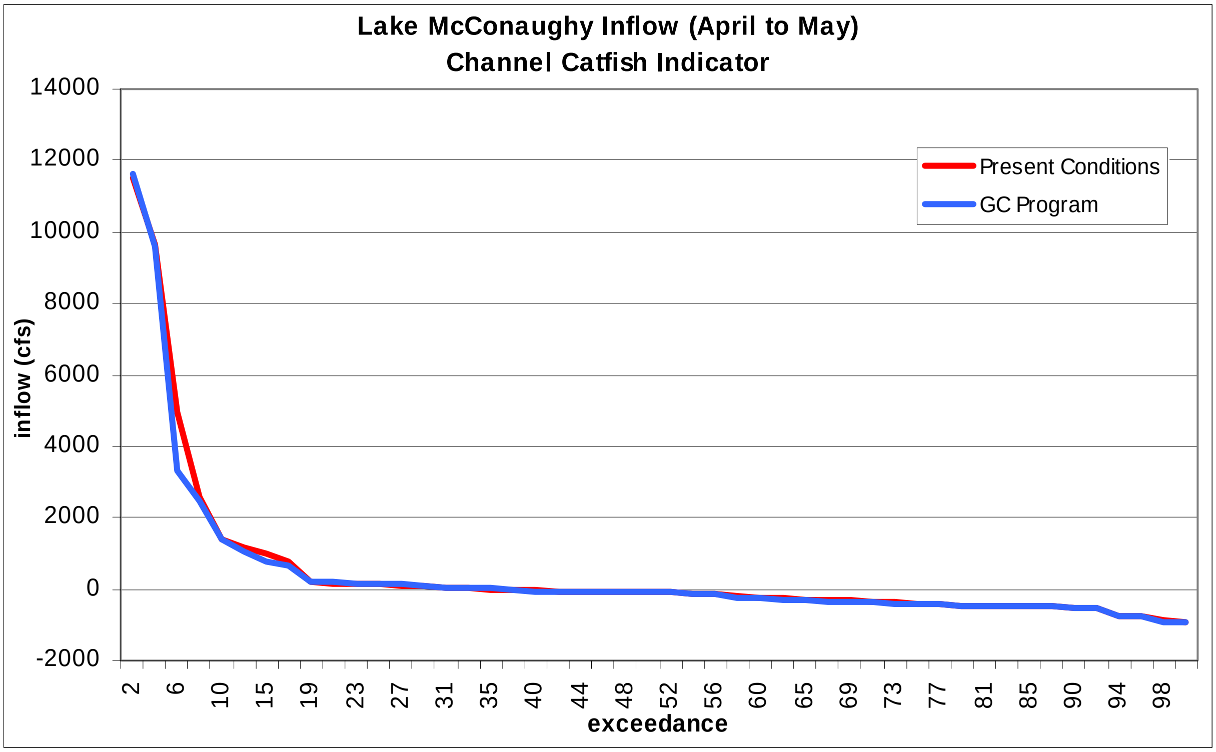


Figure 42. Channel Catfish Reproduction Potential Under the GC Alternative for April to May.

Lake McConaughy Gizzard Shad Reproduction: This analysis shows that reservoir elevations grater than 3250 ft. above msl occurred in 88% of years under Present Conditions, and 68% of years under the GC Alternative (Figure 43). The implications of this reduction are not entirely clear, although it is likely that gizzard shad reproduction will be adversely impacted as a result.

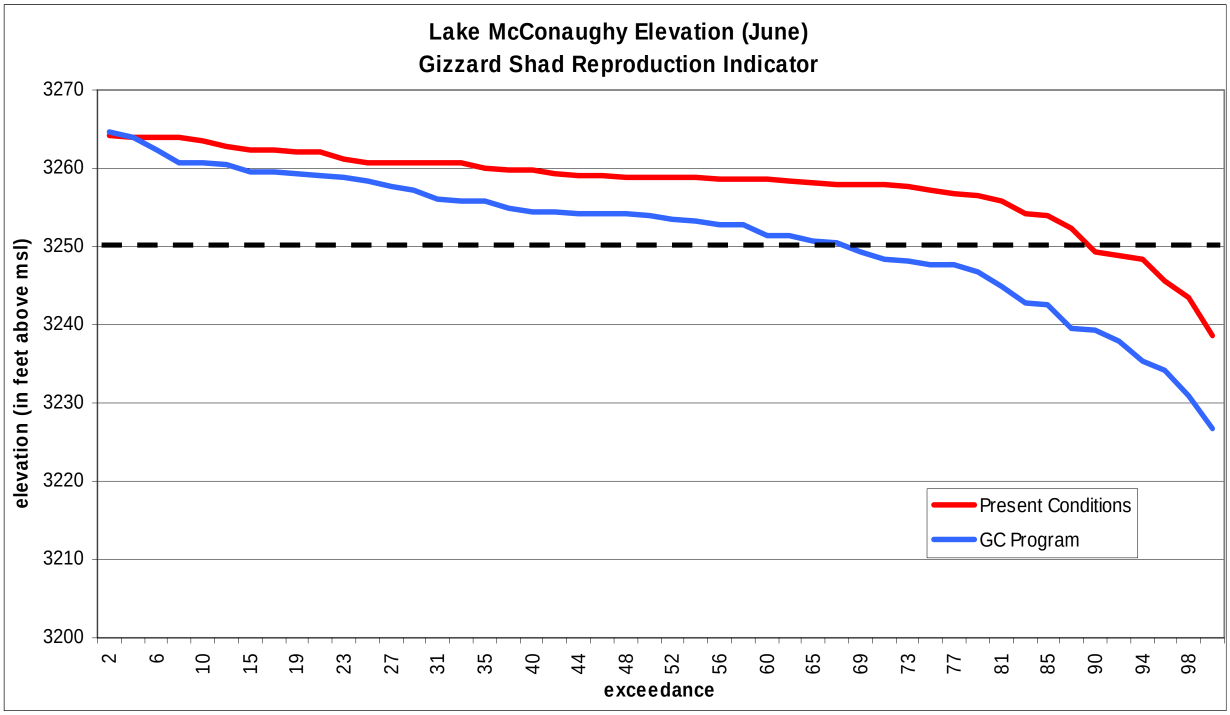


Figure 43. Gizzard Shad Reproduction Potential Under the GC Alternative.

<u>Lake McConaughy Gizzard Shad Overwintering Conditions:</u> Under Present Conditions, reservoir levels remain above the 3.240 ft elevation in 90% of years. Under the GC Alternative, the Lake McConaughy December to February flows would be reduced to 78% of years (Figure 44).

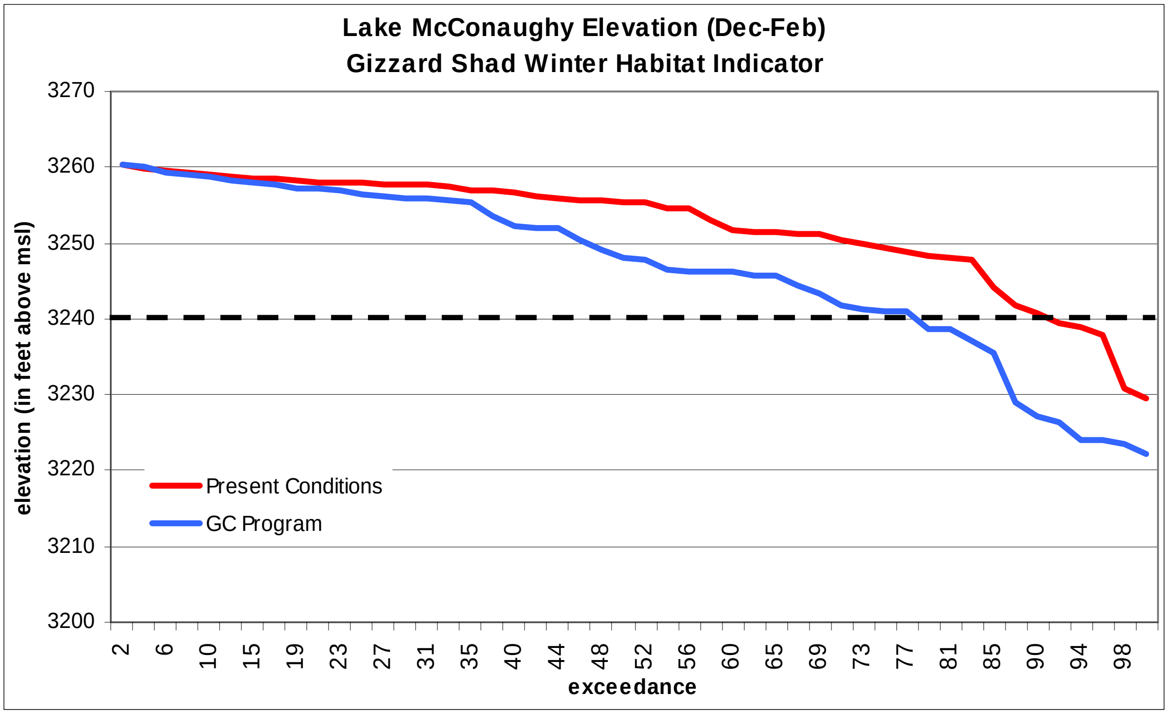


Figure 44. Gizzard shad overwintering potential under the GC Alternative.

Lake Ogallala Trout Fisheries Support: Summer water levels in Lake McConaughy are summarized in Figures 45 through 48. Neither the Program nor Present Conditions are anticipated to result in stress to the Ogallala trout fishery due to low reservoir levels in Lake McConaughy during the month of June. In July, conditions are not anticipated that would place the trout fishery under stress under Present Conditions, but would be anticipated in 6% of years under the Program. In August, conditions that would result in stress on the trout fishery are anticipated in 4% of years, and 19% of years under the Program. In September, reservoir levels that would result in temperatures that would stress the trout fishery are anticipated in 10% of years under Present Conditions, and in 24% of years under the Program.

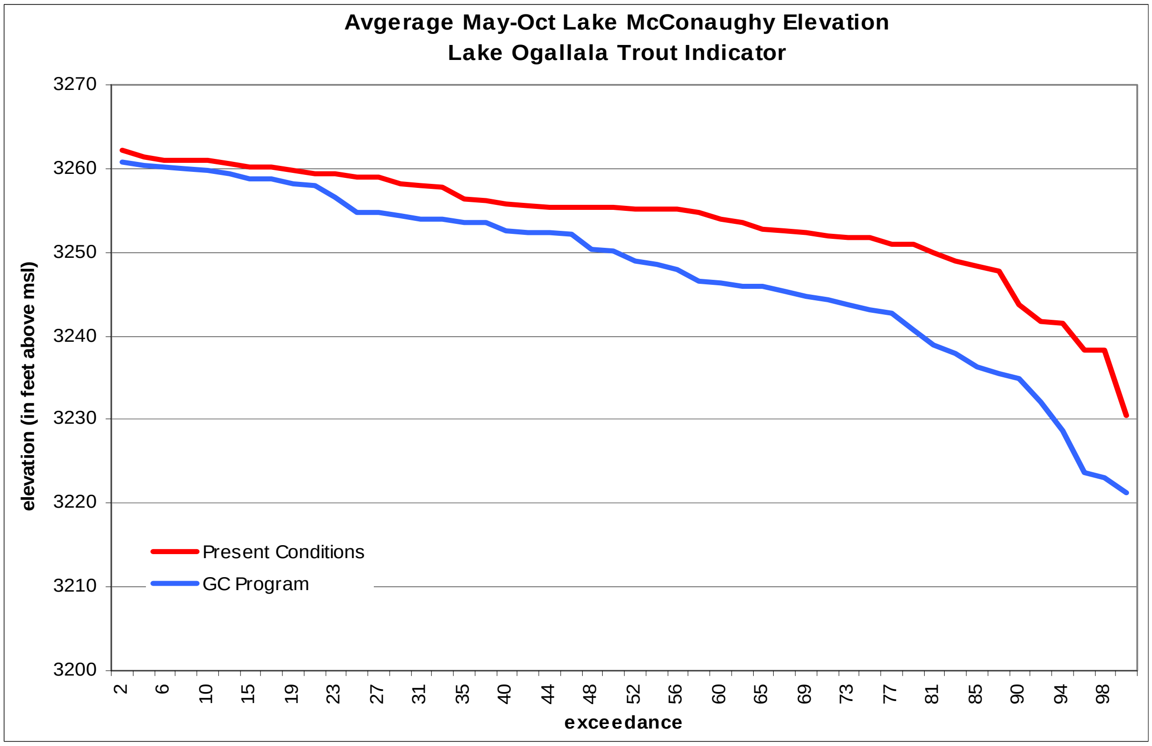


Figure 45. Lake Ogallala Trout Indicator for the GC Alternative in May to October.

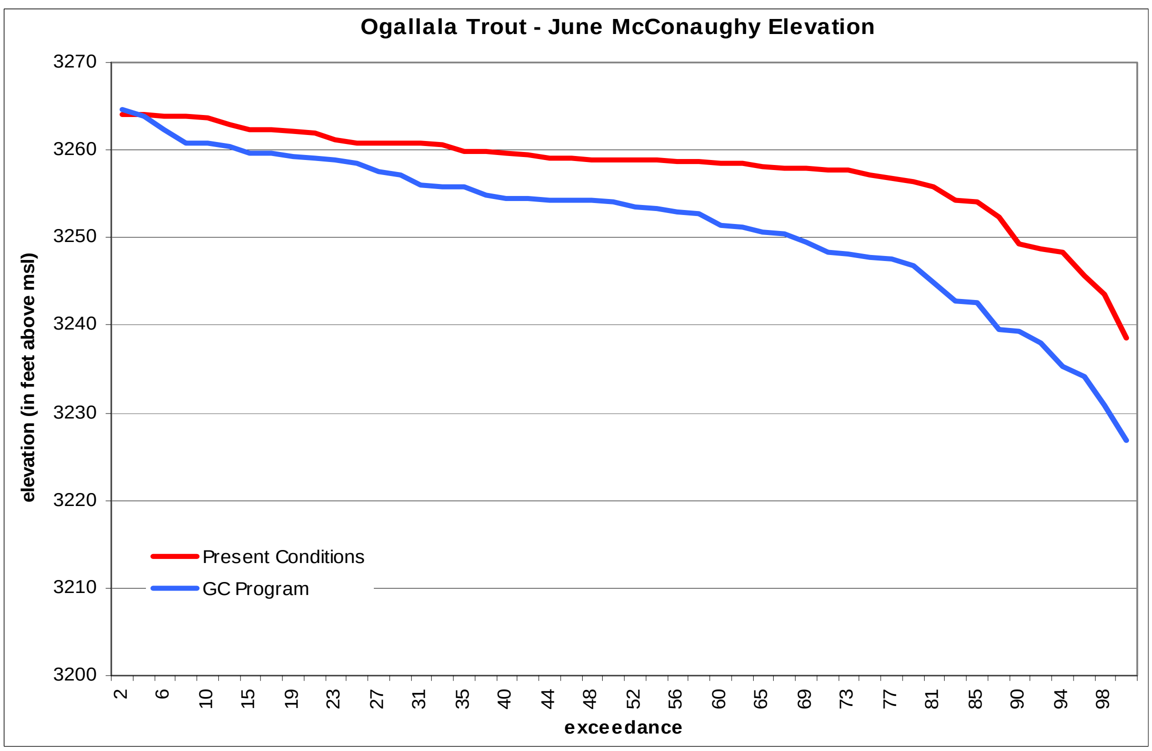


Figure 46. Lake Ogallala Trout Indicator for the GC Alternative in June.

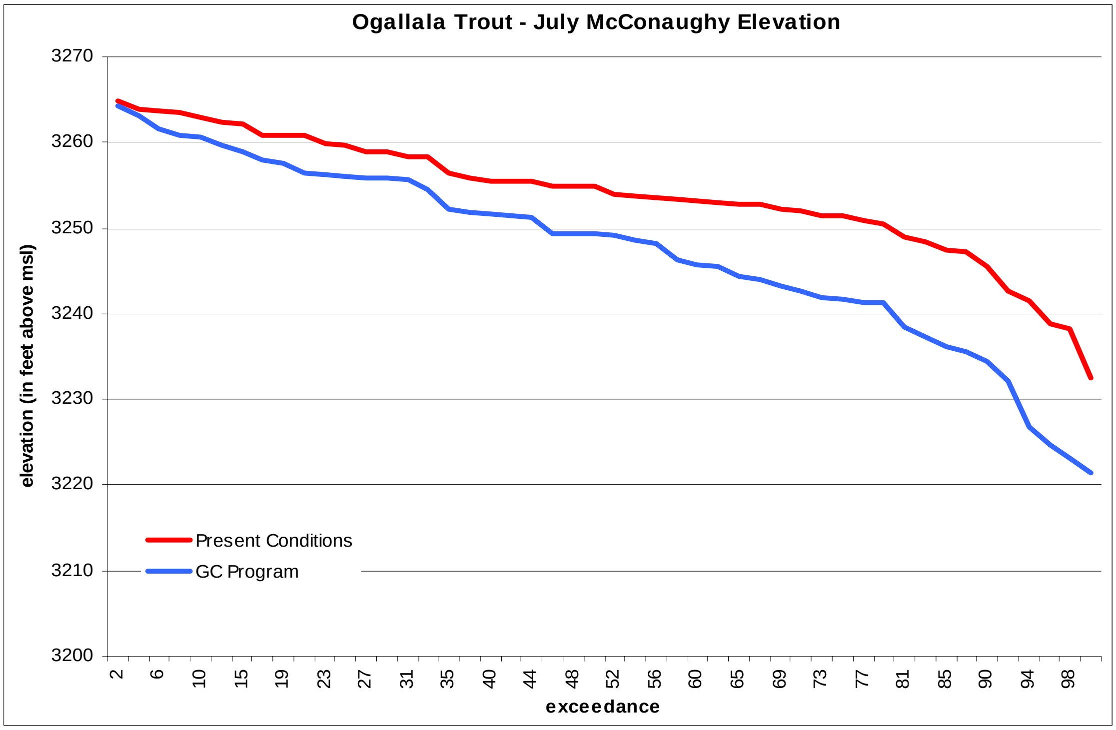


Figure 47. Lake Ogallala Trout Indicator for the GC Alternative in July.

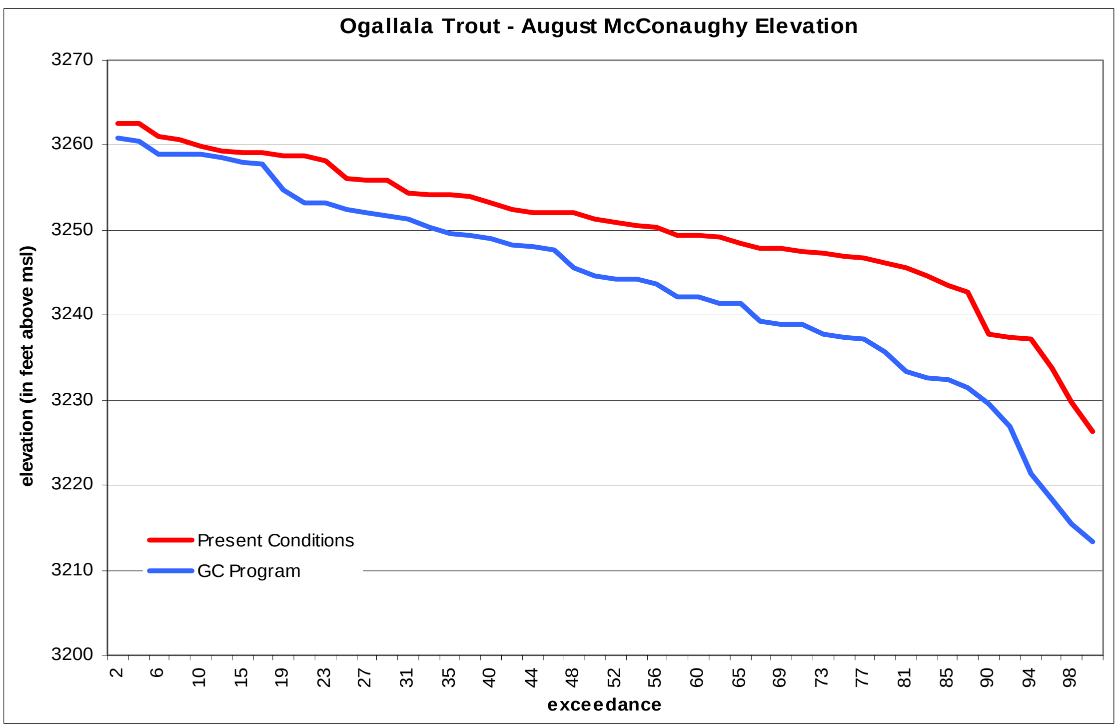


Figure 48. Lake Ogallala Trout Indicator for the GC Alternative in August.

Finescale Dace and Northern Redbelly Dace With Program

Flow patterns in the North Platte River at North Platte, Nebraska are largely indistinguishable between the GC Alternative and Present Conditions. Reduced monthly volumes during the months of June and July are anticipated to occur under the GC Alternative (Figure 49). When this is examined relative to availability of the habitat types preferred by both species, namely clear water, cool habitats with slow or still pools, such as those that could be provided by connected backwaters or side channels, the GC Alternative is anticipated to negatively impact both species.

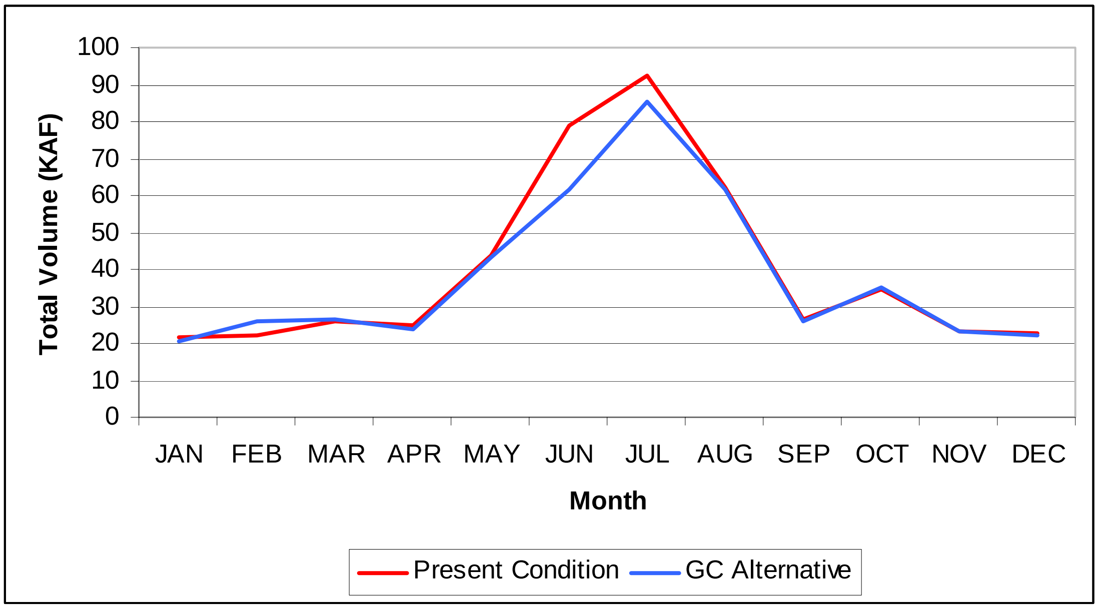


Figure 49. Average Monthly Volumes Passing the North Platte Gage along the North Platte River.

<u>Central Platte River Resources Without Program</u>

River Otter Without Program

The habitat of the river otter along the Platte River consists of forested rivers and streams with sloughs and backwaters. Marshes and beaver ponds are also frequented. River otter are opportunistic, and will forage on a variety of animals; although the majority of their food is in the form of fish and some crayfish. The slower swimming rough fish are taken more readily than faster game fish. High water temperature events associated with fish kills are significantly more likely to occur at flow rates below 1,200 cfs in the central Platte River (USFWS 1997) depleting the prey base for the otter. For the 48 years modeled under the present condition at the Grand Island flow gage, it is estimated that 744 days will fall below the 1,200 cfs threshold. As would be expected, zero flow conditions at the Grand Island gage would lead to a near complete die-off of large fish in the central Platte River, as the availability of refugia for large fish is extremely low under such conditions. For the 48 years modeled under the present condition at the Grand Island flow gage, it is estimated that 192 days of zero flow are anticipated to occur.

Riverine Fish Community Without Program

Aside from recreational and human consumptive uses of the fishery resources of the Platte River, fisheries are important as food sources for a number of migratory birds including the whooping crane, bald eagle (*Haliaeetus leucocephalus*), least tern, other terns, gulls, white pelican *(Pelecanus erythrorhynchos)*, double-crested cormorant *(Phalacrocorax auritus)*, mergansers, herons, and egrets. Spiny softshell *(Trionyx spinifer)* and snapping turtles *(Chelydra serpentina)* also forage upon fish. The bait fish industry is also supported by the forage fish population. Wildlife species which depend upon prey fish can be severely impacted during fish kills brought about by low flows and high temperatures. Although herons and egrets can, and do, prey upon other vertebrates such and frogs, snakes, and small rodents, other species such as the least tern are restricted to fish, with an occasional crustacean or insect. For terns, the width of bill gape is widely accepted as the factor determining if a fish can be swallowed. Prey fish body depth often limits the size of fish that can be eaten before length does. For example, a tern can easily swallow a slender bodied fish which may be longer than the bird's esophagus, but cannot swallow a shorter deeper-bodied fish such as a large red shiner (Hulsman 1981). Therefore, even though some deep-bodied prey species may be abundant, only those small enough to be swallowed can be considered to be available forage. As chicks begin to hatch, the availability of fry becomes important.

Small fish species and young of the year of larger species are also an important component of the food chain for other fish such as channel catfish, gar, freshwater drum, and pallid sturgeon. Mammalian species that commonly prey upon fish are mink *(Mustela vison)* and river otter, while numerous other species readily scavenge dead fish. Appendix A - Table 10 provides a list of fish species documented in the Platte River.

The effects of alternative flow regimes on physical habitat were determined using the relationships between available fish habitat and discharge (Habitat Area Curves). The OpStudy Model was used to simulate average monthly discharge over a 52 year period of record for each alternative at two locations in the central Platte River. Using the habitat time series computer programs within PHABSIM, discharge data from Overton and Grand Island, were converted to percent of optimal habitat using the final habitat/discharge relationships discussed above for the five fish guilds. Monthly habitat duration curves for each alternative were then compared to the present condition to determine percentage change in fish habitat. Positive and negative percent differences were interpreted as minor (<10%) (- or +), moderate (10-20%) (-- or ++), or major (>20%) (--- or +++), depending on the magnitude of change. The final step was a tally of each positive and negative category to determine which alternative provided the most benefit to the fish community. Monthly flow duration curves were also generated for comparative purposes.

High water temperature events associated with fish kills are significantly more likely to occur at flow rates below 1,200 cfs in the central Platte River (USFWS 1997). For the 48 years modeled under the present condition at the Grand Island flow gage, it is estimated that 744 days will fall below the 1,200 cfs threshold. As would be expected, zero flow conditions at the Grand Island gage would lead to a near complete die-off of large fish in the central Platte River, as the availability of refugia for large fish is extremely low under such conditions. For the 48 years modeled under the present condition at the Grand Island flow gage, it is estimated that 192 days of zero flow are anticipated to occur.

Sandhill Crane Without Program

Historically (before water development began in the late 1800s), cranes have used the Central Platte Valley from Sutherland to Grand Island, Nebraska (Krapu, 1999). Sandhill cranes no longer use the North Platte and Platte Rivers between North Platte and Lexington, Nebraska. In the areas still occupied on the Platte River, crane use has shifted eastward during the past 45 years. Approximately 60 percent of crane use occurred between Lexington and Kearney in 1957, with about 9 percent of the use between Kearney and Chapman (Faanes and LeValley, 1993). By 1989, 5 percent of cranes occupied the Lexington to Kearney reach, and 81 percent of cranes used the Kearney to Chapman reach.

Cranes use roosting sites that provide suitable water depth. Sandhill crane researchers have speculated that optimal water depth for roosting ranges from 4 to 8 inches, with depths greater than 14 inches believed unsuitable for sandhill cranes (Armbruster and Farmer, 1981). Research indicates that depths up to about 8 inches are commonly used for roosting, with use decreasing rapidly at deeper sites (Latka and Yahnke, 1986; Folk and Tacha, 1990; and Norling et al., 1990). Latka and Yahnke (1986) speculated that because velocities are closely correlated with depth in the Platte River—flow velocity greater than 1.3 feet/second, or channel bed instability at deeper sites with higher velocities may influence use of sites for roosting.

Flows and channel morphology have been the subject of numerous studies in the Central Platte Valley (reviewed by Simons and Associates, Inc., 2000). Permanent channel transects have been established for various purposes and used to collect data over the years. Subsets of these data, plus additional transect data are used to quantify sandhill crane roosting habitat.

The indicator for roosting suitability at the site scale is roosting depth abundance as measured by transect length (in feet) within the 3- to 9-inch-depth range. The PHABSIM modeling methodology was used to evaluate roosting depth abundance. Survey data from the eight habitat sites were selected (measured flow range between 1,068 cfs and 2,062 cfs) and compared to determine the discharge that provided the maximum transect length containing depths between 3 and 9 inches. Eight sites selected between Lexington and Chapman where roosting depth abundance is maximized between 800 cfs and 1,600 cfs (mean of 1,175 cfs). Within these flows, maximum length of transect occupied by depths between 3 and 9 inches ranged from 148 feet to 885 feet.

Median March flows (1947 to 1994) were selected to represent discharge in the discharge-roosting depth abundance relationship described above during the spring roosting period under the Present

Condition. Median March flows for all eight transect sites were greater than flows that would maximize roosting depth abundance. Median March flows ranged from 1,935.2 cfs (Overton gauge) to 2,141.4 cfs (Grand Island gauge) (Refer to Chapter 4 of the FEIS for a comprehensive description of the sandhill crane affected environment and present conditions).

Waterfowl and Waterbirds Without Program

Snow *(Chen caerulescens)*, Canada *(Branta canadensis)*, and greater white-fronted geese *(Anser albifrons)*, mallard *(Anas platyrynchos)* and pintail *(Anas acuta)* are species known to frequently use the central Platte valley. Suitable roost sites should be the focal point of habitat components (Sparling and Krapu 1994). During typical freeze-thaw cycles, considerable movement of waterfowl occurs between the Platte River and the Rainwater Basin wetlands. In late February of 2002, aerial surveys conducted by the Service's Rainwater Basin Wetland Management District office estimated 20 percent of the rainwater basins had water, and supported approximately 3.5 million light geese. One week later, temperatures fell and water in the rainwater basins froze, forcing birds to the Platte River (Trust 2002).

Several species of wading birds migrate through, and nest in the Platte River valley. Cattle egret flocks are commonly seen in the early spring. There are several great blue heron rookeries along the central Platte River, while the green heron is a common nester in the lower growth riparian zone along the river. An occasional great egret (*Casmerodius albus*), snowy egret (*Egretta thula*), black-crowned night heron (*Nycticorax nycticorax*), white-faced ibis (*Plegadis chihi*), or American white pelican (*Pelecanus erythrorhynchos*) may also be seen on the river.

Different species of shorebirds pass through the Platte River valley at different times. In general, killdeer *(Charadrius vociferus)* arrive first, followed by waves of greater yellowlegs *(Tringa melanoleuca)*, baird's sandpipers *(Calidris bairdii)*, semipalmated sandpipers *(Calidris pusilla)*, pectoral sandpipers *(Calidris melanotos)*, least sandpipers *(Calidris minutilla)*, lesser yellowlegs *(Tringa flavipes)*, and then the white-rumped sandpipers *(Calidris fusciollis)*. Some species, such as the sanderling *(Calidris alba)*, semipalmated plover *(Charadrius semipalmatus)*, and least sandpiper use the river in greater numbers during the fall migration than during spring (Lingle 1994, Sharpe et al. 2001).

Bottomland grasslands along the floodplain of the Platte River, and the river itself are heavily used by migrating shore and wading birds. Many of these grasslands are a mosaic of sub-irrigated sloughs and upland grasslands which supply an abundant source of nutrient rich invertebrates. Waders such as egrets and herons will forage for small minnows in the backwaters and slower side channels of the river, while flocks of migrating shorebirds will forage for invertebrates in shallow water edges and moist sandbars.

The Service has identified target flows necessary to maintain habitat suitability to waterfowl and waterbirds (USFWS 1994). February/March and April/May conditions play critical roles for providing flows that will subirrigate wet meadows benefiting numerous species of waterfowl, waterbirds, and shorebirds. April/May peak flows serve another purpose by maintaining vegetation free sandbars and maintaining a wide channel. Instream flow targets for the period of February 1 to March 22 provides suitable habitat to migrating waterfowl while offsetting lost habitat in the Rainwater Basins when frozen. Instream flow targets for the period of March 23 to May 10 will provide channel habitat to migratory waterfowl, wading birds, and shore birds. Migrating and wintering waterfowl benefit from the instream flows provided in the October 1 to November 15 and the November 16 to December 31 time period.

Several discharge parameters were evaluated in the central Platte River reach:

- Shortages to Instream Target Flows Feb – Apr (92.8 KAF for the Present Condition)
- Shortages to Instream Target Flows Oct – Dec (44.7 KAF for the Present Condition)
- Frequency that Annual 7-day Peak Flow Achieves 8,000 cfs at Grand Island (14 out of the 48 modeled years)
- Frequency that Annual 7-Day Peak Flow Achieves 12,000 cfs at Grand Island (7 out of the 48 modeled years)
- 30-Day Mean River Water Surface Elevations (ft) During Early Spring (Mid-February to Mid-March)
- 30-Day Mean River Water Surface Elevations (ft) During Late Spring (Mid-April Through June)

Mussels Without Program

The central Platte River is a unique area for mussels with its greater diversity of habitats compared to other Platte reaches. Mussels known to occur within the central Platte River system include the paper floater (*Anodota imbecilis*), giant floater (*Anodota g. grandis*), white heel-splitter (*Lasmigona c. complanata*), pink paper shell (*Potamilus ohiensis*), maple leaf (*Quadrula quadrula*), pimple back (*Quadrula pustules*), squaw foot (*Strophitus u. undulates*), fragile paper shell (*Leptodea fragilis*), cylindrical paper shell (*Anodontoides ferussacianus*), pond horn (*Uniomerus tetralasmus*), Asiatic clam (*Corbicula fluminea*), lilliput (*Toxolasma parvus*), and pocketbook (*Lampsilis ventricosa*) (Freeman and Perkins 1994). Many mussel species occupy side channels, canals, and backwaters of the Platte as opposed to residing in the main channel (Peyton and Maher 1992). The mussels are collectively considered a resource of concern because of their existence in relatively small pockets of habitat in the central Platte River.

Central Platte River Resources With Implementation of Program

River Otter With Program

As discussed above, river otter primarily utilize larger fish as food, and high levels of habitat availability are present for representative fish species above 1,800 cfs in the central Platte River. High water temperature events leading to fish kills are most likely to occur at flow rates below 1,200 cfs, and Zero flow rates lead to near total loss of the local large fish fauna. Under the GC Alternative, the frequency of 1,200 cfs or lower flows increases from the present condition by 7 percent (799 days compared to 744 for the present condition), and zero flow days decreased by 25 percent (153 days compared to 192 for the present condition).

The biological effects of this relative to the river otter food source are that under the GC Alternative, a relative improvement of the health of the large fish fauna would occur relative to Present Conditions. However, the fisheries would still be subject to seasonal stresses due to low habitat availability and a relatively high risk of high summer water temperature events. An elimination of zero flow months would be expected to have a positive effect on the health of the fisheries, but as those events are relatively rare even under present conditions, the long-term effect would not be expected to be substantial.

Riverine Fish Community With Program

The availability of physical habitat for a composite or a suite of species, representing the central Platte River fish community, was modeled for each of the GC Alternatives. This was performed for both the Overton and Grand Island stream gage sites (Table 2). Results of this analysis were generally quite similar for all alternatives. In general, all show significant improvement over Present Conditions, and would likely be functionally comparable. This means that there would be a greater availability of the "composite habitat" under any of the GC Alternative, which would lend itself to better support a diverse fish community.

Table 2. Summary of impacts for fish habitat at Overton (sum of each value for all months and all exceedance levels).

VALUE	Overton Gage	Grand Island Gage
MINOR LOSS -	17	11
MODERATE LOSS --	1	1
MAJOR LOSS ---	0	0
NO CHANGE	0	0
MINOR GAIN +	21	25
MODERATE GAIN ++	9	7
MAJOR GAIN +++	0	4

When comparing the ability of GC Alternative to ameliorate the occurrence of high water temperature events, all the alternatives showed improvement over Present Conditions. In general, the GC Alternative displayed a reduced probability of exceeding temperature thresholds on a daily basis during the summer when compared to Present Conditions. Under the GC Alternative, the frequency of 1,200 cfs or lower flows increases from the present condition by 7 percent (799 days compared to 744 for the present condition), and zero flow days decreased by 25 percent (153 days compared to 192 for the present condition). The ability of the system to maintain water temperatures below critical thresholds is important, in that high water temperature events can significantly stress the fish community, leading to a number of potential impacts depending on the magnitude, duration, and frequency of these events. These effects can range from habitat shifts and greater interspecific competition, to decreases in reproductive rate or growth potential, to die-offs of less tolerant species, or even to complete loss of the fish community over large reaches of the river.

Sandhill Crane With Program

Median March flows at Overton (2,100.7 cfs), Odessa/Kearney (2,344.6 cfs), and Grand Island (2,769.4 cfs) would be numerically higher than Present Conditions (1,935.2 cfs, 1,918.9 cfs, and 2,141.4 cfs respectively). PHABSIM concepts—including a stable channel—would indicate a reduction in roosting depth abundance under these projected flows (Refer to Chapter 5 of the FEIS for a comprehensive description of the sandhill crane environmental consequences).

Waterfowl and Waterbirds With Program

Shortages to instream target flows were reduced in the Feb – April and Oct – Dec time periods by 52.4 kaf and 30.5 kaf respectively (56% and 68% reduction compared to the present condition). Annual 7-day peaks exceeded the 8,000 cfs threshold 12 out of the 48 modeled years (14% decrease from the present condition) and the 12,000 cfs threshold 4 out of the 48 years (43% decrease from the present condition). Changes in the 30-day mean river water surface elevations generally increased in the mid-February to mid-March time frame with the exception of a small decrease in the 10 percent exceedance level (Table 3). The 30-day mean river water surface elevations for the mid-April to mid-June time frame decreased from the 0 to 20 percent exceedance levels but increased at the 30 to 50 percent exceedance levels (Table 4).

Table 3. Change in the 30-Day Mean River Water Surface Elevations (ft) During Early Spring (Mid-February to Mid-March) From the Present Condition

	(High Flow Years <---→ Normal Flow Years)					
	Exceedance Level (Percent of Years)					
Alternative	**0 Percent**	**10 Percent**	**20 Percent**	**30 Percent**	**40 Percent**	**50 Percent**
Governance Committee	+.06	-.02	+.04	+.09	+.13	+.16

Table 4. Change From the Present Condition in the Maximum 30-Day Peak River Water Surface Elevation During Late Spring (Mid-April Through June)

	(High Flow Years <---→ Normal Flow Years)					
	Exceedance Level (Percent of Years)					
Alternative	**0 Percent**	**10 Percent**	**20 Percent**	**30 Percent**	**40 Percent**	**50 Percent**
Governance Committee	-.29	-.39	-.11	+.04	+.22	+.27

Mussels Without Program

Changes in water delivery as a result of water action plan projects in the central Platte River may negatively affects the mussels by changing river return flows. Project impacts would vary based on the mussel resources within the projects drainage.

<u>Lower Platte River Resources Without Program</u>

Massasauga Rattlesnake Without Program

Due to low population numbers and habitat loss this species is listed as endangered in the state of Nebraska. Massasauga *(Sistrurus catenatus)* are medium-sized rattlesnakes associated with natural marsh habitats. Adult massasauga rattlesnakes range in length from 18 to 26 inches, not including the rattle. This species is typically active from April through October and considerable time is spent basking on sunny spring days (Johnson 1992). In Nebraska, this species is found in the southeastern part of the state near the town of Rogers in Colfax County. The population in Colfax County is in wet meadow and native pasture within the Platte River floodplain. In spring, massasauga typically move from moist prairie habitats into drier upland areas.

This snake is primarily diurnal, but becomes nocturnal during hot summer months. Their diet consists of mice, voles, shrew, frogs and an occasional lizard or snakes (Stebbins 1985, Johnson 1992). Sexual maturity is reached at approximately three to four years, and female massasaugas reproduce every other year. The size of the female dictates the number of young produced per clutch, and an average clutch is four to ten eggs (Johnson 1992).

This species is generally restricted to marshes and moist prairie habitats in close proximity to large floodplains, and the trend toward floodplain development and channelization has resulted in range-wide habitat loss and population decline.

Floodplain connectivity and floodplain wetland sub-irrigation is driven by the spring peak hydrograph in the lower Platte River. For this reason, flows during the February to July period were examined for the 48-year period of record modeled with the Bureau of Reclamation hydrology model. These were organized into thirds (wettest, middle and driest third of the record), and examined by highest flow month between February and July (Table 5).

Table 5. Highest monthly flows at Louisville, Nebraska (in cfs) from February to July.

		highest flow month
Present Conditions	wettest third	25,800
	middle third	13,800
	driest third	8,600

Lower Platte River Catfish/Shovelnose Sturgeon Fish Community Without Program

Catfish and shovelnose sturgeon use the lower Platte River to spawn, and require diverse habitats and velocity breaks. The cue for spawning is driven by water temperature and increases in flow, while these same increases in flow are in part responsible for creation of the diversity of habitats and velocity breaks present in the lower Platte River. No specific threshold has been examined for these resources, rather a comparison of all conditions is made (Figure 50).

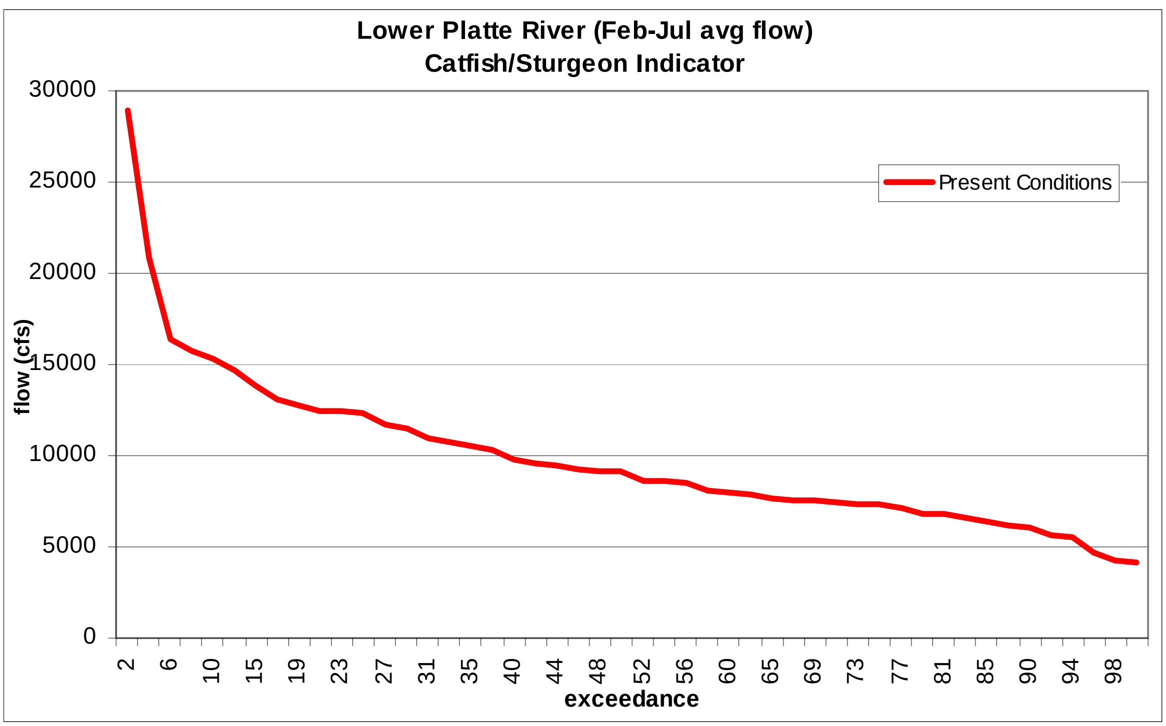


Figure 50. Catfish/Sturgeon Indicator under Present Conditions for February – July.

Sturgeon Chub Without Program

The sturgeon chub *(Macrhybopsis gelida)* is classified as an endangered species in the state of Nebraska. Nebraska is one of only five states where sturgeon chub have recently been collected. Within Nebraska, only two of the six rivers with historical records have maintained populations. Three fish were collected in the lower Platte River between 1987 and 1991.Sturgeon chubs have also been observed on the Missouri River just downstream of the confluence with the Platte River. The lower Platte River continues to provide turbidity and discharge levels suitable for the sturgeon chub, and may play a prominent role in the recovery of the species. The Platte River is one of the largest tributaries of the Missouri River, and the only one below Gavins Point Dam that carries spring snow melt from the Rocky Mountains into the lower basin area.

Water temperature (Cross 1967, Werdon 1992) and increased flows (USFWS 1993) are believed to regulate spawning. Collections of ripe fish suggest spawn timing varies across the species range (Stewart 1981, Werdon 1992, USFWS 1993). Despite the existence of a small population in the lower Platte River, infrequent and small collections have made it impossible to produce a population estimate or gather information on the movements of adults or juveniles. Sturgeon chub feed primarily on aquatic insects.

Habitat alteration and destruction are the primary factors leading to the decline of the sturgeon chub. The authorization of the Flood Control Act in 1944 spurred the construction of over 105 reservoirs on rivers and streams in the Missouri River Basin. These and other reservoirs flooded riffle habitats, altered flow and temperature regimes, and reduced turbidity; all of which are environmental conditions the sturgeon chub evolved with and is particularly suited to handle. Additional pressure is likely due to predation resulting from the stocking of piscivorous sport fish, and the alteration of water quality by industrial and agricultural pollutants (USFWS 1993, Hesse 1994).

The historic population trend of the sturgeon chub population in the lower Platte River appears to be stable, with the maintenance of a very small population. Under present conditions, it is unlikely that this would change. The population is likely driven by the availability of turbid sand-bed habitat with moderate to high current velocities, and by the high spring flows that cycle nutrients in the Platte River, which in turn drives the aquatic ecosystem. Flows during the February to July period were examined for the 48-year period of record modeled with the Bureau of Reclamation hydrology model. The average flow and peak flow, within the February through July time period, were organized into thirds (wettest, middle and driest third of the record)(Table 6).

Table 6. Average and highest monthly flows at Louisville, NE (in cfs) from February to July.

		average flow	highest flow month
Present Conditions	wettest third	14,000	25,800

	middle third	8,400	13,800
	driest third	5,800	8,600

Lake Sturgeon Without Program

The lake sturgeon *(Acipenser fulvescens)* is primarily an inhabitant of large, moderately clear rivers and lakes. The lake sturgeon is most often found over firm silt-free substrates of sand, gravel, or rock. In Nebraska, this species is listed by the state as threatened, and can be found in the Missouri River and the lower reaches of the Platte River. Spawning occurs in late spring and a single female may lay more than 500,000 eggs, although females do not spawn every year. Lake sturgeon are very slow growing and do not reproduce before they are 20 years old. Over harvest appears to have been largely responsible for population declines at the turn of the century (Pflieger 1997). Lake sturgeon spawning generally takes place from April to June, during high water. Habitat preference tends toward slower velocity habitats, and the availability of these habitats would be facilitated by high spring flows that build sandbars and submerged “dunes” that would serve as velocity breaks in the Platte River. For these reasons, both the April through June flows (Table 7) and February through July flows (Table 8) have been examined. The April through June flows are broken out into sixths for the period of record, and only the three wettest sixths are examined, as these higher flows are the most likely to provide significant spawning cues. The same is true for the February through July habitat formation flows.

Table 7. Average and highest monthly flows at Louisville, NE (in cfs) from April to June.

		average flow	highest flow month
Present Conditions	wettest sixth	19,800	28,700
	2nd wettest sixth	12,300	16,200
	3rd wettest sixth	9,600	13,000

Table 8. Average and highest monthly flows at Louisville, NE (in cfs) from February to July.

		average flow	highest flow month
Present Conditions	wettest sixth	16,900	33,100
	2nd wettest sixth	11,200	18,400
	3rd wettest sixth	9,200	15,100

Lower Platte River Resources With Implementation of Program

Massasauga With Program

A population of massasauga exists along the lower Platte River. Because massasauga inhabit lowland grasslands, changes to the hydrology of the grassland could affect the massasauga population. As shown in Table 9, high spring flows change very little under the GC Alternative when compared to present conditions. These changes in flow are given as a range (high end and low end of the range), as many factors influence the proportion of water re-timed under the GC Alternative that actually reaches the lower Platte River. As a result, little if any effect would expect to be realized on the massasauga population due to the actions of the GC Alternative.

Table 9. Changes in highest flow month at the Louisville gage (from February to July) from present conditions.

		percent change from present conditions		absolute (cfs) change from present conditions	
		Highest flow month		highest flow month	
		high end	low end	high end	low end
GC Alternative	wettest third	-1	-1	-159	-157
	middle third	2	1	213	161
	driest third	4	3	230	163
	average	2	1	94	55

Lower Platte River Catfish and Shovelnose Sturgeon Fish Community With Program

The GC Alternative provides similar effects on spring flows. They are very similar in the higher 50% of flow conditions, but provide a small flow increase during the drier 50% of spring flow conditions (Figure 51). While small reductions in the highest flows may result in similar small reductions in the spawning cues provided by these flows, this is not anticipated to be a significant impact in healthy populations. The increase in flows in the lower 50% of spring flow conditions would be expected to provide some minor benefit to the resources.

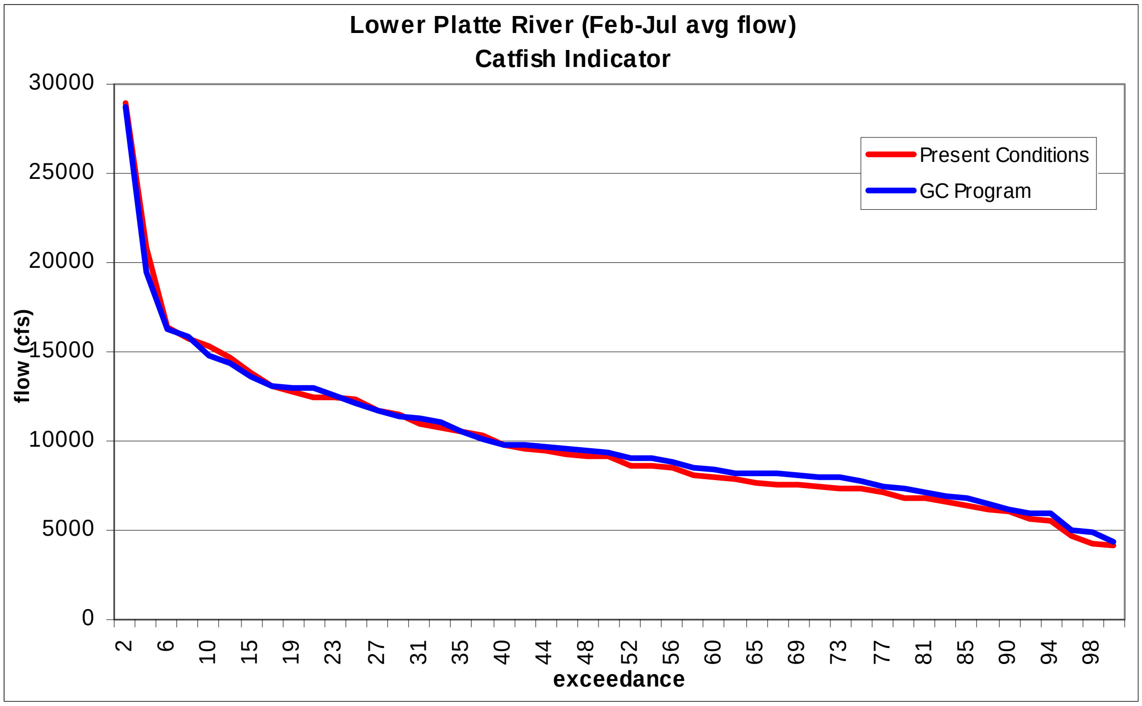


Figure 51. Catfish/Sturgeon Indicator under the GC Alternative for February – July.

Sturgeon Chub With Program

As shown in Table 10, spring flows change very little under the GC Alternative when compared to present conditions. These changes in flow are given as a range (high end and low end of the range), as many factors influence the proportion of water re-timed under the GC Alternative that actually reaches the lower Platte River. Some small benefits may be seen under the driest conditions, but changes still appear to be small, and would not be likely to significantly increase nutrient cycling under these conditions.

Table 10. Changes in average flow and highest flow month at the Louisville gage (from February to July) from present conditions.

		percent change from present conditions				absolute (cfs) change from present conditions			
		average flow		highest flow month		average flow		highest flow month	
		high end	Low end	high end	low end	high end	low end	high end	low end

GC Alternative	wettest third	1	1	-1	-1	101	87	-159	-157
	middle third	3	2	2	1	237	185	213	161
	driest third	6	5	4	3	286	218	230	163
	average	3	3	2	1	208	163	94	55

Lake Sturgeon With Program

As shown in Tables 11 and 12, spring flows change very little under the GC Alternative when compared to present conditions. These changes in flow are given as a range (high end and low end of the range), as many factors influence the proportion of water re-timed under the GC Alternative that actually reaches the lower Platte River. A very small decrease in flow is apparent during the highest flow month under the wettest of conditions for the GC Alternative. This is not likely to be highly significant, due to the very small nature of the change, the short time frame in which it occurs, and under the small range of conditions under which it occurs. In all, little or no change is expected that would affect lake sturgeon due to the effects of the GC Alternative.

Table 11. Changes in average flow and highest flow month at the Louisville gage (from April to June) from present conditions.

		percent change from present conditions				absolute (cfs) change from present conditions			
		average flow		highest flow month		average flow		highest flow month	
		high end	low end	high end	low end	high end	low end	high end	low end
GC Alternative	Wettest sixth	-2	-1	-3	-2	-373	-292	-820	-626
	2nd Wettest sixth	0	0	-4	-4	43	9	-666	-623
	3rd Wettest sixth	2	2	2	2	144	160	212	286
	average	0	0	-2	-1	-62	-41	-424	-321

Table 12. Changes in average flow and highest flow month at the Louisville gage (from February to July) from present conditions.

		percent change from present conditions	absolute (cfs) change from present conditions

		average flow		highest flow month		average flow		highest flow month	
		high end	low end	high end	low end	high end	low end	high end	low end
GC Alternative	Wettest sixth	-2	-1	-2	-2	-304	-227	-767	-582
	2nd Wettest sixth	1	1	-1	-1	101	87	-159	-157
	3rd Wettest sixth	1	1	-1	-1	138	101	-143	-237
	average	0	0	-1	-1	-22	-13	-356	-325

Nebraska Resources Affected By Program Land Management

Channel Restoration and Flow Consolidation Without Program

Restoration of channel habitat includes both clearing vegetation from islands and banks and lowering the elevation of cleared islands to improve open view in the channel and to return island sand back to the river. Channel restoration activities would likely affect woodland, shrubland, and herbaceous/grassland vegetation. The USBR land cover assessment using 1998 photography had provided estimates for woodland, shrubland, and grassland/herbaceous vegetation in the central Platte River at 29,327 acres, 5,379 acres, and 82,596 acres respectively. Additionally, the channel restoration activities could adversely impact stream wetland types including side channels, backwaters, and sloughs by lowering the islands and banks that separate these wetlands from the main channel. Side channels, backwaters, and sloughs, as a result of these restoration activities would be converted to main channel wetland type.

Flow consolidation is a method to improve braided, unvegetated channel widths through the conversion of anastomosed channels. Several different approaches to converging flows in the overwide river corridor could be used. Two methods are low sand dikes (approximately 3 feet) constructed either perpendicular to the river at approximately 1 mile spacing, or as levees parallel to the river but set-back a distance to create, at most, a reduction to one-half the existing river corridor. Flow consolidation would result in the partial or entire loss of side channel habitats.

Because of the similar affects to riverine channel habitats, the affected biotic resources have been combined into one section. Biotic resources affected by channel restoration and flow consolidation include the river otter, sandhill crane, waterfowl and waterbird species, herptiles, grassland species, woodland species, and riverine fisheries.

River Otter Without Program

The habitat of the river otter along the Platte River consists of forested rivers and streams with sloughs and backwaters. Marshes and beaver ponds are also frequented. Otters are denning animals, but rarely dig their own dens and typically use those of beaver and other animals.

Backwaters are partially separated from the main channel by bars or islands and have low or no current velocities. Studies have shown that backwaters generally support greater species richness and diversity than main channel habitats (O'Shea and Hubert 1990, Patton and Hubert 1993). Side channels are departures from the main channel, which continue to have current during normal river stages; a braided channel has many active side channels. Both side channels and backwaters provide unique habitat parameters that support different fish assemblages during their seasonal life cycle requirements (Patton and Hubert 1993). Channel incision and resultant habitat changes may lead to a shift in fish assemblages; where species adapted to shallow, turbid waters become displaced by non-native species adapted to lentic conditions (Patton and Hubert 1993). Therefore, any management action proposed must be evaluated for potential effects in sediment transport, channel morphology, and changes in fish assemblages. Currently a present conditions baseline for backwaters and side channels are not known because of the ephemeral nature of these habitats as a result of interannual and intraannual flows.

Sandhill Crane Without Program

Approximately 500,000 cranes, or 80 percent of the North American migratory population, use the central Platte River valley each spring. Cranes spend from 4-6 weeks each spring from mid-February to April, preparing themselves physiologically for the breeding season. The Platte River valley has historically provided habitat components for migrating sandhill cranes.

Spring migration habitat used by sandhill cranes in the Central Platte Valley consists of three main components: secure roost sites (the active channel), and feeding sites where cranes obtain grain (primarily corn fields), and feeding sites where cranes obtain invertebrates (wet meadows, alfalfa fields, grazed pasture and hay fields) (Armbruster and Farmer 1981). Cranes generally roost in the channel, in standing water, away from wooded banks and islands. Reaches of the Platte River used by roosting sandhill cranes tend to be greater than 50 meters wide with an unobstructed view, have shallowly submerged unvegetated sandbars, and are usually isolated from human disturbance.

SEDVEG Gen-3 Model was used at the site scale to evaluate future roosting depth abundance which addresses channel restoration and flow consolidation actions that would radically alter channel morphology. For the SEDVEG Gen-3 analysis of roosting suitability at the site scale, data from 62 SEDVEG Gen-3 transects located between Lexington and Chapman, Nebraska, were evaluated to assess roosting depth abundance during the spring migration period.

The analysis consisted of two approaches: 1) estimate roosting depth abundance for channels greater than 170 feet (52 meters) wide, and 2) estimate roosting depth abundance for channels greater than 500 feet wide. To accurately capture conditions in place at the end of the First Increment, the SEDVEG Gen-3 outputs were used from the 48-year post alternative implementation period. Transect length within the 3- to 9-inch depth range, from estimated daily flows between February 15 and April 15 (60 days) for each year of the 48-year period of hydrology record, were summarized by mean transect width.

The analysis focused on transect groupings derived from crane use. Transect groupings included all transects, managed transects, non-managed transects, transects located upstream of Kearney, NE, transects located downstream of Kearney, and transects located within bridge segments 7 through 2. All transects with usable data, for each day of use, were summed to create a total "transect length" in the 3- to 9-inch depth range for all transects. Action alternative total transect lengths were then compared to the Present Condition value to obtain a percent change from Present Conditions.

In addition to the SEDVEG Gen-3 analysis, a bridge segment scale analysis focuses on roost conditions in the Platte River between Lexington and Chapman. A digital database—supported within a GIS—was used to evaluate channel width. Two coverages (1982 and 1998), depicting an area along the river from near Lexington to Chapman, and divided into 13 "bridge segments", were compared. The indicator for roosting suitability at the bridge-segment scale is unobstructed channel width as measured in feet (distance) and acres (area) (Refer to Chapter 5 of the FEIS for a comprehensive description of the sandhill crane environmental consequences).

Waterfowl and Waterbirds Without Program

Snow geese, Canada geese, greater white-fronted geese, mallard, and pintail are species known to frequently use the central Platte valley. Suitable roost sites should be the focal point of habitat components (Sparling and Krapu 1994). Roosts should provide security from terrestrial predators. Secure sites are generally envisioned as wide expanses of active channel with limited woody vegetation. Management activities within the central Platte Valley have focused on clearing of woody vegetation from islands. Clearing has been viewed as an initial step in the process of complete island removal. The indicator for channel habitat is unobstructed channel width as measured in feet (distance) and acres (area). For the present condition, there are 9,968 acres of active channel in the central Platte habitat area.

Several species of wading birds migrate through, and nest in the Platte River valley. Cattle egret flocks are commonly seen in the early spring. There are several great blue heron rookeries along the central Platte River, while the green heron is a common nester in the lower growth riparian zone along the river. An occasional great egret, snowy egret, black-crowned night heron, white-faced ibis, or American white pelican may also be seen on the river.

Different species of shorebirds pass through the Platte River valley at different times. In general, killdeer arrive first, followed by waves of greater yellowlegs, baird's sandpipers, semipalmated sandpipers, pectoral sandpipers, least sandpipers, lesser yellowlegs, and then the white-rumped sandpipers. Some species, such as the sanderling, semipalmated plover, and least sandpiper use the river in greater numbers during the fall migration than during spring (Lingle 1994, Sharpe et al. 2001).

All geese species are known to use the active channel habitat while many species of ducks are known to use the active channels as well as backwaters and side channels. Waders such as egrets and herons will forage for small minnows in the backwaters and slower side channels of the river, while flocks of migrating shorebirds will forage for invertebrates in shallow water edges and moist sandbars. The Platte River FEIS identifies the area of active channel 9,975 acres of the active channel land cover classification as identified by the USBR land cover assessment using 1998 photography. Currently a present conditions baseline for backwaters and side channels are not known because of the ephemeral nature of these habitats as a result of interannual and intraannual flows.

Grassland Species Without Program

Herkert et al. (1995) separated grassland habitats into subunits found to be important in the conservation of birds. Units recognized by Herkert et al. (1995) as being important to the conservation of grassland birds include native prairies, sedge (wet) meadows, restored prairies, and hayfield and pastures. As a group, endemic grassland bird species have declined more than others, including neotropical migrants, in the last quarter century (Knopf 1994).

Wet meadow complexes, as defined for this document, are native grasslands dissected by sub-irrigated sloughs and wetlands. As water levels rise and fall, the wetland and grassland environments form a dynamic continuum between upland and wetland habitats. Due to their unique hydrology, structure, and flora, these meadows provide primary habitat for some distinctive grassland birds including sedge wrens (*Cistothorus platensis*) and LeConte's sparrow (*Ammodramus leconteii*), although overall, these meadows do not support highly diverse bird communities (Herkert et al. 1995). White-tailed deer utilize herbaceous vegetation provided by lowland grasslands as a source of forage and protein.

This grassland/slough habitat supports nesting populations of shore and grassland birds including: upland sandpiper (*Bartramia longicauda*), bobolink (*Dolichonyx oryzivorus*), eastern meadowlark (*Sturnella magna*), grasshopper sparrow (*Ammodramus savannarum*), and the dickcissel (*Spiza americana*). The Le Conte's sparrow, a bird of wet fields and meadows, is frequently documented in Platte River wet meadows during its northward migration to Canada. Although the American woodcock (*Scolopax minor*) nests in moist second-growth woodlands and thickets, its elaborate aerial courtship displays take place in open areas including lowland grassland fields. The short-eared owl (*Asio flammeus*), a species of national management concern will also nest in the more terrestrial parts of wet meadows along the Platte River.

Two birds of prey, the short-eared owl, and the northern harrier (*Circus cyaneus*) nest in the Platte River grasslands. Other birds of prey, including the ferruginous hawk (*Buteo regalis*), Swainson's hawk (*Buteo swainsoni*), red-tailed hawk (*Buteo jamaicensis*), American kestrel (*Falco sparverius*), and prairie falcon (*Falco mexicanus*) forage over open grasslands and prairies.

Woodland Species Without Program

Davis (2001*b*) found the highest avian species richness in forests, and that the river valley bird community is dominated by nearly 80 percent woodland-associated species that are found primarily in eastern deciduous forests, with grasslands having the lowest number of species and lowest abundance. Colt (1997) conducted avian distribution research along the Platte River, during which time he found few habitat specialists, and many habitat generalists.

Forested riparian habitat along the Platte River is used by neotropical songbirds both as stopover habitat during their migrations, and as nesting habitat (Appendix A, Table 4). Species included in the Service's "Migratory Non-game Birds of Management Concern in the United States: the 1995 List" are specifically identified in this table. Criteria for inclusion in the above identified document includes 1) documented or apparent population declines, 2) small or restricted populations, or 3) dependence on restricted or vulnerable habitats.

Game species of State and local importance in forested accretion ground include white-tailed deer *(Odocoileus virginianus),* turkey *(Meleagris gallopavo)*, cottontail rabbit *(Sylvilagus floridanus)*, and fox squirrel *(Sciurus niger)*. Furbearers such as beaver *(Castor canadensis)*, mink, muskrat *(Ondatra zibethica),* and raccoon *(Procyon lotor)* are present in relative abundance and provide important economic and consumptive use values. During the hunting season, deer typically seek refuge in the forested areas in and along the river channel.

A New Species of Caddisfly Without Program

The Platte River caddisfly (*Ironoquia plattensis*) is a new species first described in 1999 (Whiles et al. 1999). This caddisfly is known to occur in an intermittent palustrine sloughs and side channels that are subirrigated by Platte River flows. Caddisfies provides nutrients and energy to a wetland food web by shredding coarse particulate organic materials which is a function unique to wetland communities in North America (Whiles and Goldowitz 2005). Current studies conducted in 2005 indicated that species range is constrained to a 50 to 60-mile reach of the Platte River between Gibbon and Central City (Goldowitz pers. comm.). Distribution surveys were conducted on similar habitats in the Elkhorn and Loup River Basins which resulted in no observations at these sites. Therefore, the Platte River caddisfly seems restricted to the Platte River (Goldowitz pers. comm.).

Mussels Without Program

The central Platte River is a unique area for mussels with its greater diversity of habitats compared to other Platte reaches. Many mussel species occupy side channels, canals, and backwaters of the Platte as opposed to residing in the main channel. The mussels are collectively considered a resource of concern because of their existence in relatively small pockets of habitat in the central Platte River.

Herptiles Without Program

Species of conservation concern such as the smooth green snake (*Opheodrys vernalis*), red-bellied snake (*Arizona elegans*), and glossy snake (*Storeria occipitomaculata*) could be adversely affected by the anticipated loss of habitats, including grassland/herbaceous, woodland, shrubland, backwaters, and side channels as a result of GC Alternative restoration actions.

Channel Restoration and Flow Consolidation With Program

Although a baseline for side channels and backwaters was not identified in the FEIS, it is anticipated that these habitats would be negatively affected by GC Alternative channel restoration and flow consolidation activities. Decreases in wooded, shrub and grassland land cover types as a result of channel restoration projects would be approximately 150 acres (-0.5% of total central Platte acres), 160 acres (3.0% of total central Platte acres), and 40 acres (<0.1% of total central Platte acres), respectively. Cover type acres converted to active channel represent a fraction of a percentage of total acres for central Platte River. Both activities have the potential to convert side channel and backwater habitats into main channel habitats. The extent of habitat loss is not known because restoration activities are dependent on developing land management plans for future protected properties.

River Otter With Program

Although a baseline for side channels and backwaters was not identified in the FEIS, it is anticipated that these habitats would be negatively affected by GC Alternative channel restoration and flow consolidation activities. Both activities have the potential to convert side channel and backwater habitats into main channel habitats. The extent of habitat loss is not known because restoration activities are dependent on land management plans for future protected properties.

Sandhill Crane With Program

SEDVEG Gen-3 output for all channels greater than 170 feet indicate reduced (-3.4 to -14.9 percent) roosting depth abundance in the following transect categories: all transects, non-managed transects, transects downstream from Kearney, and transects within bridge segments 7 to 2. Increases from 5.9 to 38.3 percent are projected for managed transects and transects upstream from Kearney respectively.

SEDVEG Gen-3 output for channels greater than 500 feet predicts that the Governance Committee Alternative would increase roosting depth in the all transects category, managed transects, transects upstream from Kearney, and transects within bridge segments 7 to 2. Roosting depth is predicted to decline in non-managed transects and transects downstream from Kearney.

Analysis of roosting depth under this alternative indicates that for most of the river channel between Lexington and Chapman (as represented by the all transects and non-managed transects categories), some small reduction in roosting depth may occur, although analysis of channels greater than 500 feet indicate a small increase for all transects.

GIS analysis results determined that unobstructed channel width would increase at sites (and bridge segments) receiving proposed island leveling channel management. For the purposes of analysis, channel width changes were simulated in nine transects that resulted in a 21.1 percent increase (over the Present Condition between Lexington and Chapman, Nebraska) in unobstructed channel width greater than 501 feet (Refer to Chapter 5 of the FEIS for a comprehensive description of the sandhill crane environmental consequences).

Waterfowl and Waterbirds With Program

It is anticipated that waterfowl and waterbirds would be negatively affected by the conversion of side channel and backwater habitat to main channel habitat. The extent of habitat loss is not known because restoration activities are dependent on land management plans for future protected properties. Several species of ducks and waterbirds will be negatively affected by the loss of these habitats. The total active channel acres are expected to increase by approximately 4% (364 acres over the Present Condition).

Grassland Species With Program

Grassland species could be adversely affected by the anticipated loss of grassland habitat as a result of GC Alternative restoration actions. Grasslands converted to active river channel must be weighed against acres of grassland gained through nonchannel restoration activities.

Woodland Species With Program

Woodland species could be adversely affected by the anticipated loss of woodland and shrubland habitat as a result of GC Alternative restoration actions, but the loss is a fraction of a percentage of total woodland acres.

A New Species of Caddisfly With Program

It is anticipated that the Platte River caddisfly would be negatively affected by the conversion of side channel and backwater habitat to main channel habitat. The extent of habitat loss is not known because restoration activities are dependent on land management plans for future protected properties.

Freshwater Mussels With Program

It is anticipated that the freshwater mussels would be negatively affected by the conversion of side channel and backwater habitat to main channel habitat. The extent of habitat loss is not known because restoration activities are dependent on land management plans for future protected properties.

Herptiles With Program

Species of conservation concern such as the smooth green snake, red-bellied snake, and glossy snake could be adversely affected by the anticipated loss of habitats, including grassland/herbaceous, woodland, shrubland, backwaters, and side channels as a result of GC Alternative restoration actions.

<u>Nonchannel Restoration Without Program</u>

Nonchannel restoration activities are used to increase the amount of grasslands and/or wet meadows within Program's habitat complexes. Nonchannel restoration activities would likely affect woodland, and shrubland vegetation as well as agricultural land. The USBR land cover assessment using 1998 photography had provided estimates for woodland vegetation, shrubland vegetation, and agricultural land in the central Platte River at 29,327 acres, 5,379 acres, and 258,153 acres respectively. Woodland and shrub vegetation acres would be reduced through woody vegetation clearing. Cropland will be converted to grassland/wet meadow habitat by seeding with native plant species, restoring swales and sloughs, and augmenting water supplies for wet meadows from existing drains or wells. Other actions to reduce disturbance, such as the screening of roads, would result in the conversion of herbaceous/grassland or cropland acres to woody vegetation. Biotic resources affected by channel restoration include the sandhill crane, waterfowl and other waterbird species, grassland species, woodland species, and herptiles.

Sandhill Crane Without Program

Cranes spend from 4-6 weeks each spring from mid-February to April, preparing physiologically for the breeding season. Diurnal observations of cranes showed that 48 percent were in cornfields, 34 percent in lowland grasslands, 13 percent were in alfalfa fields, and the remaining 5 percent were in soybean, winter wheat, and upland grasslands (Davis 2001). The Platte River valley has historically provided habitat essential non-riverine components for sandhill cranes. Data from an ongoing study conducted by the Platte River Whooping Crane Maintenance Trust, Inc. (Trust) confirmed the highest crane use occurred in the widest river channels and were also likely related to the large amounts of wet meadow-lowland grassland habitat in those reaches (Davis 2001). Sandhill cranes use wet meadows and lowland grasslands for activities that include loafing, sleeping, and courtship. The afternoon feeding period ends at dusk when cranes begin moving to roost sites for the night.

Waste corn accounted for about 97 percent of sandhill cranes diets during the late 1970s (Reinecke and Krapu, 1986), and recent studies indicate that waste corn continues to provide significant food resources for cranes using the Platte River Valley (Krapu, 2003). Waste corn permits cranes to acquire and store large nutrient reserves as fat for subsequent use during migration and reproduction on the breeding grounds.

There are indications that the relationships between food abundance and cranes' ability to efficiently store nutrients as fat may be changing. VerCauteren (1998) observed cranes using corn fields 5 miles north and 8 miles south of the river, while Krapu and Brandt (U.S. Geological Survey, Jamestown, North Dakota, unpublished data in Davis 2003) observed cranes foraging up to12 miles south of the river in 1999 and 2000. In addition to an increase in movement patterns, larger cranes are now storing less fat then in the 1970s (Krapu, 2003 and Krapu et al., in press).

The food component of spring sandhill crane habitat is also evaluated at the bridge-segment scale via use of a GIS land cover database. The approach compares existing acres in bottomland grasslands and various cropland types to projected acreages under future alternative management scenarios.

The abundance of invertebrate food in wet meadows is also evaluated via an analysis of riverflows during the February-March period when sandhill cranes are using the Platte River between Lexington and Chapman. Under Present Conditions, the median February flows for Overton and Grand Island are 2,177 cfs and 2,089 cfs respectively. For March, the flows are 1,935 cfs (Overton) and 2,141 cfs (Grand Island). The detailed analysis occurs in the "Whooping Crane" section of this FEIS and is summarized as median flows for sandhill cranes. The analysis of waste corn and wet meadow invertebrate abundance is restricted to the Central Platte between Lexington and Chapman, Nebraska.

Waterfowl and Waterbirds Without Program

Resources of concern baseline is similar to that of the channel restoration and flow consolidation section.

Grassland Species Without Program

Resources of concern baseline is similar to that of the channel restoration and flow consolidation section.

Woodland Species Without Program

Resources of concern baseline is similar to that of the channel restoration and flow consolidation section.

Herptiles Without Program

Although seldom observed by the casual observer, the Platte River floodplain is rich in reptiles and amphibians (i.e., herptiles). Surveys conducted by the Trust from 1980-1986, and during 1998-1999, along the central Platte River are summarized by species and habitats in Appendix A

- Table 5. Four species of conservation concern include the smooth green snake, glossy snake, red-bellied snake, and the Blandings turtle (*Emydoides blandingii*) whose habitats include wet meadows and moist prairies, dry open sandy areas, moist woodlands with logs and litter, and semi-aquatic marshes and lagoons respectively.

Nonchannel Restoration With Program

Results from the FEIS identify a potential 3,800-acre increase in grassland/herbaceous land cover which includes wet meadows. The anticipated increase in grassland/herbaceous land cover would result in the approximate conversion of 1,100 acres of cropland (0.4% of total acres in the central Platte). The combined effects of channel and non-channel restoration would result in the loss of approximate 2,200 woodland acres (7.5% of central Platte total) and 500 shrubland acres (9% of central Platte acres). The actual extent of land cover conversion is not known because restoration activities are dependent on developing land management plans for future protected properties.

Sandhill Crane With Program

For the Governance Committee Alternative, anticipated lowland grassland acres amounted to about a 14.9 percent increase over the Present Condition within the Lexington to Chapman study area. A portion of converted lowland grassland acres would come from cropland. The exact acres or location of corn reduced under this alternative are unknown, but the anticipated cropland loss would likely be a fraction of a percentage of total acres. Median February and March flow under this alternative would increase over Present Conditions at each of the three gauging stations. Such increases may increase access to soil invertebrates for sandhill cranes at existing wet meadows.

Waterfowl and Waterbirds With Program

Waterfowl and waterbirds will benefit from the anticipated increase in wet meadow habitat as a result of GC Alternative restoration actions, but the decrease in cropland acres could adversely impact waterfowl.

Grassland Species With Program

Grassland species will benefit from the anticipated increase in grassland/wet meadow habitat as a result of GC Alternative restoration actions.

Woodland Species With Program

Woodland species could be adversely affected by the anticipated loss of woodland and shrubland habitat as a result of GC Alternative restoration actions, but the loss is a fraction of a percentage of total woodland acres.

Herptiles With Program

Species of conservation concern such as the smooth green snake, red-bellied snake, and glossy snake could be adversely affected by the anticipated loss of habitats, including grassland/herbaceous, woodland, shrubland, backwaters, and side channels as a result of GC Alternative restoration actions.

Non-complex Habitat Enhancement Without Program

Non-complex habitat include gravel mine sandpits that are, or could be, managed as nesting areas for terns and plovers, and small wet meadows or wetlands that may provide foraging or roosting habitat for cranes. Existing acres for active sandpits were not identified in the FEIS nor were rates of change in active and inactive sandpits identified. The FEIS identified 82,596 acres of grassland/herbaceous vegetation which includes wet meadows, and 4,493 acres of open water land cover (i.e., ponds, sandpits, etc.) based on USBR land cover assessment using 1998 photography. Biotic resources affected by channel restoration include the sandhill crane, waterfowl and waterbird species, grassland species, woodland species, and herptiles.

Sandhill Cranes Without Program

As identified in the nonchannel restoration section, sandhill cranes use wet meadows for activities that include loafing, sleeping, and courtship.

Waterfowl and Waterbirds Without Program

Waterfowl and waterbirds are known to use sandpits and wet meadows.

Grassland Species Without Project, Woodland Species Without Program

Resources of concern baseline is similar to that of the nonchannel restoration section.

Herptiles Without Program

Although seldom observed by the casual observer, the Platte River floodplain is rich in reptiles and amphibians. Surveys conducted by the Trust from 1980-1986, and during 1998-1999, along the central Platte River are summarized. The NGPC has also identified twenty two species in need of special conservation, four of which can be found within the Platte River floodplain.

Non-complex Habitat Enhancement With Program

The GC Alternative will maintain sandpits by controlling vegetation to maintain open sandy areas that would otherwise transition to herbaceous vegetation, or sandpits may become future housing developments. It is unlikely that, through the GC Alternative, sandpits will be created. The GC Alternative will increase restored/created wetlands by converting cropland, grassland/herbaceous, woodland, and shrubland habitats. The combined acres of non-complex habitats are not to exceed 800 acres.

Sandhill Cranes With Program

Sandhill cranes will benefit from the anticipated increase in grassland/wet meadow habitat as a result of GC Alternative restoration actions, but the potential decrease in cropland acres could adversely impact the cranes.

Waterfowl and Waterbirds With Program

Waterfowl and waterbirds will benefit from the anticipated increase in wet meadow habitat as a result of GC Alternative restoration actions. Shorebirds and waterfowl will benefit from the anticipated increase in sandpit habitat. The decrease in cropland acres could adversely impact waterfowl but the loss is a fraction of a percentage of total woodland acres.

Grassland Species With Program

Grassland species will benefit from the anticipated increase in grassland/wet meadow habitat as a result of GC Alternative restoration/creation actions.

Woodland Species With Program

Woodland species could be adversely affected by the anticipated loss of woodland and shrubland habitat as a result of GC Alternative wetland restoration/creation actions, but the loss is a fraction of a percentage of total woodland acres.

Herptiles With Program

Certain species, such as the smooth green snake and Blandings turtle, will benefit from the anticipated increase in grassland/wet meadow habitat as a result of GC Alternative restoration actions. Other species such as the red-bellied snake could be adversely affected by the anticipated loss of woodland and shrubland habitat as a result of GC Alternative restoration actions.

<u>Nebraska Fish and Wildlife Resources Not Analyzed</u>

Inland Lakes Resources

Lakes Alice, Minatare, Winter’s Creek, and Little Lake Alice are located in Scotts Bluff County in the panhandle of Nebraska. Lakes Alice and Minatare were formed by damming basin-like valleys while Winters Creek Lake is a natural wetland which has been altered to operate as a reservoir. Little Lake Alice is not part of the North Platte National Wildlife Refuge (NWR), and is currently a residential development. These inland lakes are fed by the interstate canal, and the amount of water entering the reservoirs is dependent upon the amount of spring run-off and water right allocations. The interstate canal, completed in 1904, begins in Wyoming, where it takes water from the North Platte River at the Whalen diversion dam in Goshen County, Wyoming.

The North Platte NWR was established by Executive Order 2446 under President Wilson in 1916 as "a preserve and breeding ground for native birds" and consists of Winters Creek, Lake Alice, portions of Lake Minatare, and Stateline Island. The four refuge units were superimposed over existing Bureau of Reclamation (Bureau) projects. Stateline Island is located one mile south of Henry, Nebraska, and is an island in the North Platte River. The Bureau holds a Wyoming water right, with a priority date of December 6, 1904, for storage at North Platte NWR, also known as the Inland Lakes. Under this right, the Bureau may divert 46,000 af (up to 910 cfs from the North Platte River at Whalen Diversion) during the month of October, November and April for temporary storage in Bureau reservoirs prior to release into the Interstate Canal for storage in the Inland Lakes; and may divert at a rate up to the canal capacity during the irrigation season as part of Nebraska's share of flows below the Whalen Diversion. This right was confirmed by the Supreme Court in Nebraska v. Wyoming (1945), and reconfirmed by the Special Master's Ruling of April 9, 1992.

In 1963 a reclamation development plan allowed the NGPC to establish a State Recreation Area at Lake Minatare. Today, the NGPC manages recreation and fishing within the State Recreation Area and all of Lake Minatare. The NGPC also manages the Winters Creek Lake fishery through a Cooperative Agreement with the Service, and stocks it with yellow perch, bluegill, walleye, largemouth bass, and channel catfish.

The management focus of the North Platte NWR is oriented toward non-consumptive wildlife recreation. Visitor use of the refuge consists of birdwatching, nature photography, hiking, environmental education activities, and other wildlife related activities. Mushroom harvesting, berry harvesting, and fishing are currently the only consumptive use activities permitted on the refuge. Fishing is allowed on all three reservoirs and from the Stateline Island Unit, but Lake Minatare and Winters Creek have the only viable sport fisheries. Lake Alice is lowered to dead pool each fall, and therefore does not support a viable fishery.

Sport fish in refuge lakes include walleye, crappie, yellow perch, goldeye, northern pike, white bass, striped bass, wipers (white bass x striped bass hybrid), channel catfish, and carp. Changes in Inland Lakes operations as a result of changes in North Platte River flows through the GC Alternative was not analyzed in the FEIS, therefore affects to Inland Lakes was not analyzed. If Program impacts are identified, offsets to these impacts and/or proposed mitigation will be provided as a subsequent amendment to the FWCA report.

Western Alkaline Wetlands

Western alkaline wetlands of Nebraska occur on the floodplain of the North Platte River upstream of the Village of Lewellen where groundwater levels are high and soil drainage is poor.

Alkaline wetlands do not develop immediately adjacent to the river where river flows can flush salts from sandy, porous soils. Typically, alkaline wetlands form farther from the river channel where clayey and loamy soils impede leaching. These wetlands receive water from a combination of groundwater, overland runoff, flood overflows, and springs; and most are ephemeral. The hydrology is complex and influenced by local irrigation runoff. Alkalinity is principally caused by sodium carbonate and calcium carbonate becoming concentrated in the soils as a result of high rates of evaporation in this semi-arid region. Typically, alkaline soils have a pH above 8.5. Several plants rare to Nebraska occur in these wetlands, including the Nevada bulrush *(Scirpus nevadensis),* slender plantain *(Plantago elongata)*, silverweed *(Potentilla anserina)*, eastern cleomella *(Cleomella angustifolia)*, thelypody *(Thelypodium integrifolium)*, seaside heliotrope *(Heliotropum curassavicum)*, and sea milkwort *(Glaux maritima).* The most abundant grasses include alkali sacaton *(Sporobolus airoides),* foxtail barley *(Hordeum jubatum),* and inland saltgrass *(Distichlis spicata).* In deeper alkaline depressions where standing water persists throughout most of the growing season, sago pondweed *(Potamageton pectinatus),* horned pondweed *(Zannichellia palustris),* and green algae *(Chara spp.)* are the dominant species (Steinauer 1994, LaGrange 1997).

The western alkaline wetlands provide habitat for a variety of waterfowl, shorebirds, and other waterbirds throughout the spring migration and nesting season. This complex is especially attractive to nesting American avocets (*Recurvirostra americana*), Wilson's phalaropes (*Phalaropus tricolor*), blue-winged teal (*Anas discors*), mallards, and Canada geese. Much of the shorebird habitat is provided by the open alkaline flats. These wetlands provide important hunting and wildlife viewing opportunities in this region of the state. In addition to wetlands, the North Platte River valley supports alkaline meadows. These grasslands are only moderately productive pastureland compared to the valley's non-alkaline meadows and are hayed or grazed from May through mid-October with cow-calf pairs (Steinauer 1994, LaGrange 1997). Soils in this wetland complex are poorly suited to crop production, and have therefore been spared the development pressure which threatens other wetland complexes. Some meadows have, however, been drained and converted to cropland or planted to non-native wheatgrass.

South Platte River Resources

The headwaters of the South Platte River begin along the Continental Divide in Colorado. The South Platte River enters Nebraska near Julesburg, Colorado and continues eastward to it's convergence with the North Platte. Program affects to the South Platte River in Nebraska was not analyzed because no significant resources of NGPC concern were identified for the South Platte River in Nebraska.

Fisheries Associated with NPPD and CNPPID Supply Canal and Reservoirs

Reservoirs and supply canals owned and operated by the Central Nebraska Public Power and Irrigation District and the Nebraska Public Power District also support recreational fishing. Anglers fishing the supply canals and reservoirs may catch walleye, white bass, wipers, rainbow trout, and channel catfish. Rainbow trout, however, are generally restricted to areas where canal waters are still cold from deep water releases from Lake McConaughy. Some trout are migrants from Lake Ogallala where they were originally stocked, while others are fish stocked directly into the canal each spring and fall. The sport fish prey base in the canals consists of plankton, minnows, aquatic invertebrates, and crayfish (Hoffman 2000). These resources were not evaluated because of the uncertainty regarding how the Program would implement a 5,000 cfs pulse flow at Overton. Possible affects to fish spawning and retention could exist if these facilities are utilized to achieve a pulse flow. Affected reservoirs could include Sutherland, Maloney, Jeffrey, and Johnson. NGPC is concerned that the rapid evacuation of water in the spring/summer time period could result in fish spawning and retention impacts similar to those identified in the Lake McConaughy fisheries section. Once Program pulsing details are identified, offsets to these impacts and/or proposed mitigation will be provided as a subsequent amendment to the FWCA report.

Saltwort

This species is listed as endangered by the state of Nebraska due to its limited range in the state and continuing threats to existing populations. Saltwort (*Salicornia rubra),* is a small annual, succulent wetland plant characteristic of mudflats with high salinity and poor soil aeration. Few other species can tolerate these conditions, and locations with supporting saltwort are usually otherwise unvegetated. In Nebraska, all but one documented occurrence of this species are in the saline floodplain wetlands of Salt Creek and Little Salt Creek. One small population (less than 20 plants) was identified in a sparsely vegetated alkali flat within a Phelps County wet meadow in 1997, but has not been documented since. Since this species is an annual, conditions required for seed germination may not be present every year.

Small White Ladies' Slipper

This species is listed as endangered by the state of Nebraska. The small white ladies slipper *(Cypripedium candidum)* is the smallest of the lady-slipper orchids, and ranges from 6 to 16 inches tall (Summers 1996). One of Nebraska's rarest plants, the small white lady's-slipper thrives in the unobstructed prairie sun, growing in wet prairies and meadows in eastern and central Nebraska (Farrar 1990). All of Nebraska's known populations are found in relatively undisturbed sub-irrigated wet meadows with sandy loam soils. This species has been identified as an obligate wetland plant on both the regional and national wetland indicator plant species list. This orchid does not appear to be tolerant of cattle grazing, and has not been documented in pasture lands.

This species is becoming rare throughout the United States due to collecting and the disappearance of its habitat (McGregar et al. 1986, Summers 1996). The small white lady's slipper has only been collected from Howard, Pierce, Platte, and Sherman counties in the last fifteen years. There are only seven known extant populations, and all known Nebraska populations consist of less than 200 plants. Threats to the species include removal from the natural environment by orchid collectors, habitat fragmentation, alteration of natural groundwater levels by direct irrigation pumping, conversion of wet meadows into cropland, reduced flows in streams adjacent to wet meadows, and its susceptibility to both applied and drifted herbicides (NGPC 1999). The status of this species under existing conditions would be expected to remain constant, to gradually declining as a result of lowered groundwater levels. The small white ladies slipper was not analyzed because historic records are not representative of a present conditions baseline.

Land Management Activities Associated with North Platte Flow Conveyance Improvements

The Program is developing plans to restore the channel capacity of the North Platte River at North Platte, Nebraska to 3,000 cfs. On September 9, 2002, the National Weather Service had reduced the channel capacity of the North Platte River at North Platte from 3,000 to 1,980 cfs as a result of flooding that had occurred in the summer of 2001 and 2002. The current channel capacity has reduced the ability to provide Program water to the central Platte River. The Program is currently developing methods to improve channel capacity to the previous 3,000 cfs level, but the development of a final plan has not been completed.

Land management impacts to fish and wildlife resources were not evaluated because of the uncertainty regarding how the Program would implement measures to improve the North Platte flow conveyance. Land management activities to improve channel conveyance could result in direct, disturbance-related impacts to waterfowl and sandhill cranes as well as indirect impacts through channel modification. NGPC is concerned that the construction activities, if conducted during spring and fall migration periods, could affect waterfowl and sandhill crane activities. Once Program land management activities are identified, offsets to these impacts and/or proposed mitigation will be provided as a subsequent amendment to the FWCA report.

Miscellaneous Platte River Fish Species

Infrequent observations of the plains topminnow (*Fundulus sciatucus*) have been documented for the central and lower Platte River reaches from the early 1900's to the early 1990's. Paddlefish *(Polyodon spathula)* were captured near the City of North Platte in the Platte River (following high flows) during 1983-1984, and young-of-the-year was collected in the lower Platte River in 1993. Flows during these years were exceedingly high. Another seldom observed species of the lower Platte River is the blue sucker *(Cycleptus elongatus)*. Blue suckers have historically been located in the lower Platte River, however only recently has reproduction in the lower Platte been documented (Reade 2000). These resources were not analyzed because historic records are not representative of a present conditions baseline.

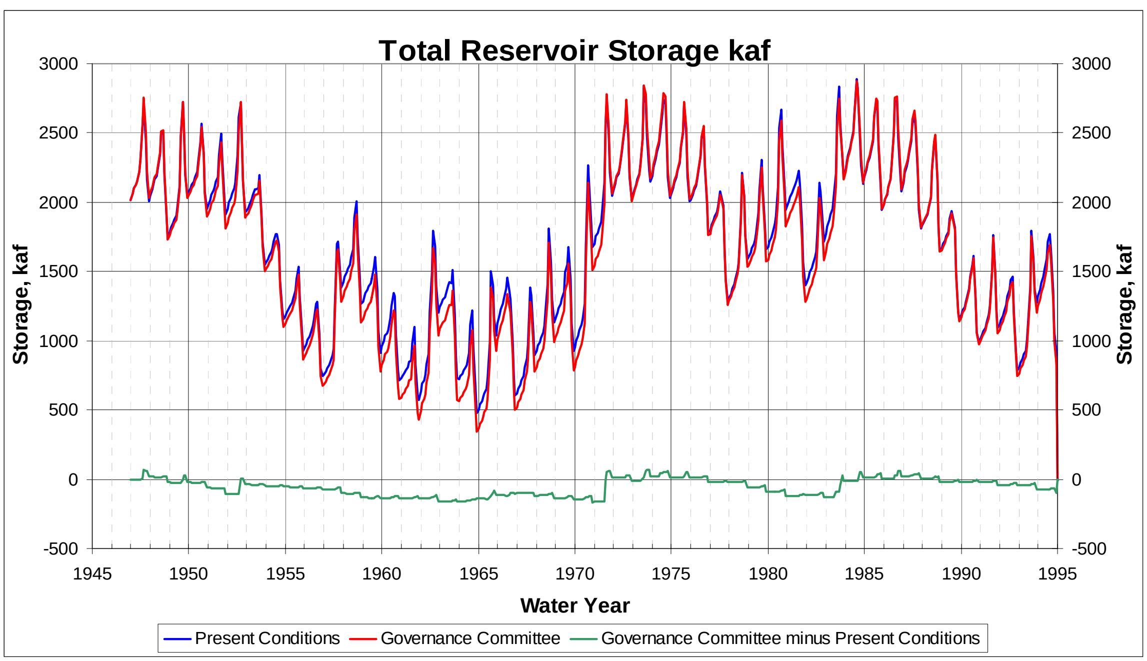
WYOMING FISH AND WILDLIFE RESOURCES

Proposed water leasing activities will change local irrigation practices and resultant return flows. This may alter the hydrology of some wetlands and the Platte River which is largely dependent upon irrigation return flows to maintain base flows between irrigation seasons. Without site-specific proposals, however, it is impossible to evaluate impacts to these habitats.

The largest effects of the Program in Wyoming relate to changes in management of the mainstem reservoirs. Consequently, the Wyoming portion of this report primarily deals with fish and wildlife resources dependent upon riverine and reservoir habitats. Impacts to riparian habitat and terrestrial species dependent upon aquatic resources are evaluated in a qualitative manner. Resource Categorization for Wyoming was based on an analysis conducted by the Service (FWS 1988).

The degree of adverse effect based on the historical response of aquatic resources to known patterns of reservoir and river management was examined. Limiting conditions and sources of adverse impacts were provided by Wyoming Game and Fish Department (WGFD) (Conder and Deromedi 1998). The magnitude of effects is based on changes in frequency of limiting conditions and sources of impact from the Present Condition over the period of record.

Figure 52. Average annual Total Reservoir Storage (thousand acre-feet) in the North Platte River Basin, Wyoming, over the 48-year period of record (1947-1994) for Present Conditions, the Proposed Program, and their difference (NPRWUM results, USBR 2005).



Species of Special Concern Without Program

The following species of special concern may occur in the North Platte River Basin in Wyoming. With the exception of the wood frog, boreal toad and fish species, information provided below was taken directly from Oakleaf et al. (1996).

Common Loon (*Gavia immer*)
This species is classified as an uncommon summer resident in Wyoming; confirmed or probable breeding has been documented in 4 of Wyoming's 28 latilongs, and loons have been observed in an additional 22 latilongs. In Wyoming, loons nest on lakes greater than 4 ha (10 ac) in size and at elevations between 1,800 and 2,400 m (5,900 and 7,900 ft). Large lakes with adequate nesting islands and abundant populations of small and mid-sized fish, aquatic invertebrates, and amphibians are preferred. Lakes also should be clear enough for loons to see their prey, deep enough to prevent winter kill of fish (>6 ft), and must remain ice-free for a minimum of 4 months for successful fledging of young. Escape cover for adult loons is deep, open water, whereas young loons and their attending adults will use emergent shoreline vegetation as cover when disturbed.

Loons exhibit a high fidelity to nesting lakes. The most important factors that determine nest locations are well protected sites, on small islands, if available, in close proximity to open water. Nests are built of aquatic vegetation at or near the water's edge and may be concealed by surrounding aquatic vegetation. In Wyoming, nesting typically begins in early to mid-May, and hatching occurs in early to mid-June. The breeding territory also includes an area with shallow water, protected bays, aquatic vegetation, and abundant small fish for brood rearing.

Primary threats leading to decline of loons include loss of nesting habitat, increased human disturbance, and increased predation due to shoreline developments; nest desertion or increased egg predation due to human disturbance; flooded or stranded nests due to water level fluctuations; direct mortality or loss of prey base from exposure to environmental contaminants; and possibly excessive human-induced mortality during migration and on wintering grounds.

American White Pelican (*Pelecanus erythrorhynchos*)
This species is classified as a common summer resident in Wyoming and, although pelicans can be observed statewide, confirmed breeding has only been documented in 4 of Wyoming's 28 latilongs. Causes of population decline have included illegal shooting, probable decline from the widespread use of DDT, habitat loss due to human activities, and excessive human disturbance at breeding colonies and foraging sites.

White pelicans forage at depths of less than 3 ft. from the surface of water, with fish comprising the majority of their diet. Pelicans nest in colonies, often associated with double-crested cormorants. Pathfinder Reservoir Bird Island colony was first active in 1984. The island became a peninsula in 1989 due to low water conditions resulting from drought; this condition continued throughout 1995. Pelicans have failed to fledge any young from this colony since 1990 due to continued low water levels resulting in increased predation on the colony, and have not even attempted to nest at this site since 1992. The Wheatland Reservoir #3 site was first active in 1993. In past years the site was not surveyed because of the lack of suitable breeding habitat, partially due to disturbance from anglers along the shoreline. The suitability of this site for nesting pelicans is currently unknown.

American Bittern (*Botaurus lentiginosus*)
Bitterns in Wyoming are classified as uncommon summer residents, with confirmed or probable breeding recorded in 9 of 24 latilongs. Bitterns are typically solitary nesters in marsh habitat, making censusing difficult. Bitterns nest on dry ground or above water or mud in tall emergent vegetation, building a scanty nest of sticks and emergent vegetation. Nests contain separate entrance and exit paths, and may be partially covered by vegetation arch. In Wyoming, American bitterns have been documented at 7 different sites since 1984. Diet of the bittern is varied and includes any prey item that can be caught including fish, aquatic invertebrates, small vertebrates, and insects. Young are fed regurgitant.

Snowy Egret (*Egretta thula*)
In Wyoming, the snowy egret is classified as an uncommon summer resident, with confirmed or probable breeding recorded in 7 of 23 latilongs. Snowy egrets nest in mixed colonies and build flat, flimsy stick nests in emergent vegetation or in shrubs on islands. In Wyoming, snowy egrets have been documented nesting at 9 different sites from 1982 through 1994. However, the only site where snowy egrets have consistently nested over the past 13 years is Bamforth Lake. Primary food items include aquatic invertebrates, fish, insects, and small vertebrates. Primary threats to snowy egret populations include loss of suitable nesting wetland habitat due to human activities; human disturbance of nesting colonies; habitat changes in suitable nesting sites due to drought; and pesticide contamination, especially in the western U.S. where breeding populations may be accumulating DDT and DDE on their wintering grounds in Mexico.

Black-crowned Night Heron (*Nycticorax nycticorax*)
In Wyoming, the black-crowned night-heron is classified as an uncommon summer resident, with confirmed breeding recorded in 10 of 26 latilongs in which the species has been documented. Night-herons nest in colonies that can range greatly in size, and they feed primarily on minnows, crayfish, and aquatic invertebrates. Loose nests of sticks, twigs, or cattail stems are built in emergent vegetation or in shrubs near the water's edge. In Wyoming, night-herons have been documented breeding at 16 different sites from 1982 through 1994. Main threats to night-heron populations include loss of suitable nesting wetland habitat due to human activities, excessive human disturbance of nesting colonies, and drought-related habitat changes in suitable nesting sites.

White-faced Ibis (*Plegadis chihi*)
In Wyoming this species is classified as an uncommon summer resident, and confirmed or probable breeding has only been recorded in 5 of 26 latilongs in which it has been documented. In Wyoming, white-faced ibises have been observed breeding at 6 sites from 1982 through 1994. This species nests primarily in bulrush stands, making a deeply cupped platform nest from

emergent vegetation and sticks. Individuals feed primarily on aquatic and moist-soil invertebrates, crustaceans, and earthworms.

Historical causes of population decline throughout their range include loss of suitable wetland habitat from water diversion projects and intentional draining of marshes, and possibly pesticide and herbicide contamination, especially dieldrin, DDT, and DDE. Changing habitat conditions, such ad drought and flooding, at nesting colonies can cause western breeding populations to fluctuate in size and location, and human disturbance of nesting colonies during nest site selection, nest building, and incubation periods may cause partial or total desertion of the colony. Of the 6 breeding sites used in Wyoming, 5 are on the margin of the species' breeding range and are extremely susceptible to habitat alterations during periods of drought, making them unreliable and unsuitable in some years.

Caspian Tern (*Sterna caspia*)
In Wyoming this species is classified as an uncommon summer resident, and confirmed or probable breeding has only been recorded in 4 of 22 latilongs in which the species has been documented. Caspian terns nest on the ground in small colonies along coasts and inland lakes, rivers, and marshes. Nests consist of scrapes in rocks or sand and are located close to water. Fish are the main food source for Caspian terns, which they take by diving underwater, often from a hovering position. Aquatic invertebrates, such as crustaceans, are also taken. In Wyoming the species has been documented nesting at 4 different sites since 1983, including Pathfinder Reservoir.

Forster's Tern (*Sterna forsteri*)
In Wyoming, this species is classified as a common summer resident, and confirmed breeding has only been recorded in 4 of 26 latilongs in which it has been documented. Forster's terns nest in colonies in marshes and aquatic areas. They nest on the ground close to water in depressions made in the mud or grass, or build deeply hollowed platform nests out of emergent vegetation. This species has been documented breeding at 8 different sites in Wyoming since 1982. This species feeds primarily on fish taken by diving underwater and insects taken while flying over marshes. They also feed on aquatic invertebrates and dead fish.

Black Tern (*Chlidonias niger*)
In Wyoming, the black tern is classified as a common summer resident; however, confirmed or suspected breeding has only been recorded in 7 of 26 latilongs in which it has been documented. This species has been documented at 6 different sites in Wyoming from 1982 through 1994. Black terns nest in dense stands of emergent vegetation (cattails and bulrushes), often on a muskrat house. Nests are typically loose, floating mats of dead vegetation that keep eggs raised just above the water's surface. Black terns feed on insects, aquatic invertebrates, and small fish.

Historically, population declines were caused by loss of wetland habitat due to water diversion projects and intentional draining of wetland habitats, as well as agricultural chemical use in the midwest that resulted in greatly reduced hatching success. Currently, the primary threats to populations are the degradation and loss of suitable wetland breeding habitat due to human disturbance and unfavorable weather conditions.

Yellow-billed Cuckoo (*Coccyzus americanus*)
In Wyoming, the yellow-billed cuckoo is classified as an uncommon summer resident, and confirmed or probable breeding has only been recorded in 5 of 20 latilongs in which the species has been documented. This species primarily nests in large stands (328 x 1312 ft.) of cottonwood-riparian habitat below 7,000 ft. and in urban areas– the only known areas in Wyoming to provide such habitat is in isolated stands along the Bighorn, Powder, and North Platte Rivers. Yellow-billed cuckoos feed primarily on terrestrial invertebrates. Young are fed insect regurgitant. Breeding often coincides with outbreaks of insects, and prey abundance may increase egg production and lead to brood parasitism of nests.

Lewis' Woodpecker (*Melanerpes lewis*)
In Wyoming, this species is classified as an uncommon summer resident, and confirmed or probable breeding recorded in 18 of 26 latilongs in which the species has been documented. In Wyoming, this species is known to nest in a variety of habitats below 9,000 ft., including cottonwood-riparian, aspen, ponderosa pine savannah, and mixed pine-juniper. Because this species prefers open areas for nesting, coniferous forests that have been disturbed by burning or logging are used by this species. Lewis' woodpeckers build cavity nests in snags, poles, or dead stubs of live trees. A nest site may be reused in successive years, and the pair bond may be permanent. Diet of this species consists primarily of insects caught in the air, although nuts, pine seeds, fruit, and berries also are eaten. Hulled acorns and other nuts are cached in natural crevices for use in the nonbreeding season.

Vagrant Shrew (*Sorex vagrans*)
This species occurs in riparian shrub, moist meadow grasslands, bogs, and riparian or marsh habitats with moist soil in a variety of habitat types from sagebrush grassland and mixed shrubland to conifer forest. It prefers areas with accumulated leaf litter and rotting logs. Currently, the documented distribution indicates the range includes all of Wyoming except the eastern tier of counties, those east of the Bighorn Mountains and Laramie Mountains. The suspected range includes the Medicine Bow, Bridger-Teton, Targhee, Wasatch, Bighorn and Shoshone National Forests, and all Bureau of Land Management Resource Areas in the state.

Western Boreal Toad (*Bufo boreas boreas*)- Boreal toads typically occur between 2,420 and 3,420 meters (8,000 and 11,000 feet) in spruce-fir (*Picea* and *Abies* spp.) forests and in meadows (Burger and Bragg 1946, Smith et al. 1965, Baxter and Stone 1985, Hammerson 1989). They also may be found as low as 2,100 meters (7,000 feet) in willow (*Salix* spp.) dominated riparian areas surrounded by sagebrush (*Artemisia* spp.) or grassland and as high as 4,000 meters (12,900 feet) in alpine habitats (Mark Jones, Colorado Division of Wildlife (CDOW), pers. comm. 1996).

Suitable breeding sites are in lakes, marshes, ponds, and bogs with shallow water and sunny exposure. The toads rarely lay eggs in streams. Breeding typically takes place in late May or early June but may occur as late as mid-July. Young toads are restricted to moist habitats but after breeding, adults, especially females, may move several miles into upland forests and meadows. Hibernation takes place in chambers near streams with ground water beneath the chamber floor or in rodent burrows deep enough to prevent freezing and with soil moisture high enough to prevent dessication. Most boreal toads are in hibernation by early October but association with the hibernacula may occur as early as late August (Steve Corn, U.S. Geological Service-Biological Resources Division (USGS-BRD), pers. comm. 1997).

Physical and climatic characteristics separate boreal toads in the southern Rocky Mountains from populations in northeastern Utah and western Wyoming. Because of this geographic isolation, possible genetic differentiation exists between toads in the southern Rocky Mountains and the remainder of their range (Blair 1964; Hubbard 1972; Anna Goebel, 1999). Southern Rocky Mountain population boreal toads were once common throughout much of the high elevations in Colorado and in the Snowy and Sierra Madre Ranges of southeast Wyoming. Declines in isolated breeding sites or localities were first documented in New Mexico and Wyoming in the mid-1980's (Woodward and Mitchell 1985, Corn et al. 1989) and in Colorado in the 1970's (Carey 1993). In the late 1980's boreal toads were found to be absent from 83 percent of breeding localities in Colorado and 94 percent of breeding localities in Wyoming previously known to contain toads.

Subsequent surveys conducted by CDOW, USFS, and others in 1998 revealed about 33 breeding localities; however, all localities, except one in Wyoming, were in Colorado. A locality may be comprised of more than one specific breeding site separated by no more than ½ mile. In 1999, the number of known breeding localities jumped to 50, still with only one in Wyoming and none in New Mexico (Boreal Toad Recovery Team 2000). However, the increase in breeding localities was likely due to survey efforts rather than expansion of the population. The 50 breeding locations comprised 29 populations with five of these considered viable under the criteria established by the Recovery Team. In surveys conducted from 1999-2005, boreal toads have been found in 7 locations within the upper North Platte River Basin, Wyoming: French Creek Basin; Ryan Park; the North Fork of the Little Laramie River; the South Fork of Bird Creek; Sourdough Creek; Foxpark; and upper Snowy Range, White Rocks. All of these locations occur in either Carbon or Albany County within the Medicine Bow National Forest.

Wood Frog (*Rana sylvatica*)– all information below taken from Baxter and Stone (1980)

In Wyoming the wood frog is found in the Medicine Bow Mountains from the Colorado-Wyoming state line north to at least Long Lake, Carbon County. Another population occurs in the Big Horn Mountains. The wood frog inhabits beaver ponds, slow moving streams and small lakes in the montane zone. Diet of the wood frog includes a variety of small invertebrates, mostly insects. The wood from breeds from mid-June to early July, shortly after the ice has melted from ponds and small lakes, at an elevation of 9,800 ft. in the Snowy Range and the Medicine Bow Mountains. Breeding is earlier at lower elevations. Adults congregate along the northern, sunlit margins of the breeding habitat, usually breeding at the same time and place with the boreal toad. Eggs develop rapidly at relatively low eater temperatures and, in Wyoming, transformation of the larvae is usually completed by early August.

Flathead Chub (*Platygobio gracilis*)– all information below taken from: Baxter and Stone (1995)

The flathead chub inhabits large, turbid rivers and is known to occur in the North Platte. This species spawns late in the summer when the rivers are lower, warmer, and the bottom more stable. The flathead chub is omnivorous, feeding mainly on aquatic invertebrates, some terrestrial invertebrates, and vegetation. This species likely provides forage for large, predatory species, and is sometimes used for bait.

Hornyhead Chub (*Nocomis biguttatus*)– all information below taken from: Baxter and Stone (1995)

While the hornyhead chub is not on the list of Species of Special Concern, it is a native fish of the North Platte Basin in Wyoming, once common in tributaries of the Laramie River in Platte County, but now very rare in the North Platte River basin in Wyoming. It was collected in the North Laramie River during 1993. This species inhabits clear, gravel-bottomed streams where it builds a gravel nest during spawning. The hornyhead chub diet includes insects, crustaceans and mollusks.

Suckermouth Minnow (*Phenacobius mirabilis*)– all information below taken from: Baxter and Stone (1995)

While this species is not on the list of Species of Special Concern, it is a native fish of the North Platte Basin in Wyoming, found rarely in tributaries of the North Platte River in Goshen County and common in lower Horse Creek. The suckermouth minnow is a riffle fish that prefers clear water and sand, gravel or rubble substrate. Spawning occurs throughout the summer, and its diet includes aquatic insects and other bottom dwelling invertebrates.

Lake Chub (*Couesius plumbeus*)– all information below taken from: Baxter and Stone (1995)

In Wyoming, the lake chub was formerly found in Pickett Lake and the Sweetwater River—although is was not found during recent surveys. The lake chub spawns in the spring in both creeks and lakes, and its diet includes microcrustaceans for young fish and aquatic and terrestrial insects for adults.

Common Shiner (*Luxilus cornutus*)– all information below taken from: Baxter and Stone (1995)

In Wyoming, this fish occurs in clear, gravel-bottomed streams tributary to the North and South Platte Rivers. It has become rare in some streams in Platte and Goshen Counties where it was once common. The common shiner is a gravel-nester, spawning in early summer, and its diet includes both aquatic insects and plant matter.

Plains Topminnow (*Fundulus sciadicus*)**–** all information below taken from: Baxter and Stone (1995)

In Wyoming, the plains topminnow is found in the North and South Platte River drainages. Typical habitat is shallow water in clear streams with sand or gravel substrate and considerable vegetation. It also is found in sloughs and backwaters with dense vegetation. Spawning takes place in early summer. Little is known about the life history of this species.

Species of Special Concern With Program

Colonial Nesting Birds

Except for some localized effects, management of mainstem reservoirs and the concomitant fluctuation in reservoir levels and North Platte River flows would not have a significant adverse impact on colonial nesting birds or their habitats. While important breeding areas occur on smaller lakes within the North Platte Basin (e.g., Bamforth Lake, Caldwell Lake, Rush Lake, Soda Lake, Webb Lake), the hydrology of areas would not be impacted by mainstem water management associated with the Program.

Water leasing activities may result in localized impacts to riparian and wetland conditions associated with smaller canals and creeks in cases where (1) return flows from farm irrigation were a significant contributor to the local water table and surface hydrology and (2) no other water users rely on the local return flows or canal deliveries to this site. In these cases, water tables could decline locally, and this could negatively impact local riparian vegetation and associated wetlands. However, effects to hydrological processes from water leasing would occur only within localized segments of habitat and effects on hydrological processes would occur on a temporary basis, only during a few months of particular years.

Colonial Nesting Birds: Pathfinder Reservoir

Program impacts to Bird Island's avifauna primarily will come from increased predator access during low water levels during the nesting period. The ground-nesting birds− American white pelican, California and ring-billed gulls, and Caspian terns− attend nests or flightless young from early April through late July (Erlich et al. 1988). The Program increased the number of years that Bird Island becomes a peninsula during the nesting season to 25 of 48 years (52 percent of years), compared with 24 of 48 years (50 percent) under the Present Condition. This 2 percent increase is not expected to contribute significant negative impacts to avian species, and likely falls within the margin of error for the hydrological analysis.

Colonial Nesting Birds: Pathfinder National Wildlife Refuge

Other important terrestrial resources potentially affected by the Program are wetlands on the Pathfinder National Wildlife Refuge. While there likely will be significant impacts to the aquatic resources in the North Platte River episodically (e.g., trout populations in Pathfinder), changes in pool elevation at Pathfinder Reservoir are not expected to be persistent enough to change the wetland vegetation and habitat values at the Refuge.

Cottonwood-Riparian Species

Management of mainstem reservoirs and the concomitant fluctuation in reservoir levels and North Platte River flows would not have an adverse impact on species occupying cottonwood-riparian habitats including Lewis' woodpecker, the yellow-billed cuckoo, or the vagrant shrew. It is possible that increased mainstem and tributary flows from the Environmental Account and water leasing activities would increase water levels seasonally in side channel wetland and riparian habitats. This would aid in maintaining important riparian habitats that may otherwise die out from desiccation and increased channelization.

While the current flow regime maintains the existing stands of riparian cottonwood, the channel is probably failing to provide suitable sites or hydrology for recruitment of younger stands. Recruitment appears limited to a narrow band along the current active channel. As the existing forest becomes increasingly decadent and dies off, it will not be replaced and declines in the riparian forest should be expected.

Water leasing activities may result in localized impacts to riparian and wetland conditions associated with smaller canals and creeks in cases outlined. However, effects to hydrological processes from water leasing would occur only within localized segments of habitat and effects on hydrological processes would occur on a temporary basis, only during a few months of particular years.

In small tributaries, conversion of irrigation diversion to instream flow could lead to hydrologic conditions more similar to pre-development conditions. Stream channels could be more active locally, providing disturbance favorable to colonization by early successional plant species including willows. Overbank flooding would be more frequent, improving soil moisture on the flood plain. Increased riparian zone scour/erosion due to water leasing is highly unlikely. Increases in flow along tributary creeks and canals should remain well within the range of historic variations in flow. If anything, the tendency to increase flows in May or June of most years along certain mainstem tributaries, at the expense of flows later in the irrigation season, should generally enhance the health of riparian zones relative to the present condition.

Other Species of Special Concern

The wood frog occurs in beaver ponds, small lakes, slow moving streams, wet meadows and willow thickets in the montane zone usually at or near 9,000 feet elevation. Similarly, the boreal toad in the North Platte Basin of Wyoming is found typically in spruce-fir forests and meadows in Medicine Bow National Forest at 8,000-11,000 feet elevation. Therefore, neither of these species is likely to occur within portions of the North Platte Basin impacted by water-related activities of the Program. The flathead chub spawns late in summer when rivers are lower, warmer, and the bottom more stable. Program related impacts to this species during this important stage of its life cycle are not expected to occur. Flow increases associated with Environmental Account management and other components of the Program would occur earlier in the year (spring and early summer) and would likely mimic conditions in which this species evolved.

The hornyhead chub, suckermouth minnow and common shiner are found in tributaries to the mainstem North Platte River, and the lake chub occupies smaller streams and lakes. Habitat typically occupied by the plains topminnow does not occur in the mainstem North Platte River. Management of mainstem reservoirs and the concomitant fluctuation in reservoir levels and North Platte River flows would not likely have a significant adverse impact on these fishes. However, water leasing for Program water in Converse, Platte, Goshen, Laramie, or Albany Counties could impact aquatic habitat. Water leasing activities may result in localized impacts to smaller tributary hydrology in cases where (1) return flows from farm irrigation were a significant contributor to the local water table and surface hydrology and (2) no other water users rely on the local return flows or canal deliveries to this site. In these cases, water tables could decline locally, and this could negatively impact local fish populations.

Native species status of the common shiner, flathead chub and lake chub is common but habitat is declining or vulnerable. Status of the hornyhead chub, suckermouth minnow and plains topminnow is rare; habitat is declining or vulnerable for the former two species, but stable for the plains topminnow. Proposed water leasing activities potentially impacting habitat for the hornyhead chub and suckermouth minnow should be evaluated on a case-by-case basis. Under specific terms and conditions for these activities, significant impacts to habitat can be avoided. For example, (a) taking land out of production for only one or two years at a time and closely monitoring habitat conditions to ensure mesic conditions of habitat; (b) providing maintenance flows within drainages containing important habitat during the irrigation season while cropland is out of production; and/or (c) avoiding water leasing activities in areas experiencing drought for several consecutive years until habitat conditions recover.

Other Fishes Native to Wyoming No Longer Extant in North Platte River

The shovelnose sturgeon (*Scaphirhynchus platorynchus*), goldeye (*Hiodon alosoides*), plains minnow (*Hybognathus placitus*), sturgeon chub (*Macrhybopsis gelida*), and sauger (*Stizostedion canadense*) are fishes native to Wyoming and historically found in the North Platte River. These species, however, have been extirpated from the North Platte in Wyoming since the early 1900s (Baxter and Stone 1995). Their disappearance from the Platte Basin in Wyoming is likely a result of several factors which may include: water development for agricultural irrigation and municipal water supply; mainstem reservoir construction and concomitant changes in water quality (e.g., temperature), reduced sediment transport, and changes in substrate for feeding and spawning; increased predation by non-native species; and increased competition with non-native species. However, complete analysis of this complex of reasons which may have led to the disappearance of these native fishes from the North Platte River in Wyoming, and potential measures by which these species may be reintroduced into this system, is beyond the purpose and need of the Platte Program as well as the scope of this report. Rather, the emphasis here is on analyzing, and recommending mitigation for, impacts from the Platte River Recovery Implementation Program to fishes that currently are found within the North Platte Basin in Wyoming.

Seminoe Reservoir Without Program

Seminoe Reservoir is a large, mesotrophic impoundment, heavily influenced by weather and by its two major sources of inflow: the North Platte and Medicine Bow Rivers. It contains 1,017,280 af of storage for irrigation, hydroelectric power production, and maintenance of instream flows. Seminoe Reservoir covers 20,291 acres at the maximum pool elevation of 6,357 feet, 12,800 acres at the average annual pool elevation of 6,329 feet, and 84 acres at the dead storage elevation of 6,185 feet (USDOI 1981).

The operation of Seminoe Reservoir provides maximum available storage space in the spring to capture annual runoff from the North Platte and Medicine Bow drainages used for irrigation and power production throughout the year. Large fluctuations in pool elevation occur annually, averaging 35 feet per year over the 50 year period of record. Maximum average monthly fluctuation within one water year was 81.2 feet, and minimum fluctuation was 7.1 feet. The reservoir is usually lowest (average low of 6,314 ft elevation) near the end of March to provide storage for spring runoff, and reaches its peak (average high of 6,342 ft elevation) at the end of the runoff period near the end of July. Water is then released downstream for re-storage in Pathfinder and downstream reservoirs (USBR 1994). This provides flexibility in the system, increases power generation efficiency, and maintains an excellent recreational pool during the summer. Seminoe Reservoir has been designated by the Service as moderate to high value for migrating diving ducks, nesting and migrating mallards, its sport fishery, and big game habitat.

The reservoir also has high national importance for the rare persistent sepal yellowcress (*Rorippa calycina*, Brassicaceae).

Aquatic Resources

Wyoming Game and Fish manages the fishery under a *Basic Yield* concept– management primarily directed towards providing fishermen with the opportunity to harvest fish– stocking 120,000 catchable rainbow trout annually. Stocked trout are supplemented by natural recruitment of rainbow and brown trout. Walleye first appeared in Seminoe in 1961, probably as a result of upstream stocking in Colorado (Conder and Deromedi 1998). This species competes with larger trout for available prey species and preys heavily on small trout, necessitating the stocking of larger trout to reduce predation. Game species include walleye, rainbow trout, brown trout, cutthroat trout, and lake trout. Nongame species include white and longnose suckers; bigmouth, emerald and sand shiners; fathead minnows; lake chubs; carp; and Iowa and johnny darters (Conder and Deromedi 1998).

Seminoe Reservoir receives substantial loads of nutrients from the North Platte and Medicine Bow Rivers. Wave action and water management preclude the formation of a classic thermocline, and it appears to be only weakly stratified during the summer. The hypolimnion seems to contain sufficient dissolved oxygen at all times to support aquatic life. During peak inflows, especially after severe drawdown in early summer, the upper reaches of the reservoir often become turbid. When high inflow follows low storage, these turbidity events may extend over the entire reservoir, adversely affecting primary production and forage conditions for young trout and forage fish (McMillan 1984). Seminoe often becomes eutrophic in late summer when large blooms of filamentous blue-green algae occur, particularly in the upper reaches. Under certain conditions, these blooms lower the reservoir's ability to support a fishery. Overall, good zooplankton levels and varied benthic organisms combined with an abundance of shallow littoral habitat support a diverse and dynamic fishery.

Terrestrial Resources

Areas surrounding Seminoe contain the full complement of seasonal habitat for pronghorn and mule deer, including significant areas of crucial winter range. About 180 bighorn sheep reside on the west side of the reservoir in the Seminoe Mountain area. The wide diversity of habitat in the area supports an equally diverse bird community. Sage grouse, an important regional game bird, are common throughout the sagebrush grasslands. The area also is attractive to birds of prey, especially golden eagles and ferruginous hawks. Waterfowl use the reservoir primarily during spring and fall migration, especially ruddy, redhead, and canvasback ducks. In addition, a limited amount of breeding habitat maintains small populations of ducks and geese.

Bald eagles use the reservoir area until ice-up. Peregrine falcons migrate through the general area and may occur in the area seasonally. Prairie dog towns are found in the general area. Populations of the rare persistent sepal yellowcress are known to occur at various locations around the reservoir and along the lower Medicine Bow River (Wyoming Rare Plant Technical Committee 1994).

Seminoe Reservoir With the Program

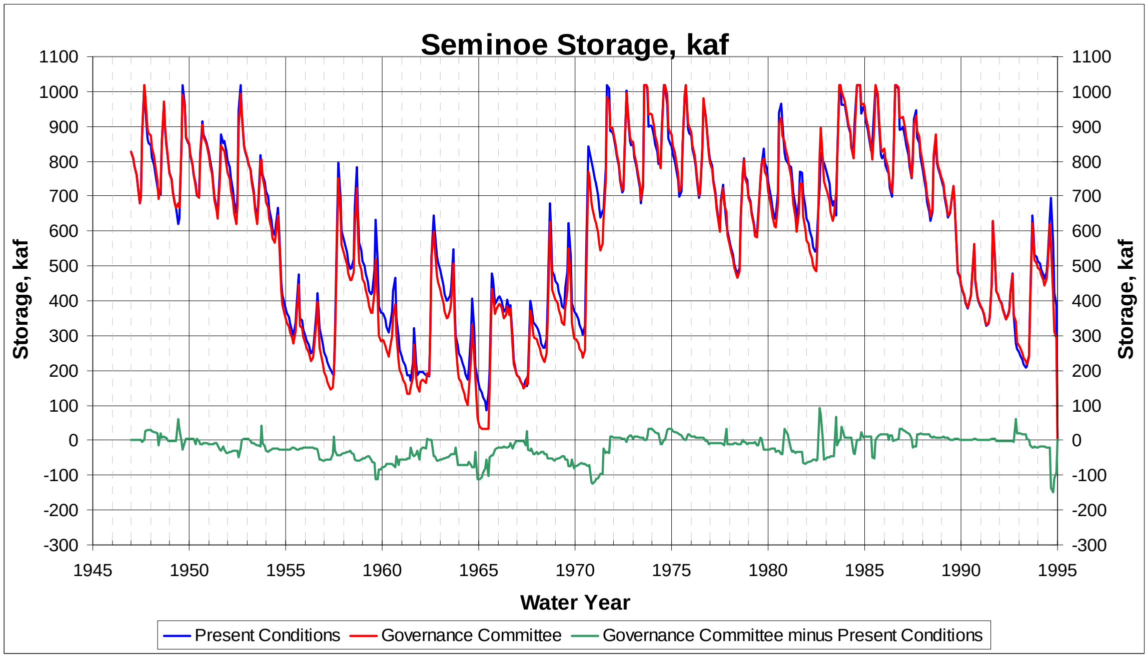
Aquatic Resources

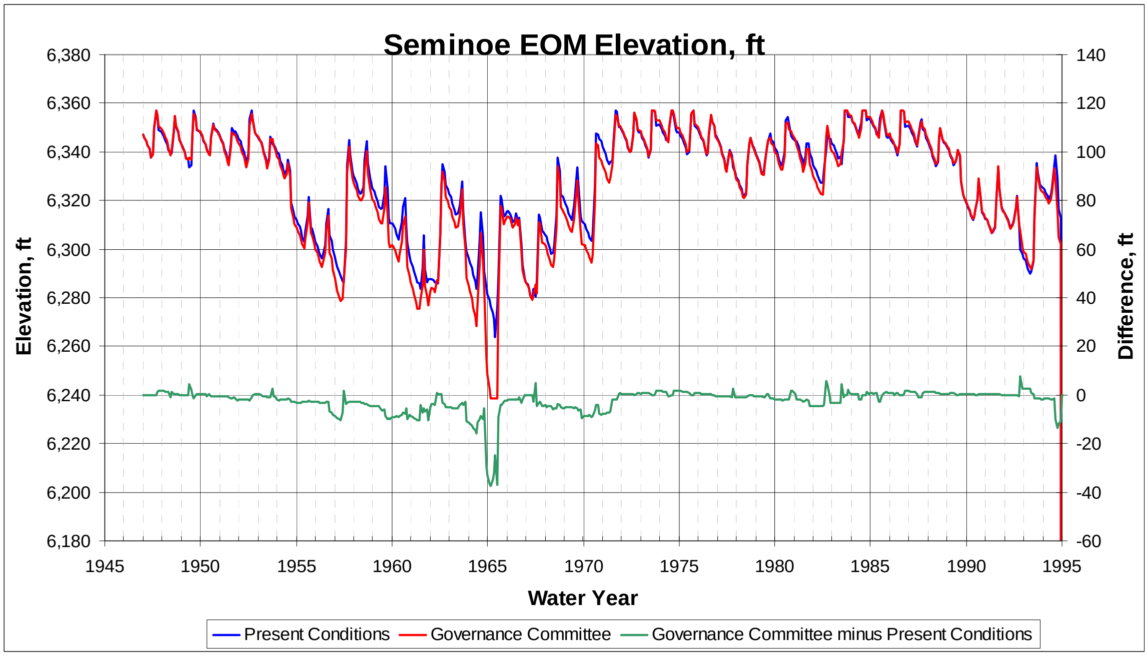
The average end-of-month storage for the 48-year period of record was 583,200 af, approximately 5% less than Present Conditions. There were 8 water years (17%) during which storage was less than 200,000 af– the minimum maintenance pool management goal for WGFD. The largest single month drawdown was 152,300 af (0% greater than for Present Conditions) occurring during July, 1954. There were 7 months over the period of record (October through March of 1965) for which reservoir content was at or below 50,000 af– the volume which WGFD has identified as minimum to ensure survival of the fishery.

Overall, approximately 65% of water years, averaged across all months for the period of record, experienced elevation level decreases. *Largest* elevation declines for any given month over the period of record ranged from 10 to 38 feet, with the greatest decreases compared with Present Conditions occurring during the fall and winter months (October-January) for several years. The overall average elevation decrease, across all months for the period of record, was approximately 4.5 feet, an approximate 3% decrease from Present Conditions. Elevation *increases* occurred during approximately 32% of water years, represented by an average increase in elevation of <1% (1ft.), and a 2% increase in content (13,500 af), compared with Present Conditions.

Elevation decreases greater than 10 feet occurred, on average across all months and years, 3 of 48 water years (6%). Overall average elevation decreases greater than 10 feet, across all months and water years, was approximately 16 feet. Elevation decreases greater than 10 feet occurred, on average for all months and water years, with a 13.5% greater frequency than Present Conditions. September was the month with the highest number of years (15 of 48 or 10%) during which elevation decreased greater than 10 feet. For those elevations less than 6,289 feet (corresponding to storage of approximately 200,000 af) the Program, compared with Present Conditions across all months and water years, exhibited: (1) an average decrease of 6% in maximum depth; and (2) an average decrease of 16% in average content.

Figure 53 and 54. Average annual end-of-month storage (thousand acre-feet) and elevation (feet) changes for Seminoe Reservoir,1947-1994, for Present Conditions, the Proposed Program, and their difference (NPRWUM results, USBR 2005).





Fisheries

Impacts to Seminoe Reservoir fisheries were analyzed by examining changes in Total Dissolved Solids (TDS), changes in closely related Morphoedaphic Index (MEI: ratio of TDS to mean reservoir depth), and consequent changes in fish production. Details of this analysis are in the Program FEIS appendices: *Water Quality* and *North Platte River Basin Fisheries*. In Seminoe, average TDS increased for the Program above Present Conditions between December and March, at which time the levels began to converge, with TDS for the Program declining below Present Conditions August through January.

Since TDS shows very little difference between the Program and Present Conditions, any difference in MEI values will reflect variation in mean depth. While average *mean* depths varied little for Seminoe between the Program (43.2 feet) and Present Conditions (43.7 feet), larger variation occurred between average *minimum* values: 21.8 feet for the Program, and 27.4 feet for Present Conditions. Overall, mean standing crop for the Program was 33.8 lb/acre (MEI of 6.3), slightly higher than that of 33 lb/acre (MEI of 6.1) for Present Conditions. The differences between fish standing crop estimates are larger than those for MEI values because of the exponential relationship—rankings are the same.

To examine trends in MEI values, geometric mean data were plotted for Present Conditions and the Program. A large difference occurs between the values during the 1960s, followed by convergence of values in the 1970s with small differences occurring thereafter. Program MEI values were always greater than those for Present Conditions, although differences were, at times, too small to see graphically. Correlation analysis showed that the most important factor influencing the MEI difference between the Program and Present Conditions was average end-of-month content. The greater the average end-of-month content for the year, the lower the annual MEI.

Using only the MEI or standing crop biomass derived from MEI does not account for the effect on reservoir storage and the amount of total fish habitat available. Therefore, standing crop biomass estimates were multiplied by average reservoir area in terms of acres to arrive at a total fish standing crop estimate for each reservoir year (converted to tons for convenience). This results in a more accurate picture of potential Program related effects on fish production since it accounts for loss of available habitat in the reservoir. Consequently, total average annual standing crop biomass for Seminoe is approximately 205 tons under Present Conditions and 204 tons for the Program. Larger, more significant, differences occur for minimum values: 130 tons under Present Conditions compared to 109 tons for the Program.

Modelling results for dissolved oxygen (DO) in Pathfinder Reservoir indicates that there is a lower probability that the hypolimnion will contain adequate dissolved oxygen during the late summer suitable to coldwater fishes under the Program compared with Present Conditions. While results show that catastrophic loss of a coldwater fishery would not likely occur, there would be an adverse effect on the fishery due to stress related to low DO levels in Pathfinder associated with the Program. Similar effects may occur in Seminoe, although to a lesser extent because of the smaller reduction in the reservoir level. A comparision of historic profiles of times of low DO in Seminoe and Pathfinder reservoirs indicates that conditions for coldwater fishes could become very stressful.

Terrestrial Resources

No significant terrestrial wildlife impacts were identified.

Kortes Reservoir Resources Without the Program

Kortes Reservoir is a 4,750 acre-foot re-regulating and power producing reservoir located below Seminoe Dam. The reservoir is located in a deep, steep canyon. Because the Kortes Unit's hydropower production is for peaking power, large daily and weekly pool fluctuations are common. Kortes Reservoir has been designated as having moderate value (Resource Category 3) for nesting raptors and wildlife in general.

Miracle Mile is the river reach between Kortes Dam and the headwaters of Pathfinder Reservoir. The length of this reach varies from 6 to 12 miles depending on Pathfinder Reservoir pool elevation. The river flows through a wide alluvial valley, with uplands of sagebrush grassland interspersed with rock outcrops. The somewhat sparse riparian habitat is comprised of narrowleaf cottonwood and willow. Because of inundation by Pathfinder, Seminoe and Alcova reservoirs, this is now the last remaining riparian habitat of this type along 60 miles of the North Platte River.

Flows in this reach are entirely dependent upon releases from Seminoe and Kortes dams upstream. Annual operation of Kortes involves daily peak flows for power production and seasonal increases in concert with releases from Seminoe for irrigation delivery. This reach of the North Platte River was designated as very high value (Resource Category 2) for: (1) migrating mallards; (2) its trophy trout fishery; (3) crucial winter range for big game; and (4) feeding area for rare colonial nesting birds (e.g., white pelicans, Caspian terns, great blue herons). The area also has high resource (Resource Category 3) value for wintering bald eagles.

Aquatic Resources

Because of the rapid turnover of water passing through this reservoir, biological productivity of the reservoir is low to moderate and the fishery, consisting mostly of rainbow trout, brown trout, and walleye, is limited. Lack of access and the resultant lack of fisheries management limit the fishery; if access could be developed, the fishery resource value could be improved.

Miracle Mile supports a well-known, Blue Ribbon trout fishery (trout fishery of national importance) managed as a Trophy fishery. Cold, clear, nutrient-rich water released from the hypolimnion of Seminoe Reservoir provides a classic "tailwater" fishery where nutrient input to the Miracle Mile stimulates growth of aquatic organisms on which trout feed. During the winter, relatively warm water released from Seminoe stimulates high productivity during that season.

Rainbow trout are stocked annually to supplement the natural recruitment, while brown trout populations are self-sustaining. Most of the harvest consists of rainbow (75-80%) and brown trout (20-25%), with small numbers of cutthroat trout and walleyes taken (Peterson and McMillan 1976). Brown trout, cutthroat trout, rainbow trout, and walleye migrate into the Miracle Mile from downstream Pathfinder Reservoir to feed on the abundant forage and to spawn. Nongame fish include white and longnose suckers, carp, longnose dace, fathead minnows, bigmouth shiners, sand shiners and emerald shiners.

Kortes Dam, constructed in 1951, caused declines in the trout fishery of the Miracle Mile from extreme daily flow fluctuations (over 1,000 cfs change within a few hours) and de-watering of the channel (as low as 10 cfs) (U.S. Fish and Wildlife Service 1964). Recognizing the value of this trout fishery, the U.S. Congress in 1971 established a 500 cfs minimum flow from Kortes Dam (Public Law 92-146; 85 Stat. 414). While this greatly improved conditions for trout in this reach, rapid flow fluctuations resulting from peaking power production still adversely affect trout productivity and survival. Extreme fluctuations in the Miracle Mile may reduce primary productivity, dry out redds, cause downstream displacement of emergent fry, and increase juvenile and adult trout mortality from stranding (Zafft and Vogt, Jr. 1992).

Instream flow studies in this reach (Zafft and Vogt 1992) provide a basis for recommending fishery improvements. Flows were identified that could maximize physical habitat for all life history stages of rainbow and brown trout (Table 13). Availability of habitat for fry and spawning gravel for adults protected from dessication probably limit fish recruitment in this reach (Zafft and Vogt 1992). Main channel trout fry habitat is maximized at 1,000 cfs, though significant habitat is available between 1,000 and 2,500 cfs. The amount of juvenile trout habitat is maximized at 500 cfs, gradually decreasing with increasing flows. Zafft and Vogt (1992) concluded that any spawning habitat made available in the fall for brown trout, or the spring for rainbow trout, must remain inundated until fry emerge from March to June to minimize destruction of eggs.

Table 13. Flows (cfs) in the Miracle Mile which produce maximum (80% range) usable area for different life stages of rainbow and brown trout (from Zafft and Vogt, Jr. 1992).

Study Site	Adult brown	Adult rainbow	Adult trout	Juvenile trout	trout larvae	trout spawning
Main channel	100	3,000	2,250 (1,300-2,900)	500	1,000/ 2,500 2 peaks (900-2,600)	–
Side channel	–	–	–	1,600 (650-2,750)	500	2,000 (1,650-2,750)

Adult and juvenile trout are mobile and less affected by fluctuating flows. Zafft and Vogt (1992) reasoned that water management to protect redds would be the most productive measure and recommended maintaining flows at spawning sites until fry emerge from gravel to minimize dessication and stranding. Flows necessary to maximize spawning habitat (1,650-2,750 cfs) could not be maintained until emergence. Consequently, they recommended maximizing the length of time the minimum flow that could be maintained from September to May to maximize available spawning habitat and reduce losses to dessication.

Terrestrial Resources

The steepness and inaccessibility of the area significantly limits most big game use except for bighorn sheep. The canyon and adjacent Seminoe Mountains to the west are the core area for this bighorn sheep herd. The canyon also provides nesting habitat for prairie falcons and golden eagles. Waterfowl nesting and feeding habitat is limited. The reservoir is frequented by wintering bald eagles.

The riparian habitat of Miracle Mile is extremely important to local wildlife. Its value is critical because it supports a wide array of wildlife species, has a very limited distribution in the North Platte River basin, and the majority of the North Platte River corridor which once supported riparian vegetation in this area has been inundated by reservoir construction.

Pronghorn antelope and mule deer are the principal big game species occupying this area-- both are year-round residents. The Seminoe Mountain bighorn sheep herd also uses the area, primarily during the winter months.

The upper reach of Pathfinder Reservoir and the Miracle Mile are used in the spring and fall by migrating waterfowl. The number of waterfowl wintering in this area appears to be positively correlated with reservoir level (Roberts, Pers. Comm., 2003). Over the last eight years, an average of 720 ducks and 90 Canada geese have been counted in the Miracle Mile area during the Mid-winter Waterfowl Survey . The heavy recreational use of the area significantly limits waterfowl nesting. White pelicans use this reach extensively for foraging and raising their young. This is probably true for other colonial nesting birds that nest on Bird Island located approximately 12 miles to the northwest. Bald eagles use this river reach extensively during the winter and commonly are observed perched in cottonwood trees. There are prairie dog towns in the general area.

Kortes Reservoir Resources With the Program

Flows ranged from a low of 284 cfs to a high of 8,893 cfs over the period of record. Average annual flow for the period of record was 1308 cfs (948 af), with 4 months over the period of record during which flow was below 500 cfs; however, minimum flow of 500 cfs through this reach is required by law. Overall percent change from Present Conditions in average annual flow is a 2.5% increase in average annual flow.

The average number of years over the period of record during which flow decreased was 18 of 48 (38%). For the times during which flow decreased over the period of record, the average drop was 15% compared with Present Conditions, ranging from a 44 to an 561 cfs decrease. There were a total of 28 times over the period of record during which flow decreased >500 cfs, with 64% of these occurring in April (6), July (5) and August (7): the average flow decrease for these years was 905 cfs, representing an average 43% decrease compared with Present Conditions. The minimum flow requirement of 500 cfs was not met October through March of 1965; during these 6 events there was an average 43% decrease in flow compared with Present Conditions. Consequently, the trout fishery in this reach would be adversely affected during the winter months.

The average number of years over the period of record during which flow *increased* was 19 of 48 (40%). For the times during which flow increased over the period of record, the average gain was17.5% compared with Present Conditions, ranging from a 21 to a 393 cfs increase. There were a total of 29 times over the period of record during which flow increased >500 cfs (8 of which occurred in the month of August, and 6 in June); the average flow increase for these years was 809 cfs, representing an average 80% increase compared with Present Conditions.

It is difficult to say to what extent Kortes Reservoir will buffer the effect of poor water quality entering from Seminoe if it is reduced at or below 50,000 af. Releases of water of very low quality into Miracle Mile may impact this fishery during low flow periods. This is particularly true for low flow and reservoir level events occurring during the warm summer months during which mixing of reservoir release water and flows in Miracle Mile would easily occur. Because of the reduced probability of adequate DO in the hypolimnion during late summer, there would be an increased likelihood of anoxic or hypoxic water released below Pathfinder and Seminoe reservoirs. Historic data suggest that low DO in Seminoe water releases could extend into the upper end of Miracle Mile.

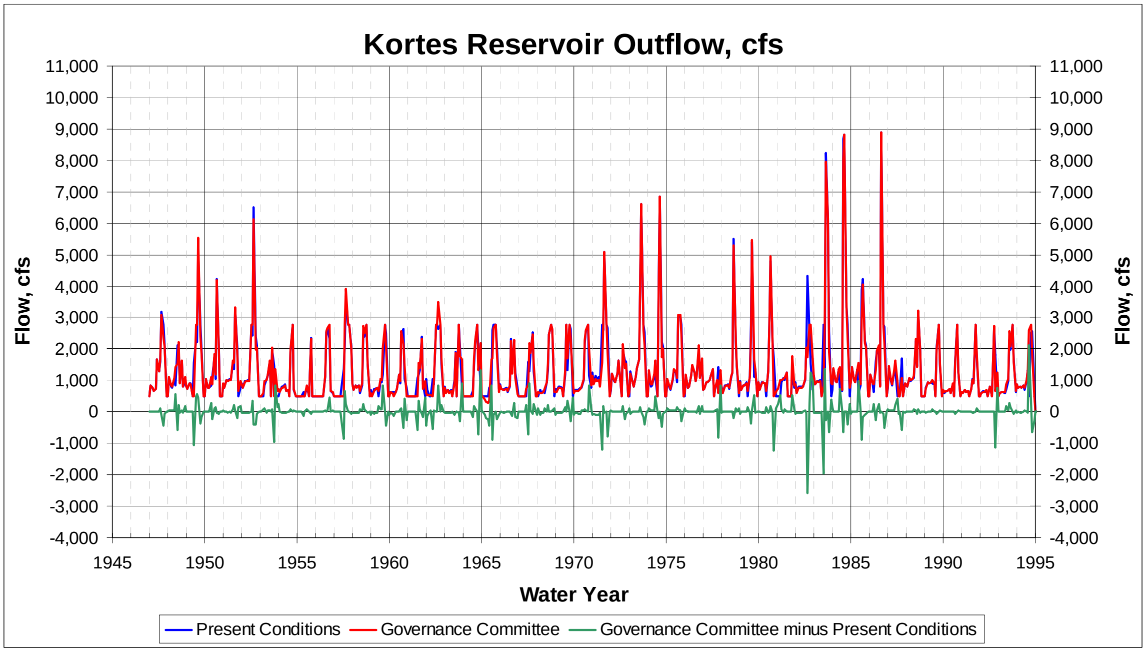


Figure 55**.** Average annual outflow (cubic feet per second) for Kortes Reservoir, 1947-1994, for Present Conditions, the Proposed Program, and their difference (NPRWUM results, USBR 2005).

Terrestrial Resources

No significant terrestrial wildlife impacts were identified.

<u>Pathfinder Reservoir Resources Without the Program</u>

Pathfinder Reservoir is a large, mesotrophic impoundment, heavily influenced by temperature, winds, and wave action. Major sources of inflow include Seminoe Reservoir and the Sweetwater River, which carries significant nutrients into this impoundment. Pathfinder contains 1,016,000 af of storage for irrigation of over 300,000 acres in Wyoming and Nebraska, hydroelectric power production, and maintenance of instream flows. Pathfinder Reservoir covers 22,012 acres at the maximum pool elevation of 5,850 feet and 11,939 acres at the average annual pool elevation of 5,818 feet (USDOI 1981, USBR Hydromet Database Res070).

Pathfinder Reservoir is generally managed to receive water from Seminoe Reservoir during the winter as power is generated and space made available for spring runoff. Pathfinder reservoir usually reaches its highest levels in June during peak runoff (average high of 5,828 ft), and is lowered throughout the irrigation season. Water level is lowest (average low of 5,804 ft) at the end of the irrigation season in September (USBR 1994).

Releases also are made throughout the non-irrigation season to provide mandated minimum flows of 330 cfs through Casper for pollution abatement. Large fluctuations in pool elevation occur annually: average annual pool fluctuations from 1947 to 2000 were 38 ft, ranging from 11 to 150 ft (USBR Hydromet database Res070).

Aquatic Resources

Pathfinder is managed under a Basic Yield concept for rainbow trout. This reservoir is a popular fishery, especially for Casper residents. Fishermen spent over 159,000 hours (i.e., 37,216 angler days) at Pathfinder Reservoir in 1995, with highest use in the summer and on weekends (Mavrakis and Yule 1998). Game fish include walleye, rainbow trout, brown trout, cutthroat trout, and lake trout. Walleye were first observed here in 1973, probably originating from upstream introductions, and were abundant by 1980. Establishment of a self-sustaining walleye population has altered trout stocking practices in Pathfinder. Previously, a trout fishery was maintained by annual stocking of fingerlings; now larger trout (average 9 inches) are stocked to limit predation by walleye (Conder and Deromedi 1998).

Nongame species include white and longnose suckers, bigmouth and sand shiners, fathead minnows, Iowa and johnny darters, carp, lake chubs, emerald and spottail shiners (Conder and Deromedi 1998). Crayfish are abundant and may be an important prey item for trout and walleye.

Deep water releases from Seminoe Reservoir provide a nutrient subsidy to Pathfinder Reservoir which supports seasonally high primary productivity, contributing to a productive and high quality reservoir fishery. Withdrawl of cold bottom waters from the dam outlet and wind-induced wave action cause weak thermal stratification in Pathfinder primarily in August. Late summer conditions often lead to nitrogen limitation, algae blooms, and subsequent declines in zooplankton (USBR 1981a).

Though less frequent and intense than in upstream waters, turbidity events occasionally reduce primary productivity by reducing light transmission in Pathfinder Reservoir. Low primary productivity may lead to reduced survival and growth of stocked trout. Downstream movement of turbid water from Seminoe through the Miracle Mile in the autumn does not usually extend beyond the headwaters of Pathfinder, but occasionally high turbidity and runoff will impact Pathfinder Reservoir. For example, the entire reservoir became turbid in 1974, resulting in the complete loss of one year class of stocked trout (McMillan 1984).

Terrestrial Resources

Pronghorn and mule deer are the principal big game species present. Rock outcrops border a portion of the reservoir and are attractive to raptors and nongame birds. Now designated an Important Bird Area of National Importance (Cerovski et al. 2000), this area provides nesting sites for colonial breeding birds including white pelicans, double-crested cormorants, Caspian terns, great blue herons, and California gulls. Mammalian predators can gain access to Bird Island when reservoir levels drop below 5,825 feet during the nesting season.

The Pathfinder National Wildlife Refuge (Figure 56) occupies portions of the water surface and the adjacent shoreline and is managed primarily for migratory waterfowl by the Service. However, these lands are owned by USBR, and grazing management is administered by the Bureau of Land Management (BLM). Current grazing management results in little residual herbaceous cover over much of the refuge. The majority of refuge lands lie on the Sweetwater Arm of the reservoir where upland sagebrush grassland dominates. This area contains seasonally wet playas and Steamboat Lake, a large closed basin valuable to nesting and migratory waterfowl and shorebirds. Additionally, refuge lands include high quality palustrine emergent wetlands and wet meadows located on Goose Bay, DeWeese Creek, and Sage Creek units.

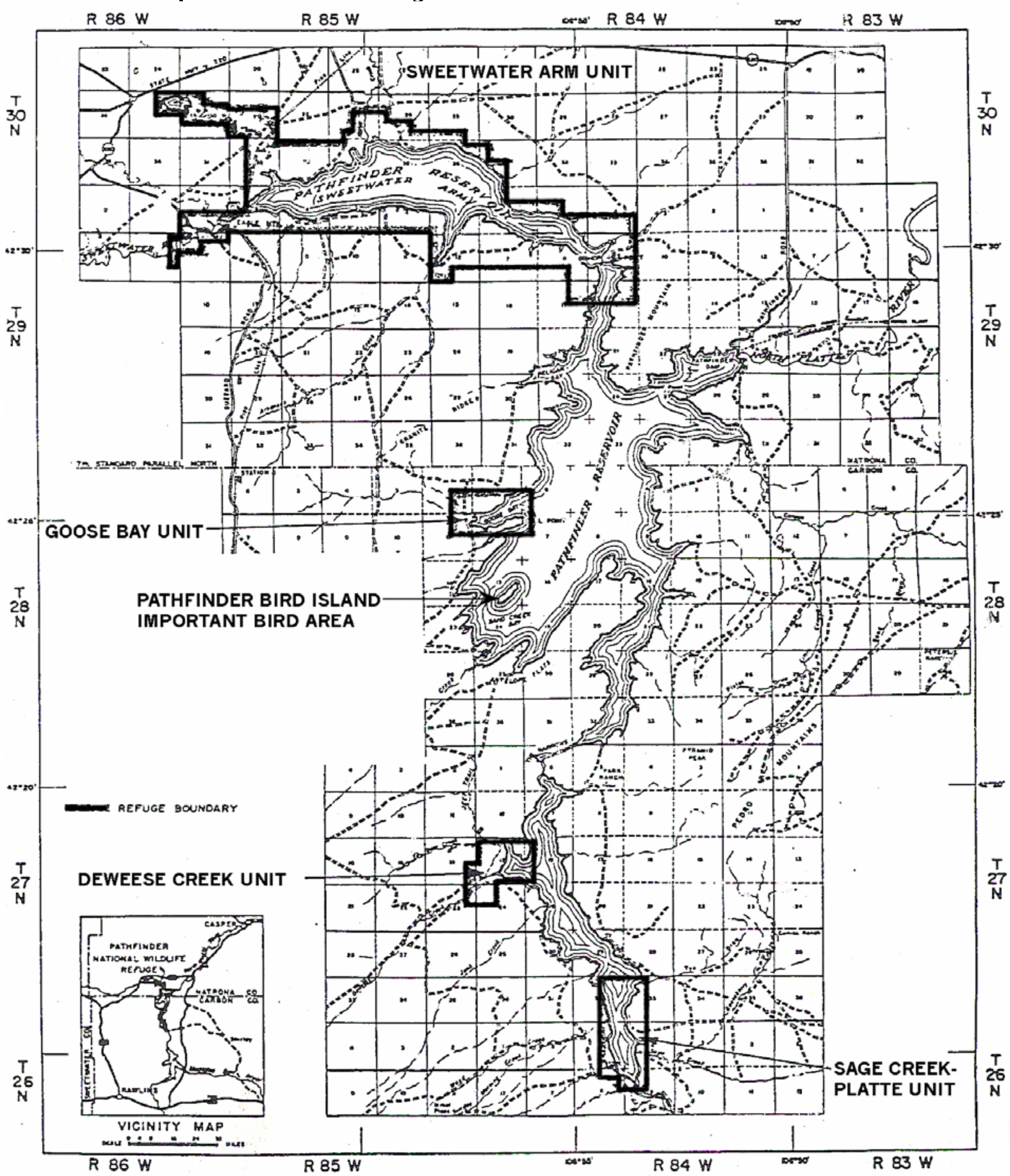


Figure 56. Pathfinder National Wildlife Refuge. The four units on Pathfinder Reservoir include the Sweetwater Arm, Goose Bay, Deweese Creek, and Sage Creek-Platte. Boundaries approximate. From USFWS, Engineering Branch, Albuquerque, N.M., 1981.

Pathfinder reservoir is a major stop-over for migrating ruddy, redhead, and canvasback ducks. Approximately 300-400 pairs of ducks and 70-90 pairs of Canada geese use the reservoir during nesting. The best nesting habitat is found within the Sweetwater River arm of the reservoir and Soda Lakes adjacent to the Refuge. Approximately 200 ducks and 100 geese use the reservoir during the fall until ice-up.

Prairie dog towns occur in the general area. A major bald eagle winter roost is located in the Pedro Mountains (T27N, R84W, Sec. 4). According to USBR data, this reservoir has the highest concentration of wintering bald eagles of any reservoir USBR manages along the North Platte River (USBR 1981b). Pathfinder Reservoir has been designated as having high value (Resource Category 3) for: (1) migrating ruddy, redhead, and canvasback ducks; (2) nesting white pelicans, double-crested cormorants, Caspian terns, great blue herons; (3) migrating and nesting habitat for mallards and Canada geese; and (4) its trout and walleye fisheries. The reservoir also has high national importance for wintering bald eagles.

Pathfinder Reservoir Resources With the Program

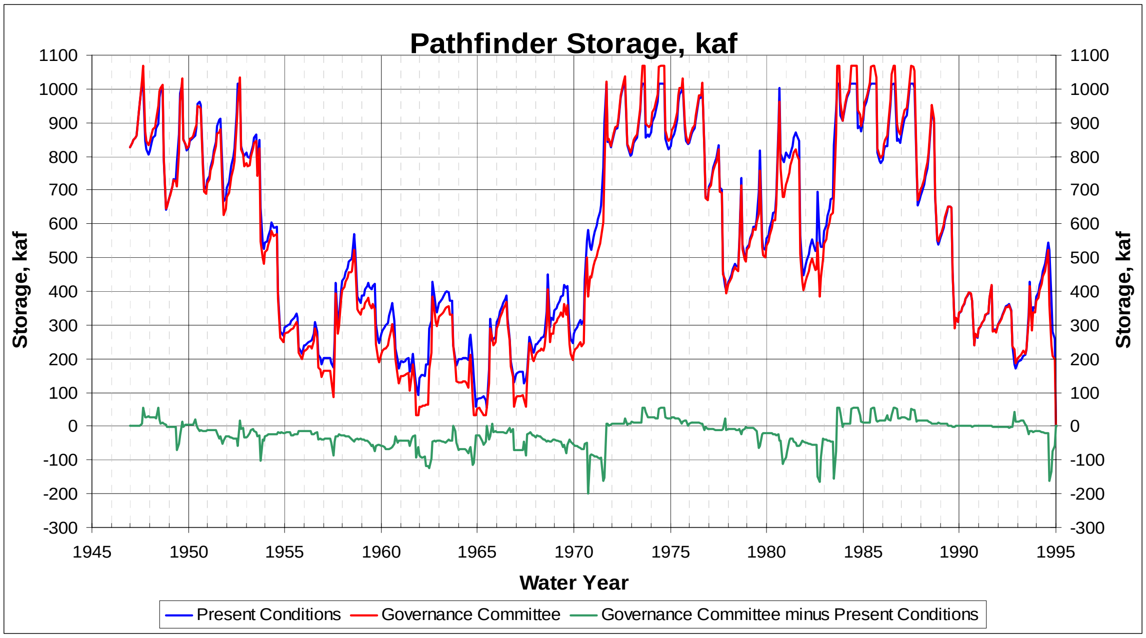
Aquatic Resources

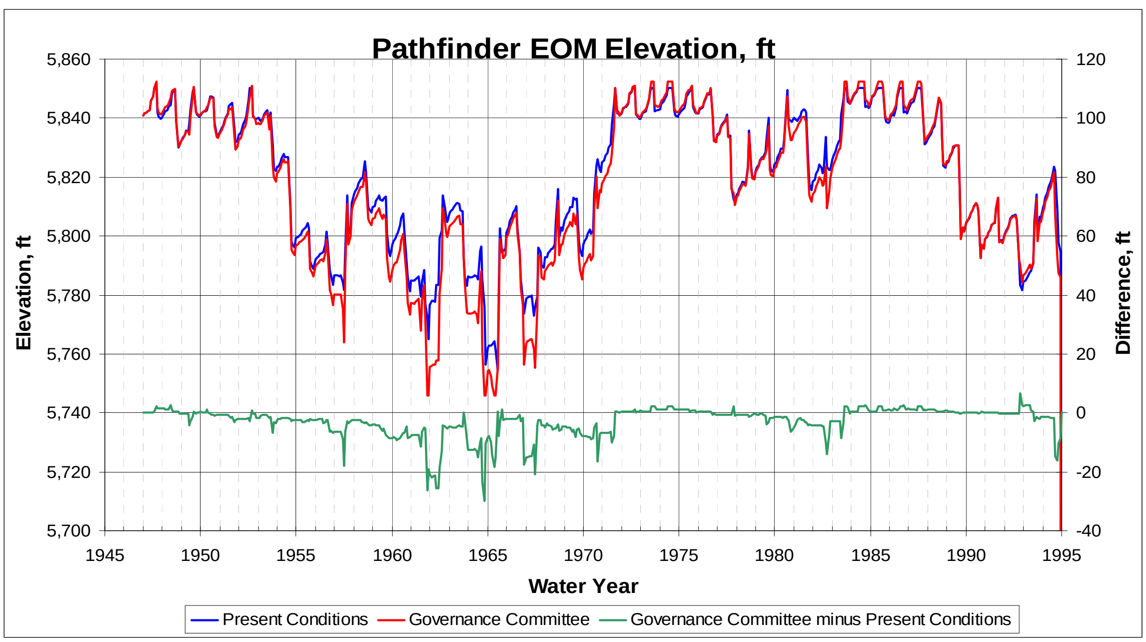
The average end-of-month storage for the 48-year period of record was 546,600 af, approximately 1% greater than Present Conditions. There were 15 water years (31%) during which storage was less than 200,000 af, the minimum maintenance pool management goal for WGFD. The largest single month drawdown was 276,600 af (10% greater drawdown than for Present Conditions) occurring during July of 1981. There were 8 months over the period of record for which reservoir content was at or below 50,000 af (December through March of one year; August and September two separate years)– the volume which WGFD has identified as minimum to ensure survival of the fishery.

Overall, approximately 65% of water years, averaged across all months for the period of record, experienced elevation level decreases. *Largest* elevation decreases for any given month over the period of record ranged from 13 to 30 feet: while the greatest single decrease occurred in the month of August, most of the large decreases occurred from late fall through winter. The overall *average* elevation decrease, across all months for the period of record, is approximately 5 feet, an approximate 4% decrease from Present Conditions. Elevation *increased* approximately 33% of water years, represented by an average increase in elevation of 1% (1 ft.), and a 2.5% increase in content (18,000 af), compared with Present Conditions.

Elevation decreases greater than 10 feet occurred, on average across all months and years, 3.5 of 48 water years (7%). Overall average elevation decreases greater than 10 feet, across all months and water years, was approximately 16 feet. Elevation decreases greater than 10 feet occurred, on average for all months and water years, with a 17% greater frequency than Present Conditions. April was the month with the highest number of years (5 of 48 or 10%) during which elevation decreased greater than 10 feet. For those elevations less than 5,786 feet (corresponding to storage of approximately 200,000 af) the Program, compared with present conditions across all months and water years, exhibited: (1) an average decrease of 9% in maximum depth; and (2) an average decrease of 24% in average content.

Figure 57 and 58. Average annual end-of-month storage (thousand acre-feet) and elevation (feet) changes for Pathfinder Reservoir,1947-1994, for Present Conditions, the Proposed Program, and their difference (NPRWUM results, USBR 2005).





Fisheries

The seasonal TDS pattern in Pathfinder is controlled by releases from Seminoe. Control of normal seasonal patterns by Seminoe had a dampening effect on seasonal variation in Pathfinder. Values of TDS for the Program and Present Conditions diverged between January and June, with values for the Program remaining slightly higher. Values for TDS remained slightly less for the Program compared with Present Conditions during the remainder of the year. Details of this analysis are in the Program FEIS appendices: *Water Quality* and *North Platte River Basin Fisheries*.

Since TDS shows very little difference between the Program and Present Conditions, any difference in MEI values will reflect variation in mean depth. Average *mean* depths varied little for Pathfinder between the Program (38.4 feet) and Present Conditions (39.2 feet), with no variation between average *minimum* values: at 14.0 feet for the Program and for Present Conditions. Overall, mean standing crop for the Program was 37.6 lb/acre (MEI of 7.0), slightly higher than that of 36.4 lb/acre (MEI of 6.8) for Present Conditions. As was done for Seminoe, standing crop biomass estimates were multiplied by average reservoir area in terms of acres to arrive at a total fish standing crop estimate for each reservoir year (converted to tons for convenience). Total average annual standing crop biomass for Pathfinder is approximately 226 tons under Present Conditions and 221 tons for the Program. Thus, total average fish production is lower under the Program compared with Present Conditions.

To examine trends in MEI values, geometric mean data were plotted for Present Conditions and the Program. Divergence between Present Conditions and the Program is more pronounced in Pathfinder compared to Seminoe Reservoir. A large difference occurs between the values during the 1960s, followed by convergence of values in the 1970s, diverging again slightly in the 1990s. Program MEI values were always greater than those for Present Conditions, although differences were, at times, too small to see graphically. Correlation analysis showed that the most important factor influencing the MEI difference between the Program and Present Conditions was the ratio of the total annual inflow to either the maximum or the average annual end-of-month content. The larger ratios correspond to larger MEI differences.

Modeling the effects of temperature and DO on Pathfinder Reservoir and its downstream fishery indicates that temperatures should remain suitable for coldwater fish in the conditions exemplified during the critical years of 1961 and 1964. Results showed little difference exists in temperatures of reservoir surface and bottom for the Program and Present Conditions. However, the Program would result in a smaller cold bottom layer due to overall smaller reservoir size.

Modelling results for DO indicates that there is a lower probability that the hypolimnion will contain adequate dissolved oxygen during the late summer suitable to coldwater fishes under the Program compared with Present Conditions. While results show that catastrophic loss of a coldwater fishery would not likely occur, there would be an adverse effect on the fishery due to stress related to low DO levels in Pathfinder associated with the Program. Because of the reduced probability of adequate DO in the hypolimnion during late summer, there would be an increased likelihood of anoxic or hypoxic water released below Pathfinder Reservoir. Low DO in the Fremont Canyon bypass below Pathfinder Dam would likely not extend a significant distance downstream given the nature of the outlet to Fremont Canyon.

Terrestrial Resources

Program impacts to Bird Island's avifauna primarily will come from increased predator access during low water levels during the nesting period. The ground-nesting birds, American white pelican, California and ring-billed gulls, and Caspian terns, attend nests or flightless young from early April through late July (Erlich et al. 1988), as well as Canada geese (Roberts, Pers. Comm., 2003). Compared with the Present Condition, the Program increased the number of years that Bird Island becomes a peninsula compared with the Present Condition (Table 14).

Table 14. Number of years (percent) that Pathfinder elevation falls below 5,825 ft during the April 1-July 31 nesting period at Pathfinder Bird Island. (NPRWUM results, USBR 2005)

Alternative	March	April	May	June	July	Mean
Present Condition	24 (50)	24 (50)	24 (50)	22 (46)	25 (52)	24 (50)
Proposed Program	24 (50)	24 (50)	24 (50)	26 (54)	27 (56)	25 (52)

Additional impact will result from inundation and increased shoreline erosion of the small, sandy island when Pathfinder is filled an additional 2.4 feet. No accurate topographic data were available to analyze these impacts. Instead, dimensions were taken from the 1990 NWI map, Pathfinder NW (based on USGS 7.5 minute maps at 1:24,000 scale). Length, width, and height of the island were transformed into two elevational profiles based on mapped 20-foot contours. Changes in length and width were estimated by projecting the 2.39-foot increase in maximum pool elevation onto these profiles and converting to change in total area.

The island will decrease from approximately 39 acres at the current maximum pool of 5,850 feet to approximately 28 acres at the new maximum pool of 5,852.3 feet, a 27% reduction. This method probably over-estimates the change in area an undetermined amount, both due to the rectangular approximation and the fact that at least some of the banks are sheer due to existing beach erosion. This is especially true along the west (windward) shore of the island (Figure59). Additional program-induced changes are likely to result from increased bank erosion from waves striking previously un-inundated areas. However, the magnitude of this impact was impossible to analyze with the existing data.

Figure 59. Pathfinder Bird Island at pool elevation 5,849.5 feet, showing steep banks and evidence of bank erosion.

<u>Fremont Canyon Resources Without the Program</u>

For approximately 6.5 miles below Pathfinder Dam, the North Platte River flows through Fremont Canyon. Soil and vegetation development is poor within the canyon. However, a few miles of alluvial valley and riparian cottonwood and willow habitat occur between Pathfinder Dam and the canyon reach. Creation of Glendo Reservoir with its re-storage space made year-round releases of water for power generation feasible. Fremont Canyon Power Plant, part of the Pick-Sloan Missouri Basin Glendo Project, was completed in 1961 to take advantage of this. The design includes penstocks from Pathfinder Dam which bypass 4.1 miles of this stream reach, releasing the water at the head of Alcova Reservoir. This stream reach was designated by the Service as having moderate value (Resource Category 4) for wildlife (e.g., raptor nesting). There is excellent potential to upgrade the existing fishery, if adequate stream flows are provided, to a "blue ribbon" trout fishery of high national importance.

Aquatic Resources

Prior to construction of the Fremont Canyon Power Plant, this reach of the North Platte River supplied anglers with abundant trophy-size trout, as expected in a tailwater environment (Conder and Deromedi 1998). The Cardwell fishery "began" in 2002 with constant minimum releases of 75 cfs in the historic North Platte River channel below Pathfinder Dam. This is primarily a rainbow trout fishery. Prior to the minimum flow releases, WGFD (with funding from numerous partners) constructed a low-flow channel in this reach to provide instream habitat for the designated flow regime of 75 to 300 cfs.

Terrestrial Resources

The number and variety of big game species using the river area is limited. Breaks above the canyon provide good mule deer habitat. The rocky, steep-sided canyon provides excellent nesting opportunities for raptors and could provide for peregrine falcon nesting habitat. The few miles of cottonwood/willow riparian habitat provides habitat for migratory birds, deer, and small mammals.

Fremont Canyon Resources With the Program

Aquatic Resources

Over the period of record, flow decreased during the months of February through August an average of 11 of 48 years (23%). For the times during which flow decreased, the average decline was 30% compared with Present Conditions, ranging from a 398 to an 724 cfs decrease. There were a total of 15 times over the period of record during which flow decreased >500 cfs (6 of which occurred in July); the average flow decrease for these years was 1209 cfs, representing an average 59% decrease compared with Present Conditions. There were no years over the 48 year period of record during which flows were less than 75 cfs– consistent with the management strategy of WGFD to maintain a 75 cfs maintenance flow through this reach.

Over the period of record, flow *increased* during the months April through September an average of 6.8 of 48 years (14%). For the times during which flow increased over the period of record, the average gain was 83% compared with Present Conditions, ranging from a 91 to a 521 cfs increase. There were a total of 8 times over the period of record during which flow increased >500 cfs (3 of which occurred in the month of August, and 3 in June); the average flow increase for these years was 1151 cfs, representing an 8-fold increase compared with Present Conditions.

Terrestrial Resources

No significant wildlife impacts were identified

Alcova Reservoir Resources Without the Program

Alcova Reservoir is a deep, steep-sided mesotrophic water body with a limited littoral area. As part of USBR's Kendrick Project it raises irrigation water to an elevation enabling it to flow into the Kendrick Project's main canal, but provides no storage capacity. It also is equipped with hydroelectric facilities. The water level is generally stable-- the only fluctuation is a 10-foot change between summer and winter operation. Major factors influencing its limnology include the reservoir system operating pattern, natural flow variations in the three major upstream tributaries, and nutrient subsidies from Seminoe and Pathfinder Reservoirs. Alcova is weakly stratified during summer. Breaks and canyon areas adjacent to the reservoir are dominated by juniper and sagebrush. Above the breaks, the terrain is mostly sagebrush grassland flats. Alcova Reservoir was designated by the Service as high value (Resource Category 3) for migrating waterfowl and its rainbow trout fishery.

Aquatic Resources

Alcova supports an excellent Basic Yield fishery for rainbow trout. The reservoir's trout population is based on the stocking of large numbers of catchable sized rainbow trout– currently, stocking of up to 90,000 annually. Wild walleye and stocked brown trout also may be caught. Trout populations are entirely dependent upon stocking, and with the growth of the walleye population, stocking has shifted from fingerling trout to trout averaging 9 inches. Major blue-green algae blooms do not commonly occur in this reservoir. Thus, zooplankton production generally remains high during summer months, supporting an excellent growth rate in trout (Conder and Deromedi 1998).

Native nongame species include the fathead minnow, white and longnose sucker, bigmouth and sand shiners, and Iowa and johnny darters. Non-native species include the lake chub, carp, emerald and spottail shiners (Conder and Deromedi 1998). Largely because of trout fishing, Alcova ranks as one of the state's most important reservoir fisheries. It is commonly called "Casper's Playground," alluding to its popularity among Casper residents. Use was estimated at 49,539 angler days/year in 1995 and 1996 (Mavrakis and Yule 1998).

Terrestrial Resources

Upland game species include mule deer, pronghorn antelope, sage grouse, and desert cottontails. Other species include the white-tailed jackrabbit, bobcat, coyote, and badger. Raptors are numerous, and Fremont Canyon provides excellent nesting habitat for prairie falcons, red-tail hawks, and golden eagles.

Daily water level fluctuations and wind prevent ice from forming on much of Alcova Reservoir. Waterfowl are present on the reservoir during the entire winter. Over the last eight years, an average of 1,300 ducks and 550 Canada geese have been counted on the reservoir during the Mid-winter Waterfowl Survey. During "normal" winters a small number, 2 to 8, of trumpeter swans will roost on the (Roberts, Pers.Comm., 2003).

Alcova Reservoir Resources With the Program

Aquatic Resources

The average end-of-month storage for the 48-year period of record was 167,800 af, essentially the same as Present Conditions. There were no water years during which storage was less than 150,000 af– the minimum maintenance pool management goal for WGFD. The largest single month drawdown was 23,500 af (essentially the same as Present Conditions) occurring during October, 1947.

The mean MEI value of 3.6 and fish standing crop of 19.2 lb/acre in Alcova was the same for Present Conditions and the Program. The difference seen between Alcova and Pathfinder in terms of MEI and fish standing crop estimates is primarily a reflection of differences in mean depth between the reservoirs, since TDS values are approximately the same. As was done for Seminoe and Pathfinder, standing crop biomass estimates were multiplied by average reservoir area in terms of acres to arrive at a total fish standing crop estimate for each reservoir year (converted to tons for convenience). Total average annual standing crop biomass for Alcova is approximately 22.6 tons under Present Conditions and 22.5 tons for the Program. Thus, total average fish production is slightly lower under the Program compared with Present Conditions. Modeling indicates that DO in waters released from Alcova should not change from historic conditions.

Terrestrial Resources

No significant wildlife impacts were identified

Gray Reef Reservoir Resources Without the Program

The two-mile long Gray Reef Reservoir (1,800 af capacity) functions to re-regulate flows from Alcova Reservoir hydropeaking power water releases. Gray Reef Dam releases a minimum of 330 cfs to the North Platte River at all times for pollution abatement in the Casper area, but USBR usually maintains winter releases around 500-700 cfs. Upland habitats adjacent to the reservoir consist of rock outcrops and sagebrush grassland. This reservoir was designated by the Service as having moderate value (Resource Category 4) for white pelicans and migrating waterfowl.

Aquatic Resources

Wyoming Game and Fish stocks rainbow trout brood culls and occasionally other trout which are extras from their hatchery system (Conder, Pers. Comm. 2002). Additionally, trout pass through Alcova's outlet and supplement the fishery.

Terrestrial Resources

Mule deer are the principal big game species present in this area. White pelicans and California gulls use the reservoir for foraging. Daily water level fluctuations prevent ice from forming on much of Grey Reef Reservoir. Waterfowl are present on the reservoir during the entire winter. Over the last eight years, an average of 760 ducks and 35 Canada geese have been counted on the reservoir during the Mid-winter Waterfowl Survey. During "normal" winters a small number, 2 to 8, of trumpeter swans will roost on the reservoir (Roberts, Pers.Comm., 2003).

Gray Reef Reservoir Resources With the Program

Aquatic Resources

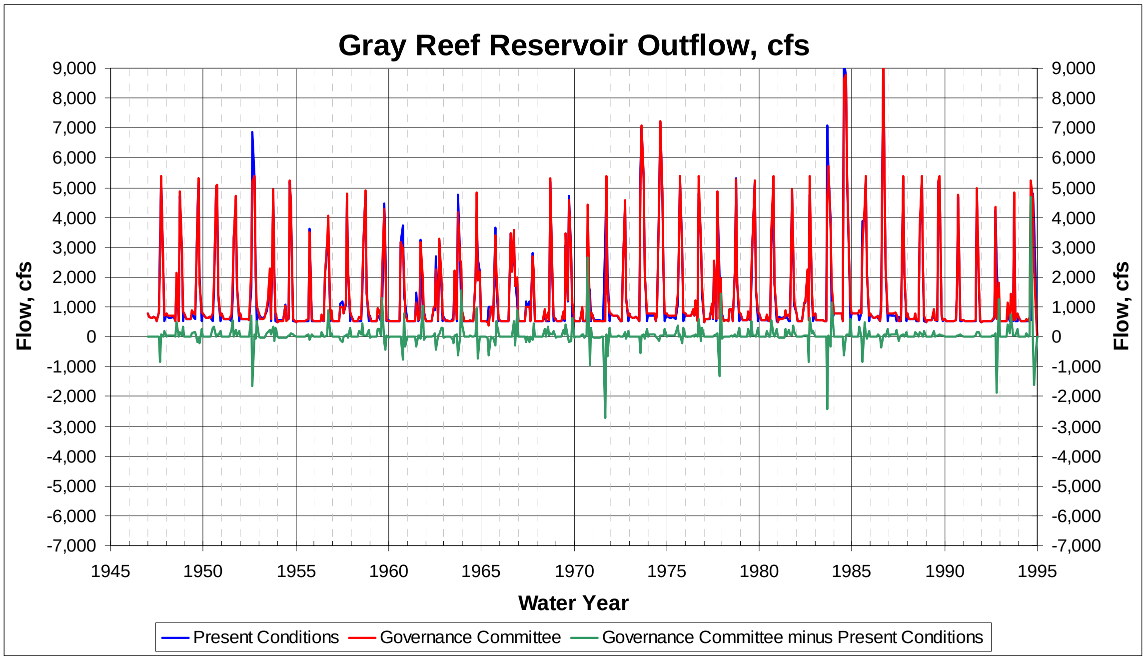
The average number of years over the period of record during which flow decreased was 8 of 48 (17%). For the times during which flow decreased over the period of record, the average drop was 16% compared with Present Conditions, ranging from a 60 to an 985 cfs decrease. There were a total of 23 times over the period of record during which flow decreased >500 cfs (occurring May through August); the average flow decrease for these years was 1026 cfs, during which average flow was 2086 cfs, representing a 38% decrease compared with Present Conditions. There were a total of 5 events of the 48 year period of record during which flows were less than 500 cfs; during these 2 events there was an average 31% decrease in flows compared with Present Conditions.

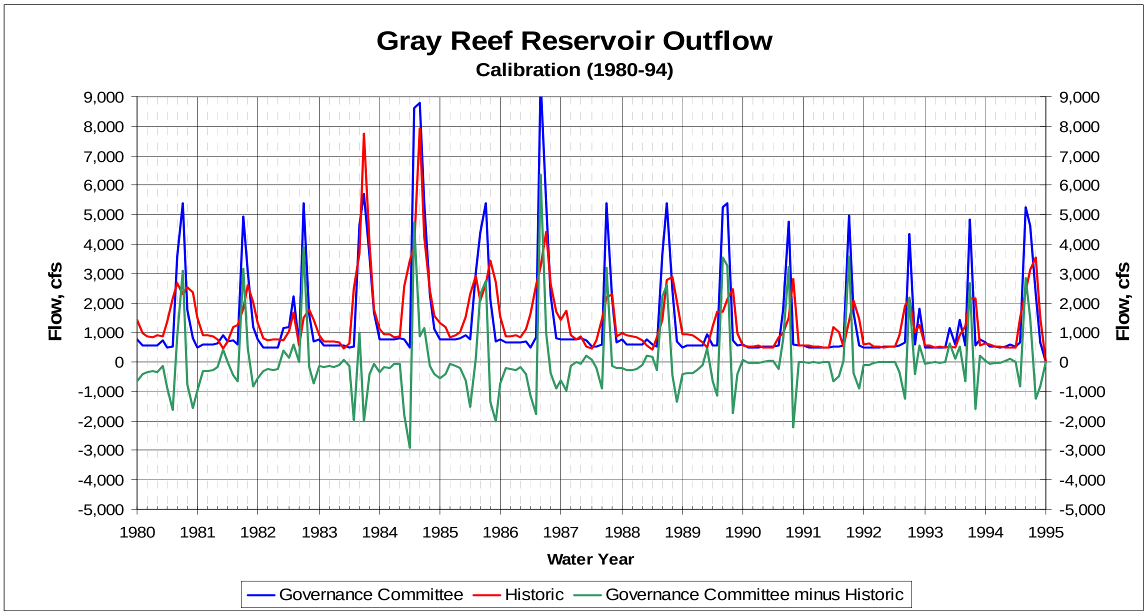
The average number of years over the period of record during which flow *increased* was 24 of 48 (50%). For the times during which flow increased over the period of record, the average gain was 20% compared with Present Conditions, ranging from a 27 to a 395 cfs increase. There were a total of 43 times over the period of record during which flow increased >500 cfs (7 in August and 13 in September); the average flow increase for these years was 993 cfs, representing an average 78% increase compared with Present Conditions.

Terrestrial Resources

No significant wildlife impacts were identified

Figure 60 and 61. Average annual outflow (cubic feet per second) changes for Gray Reef Dam,1947-1994, for Present Conditions, the Proposed Program, and their difference (Fig.60) and for Historic Conditions, Present Conditions, and their difference (Fig.61) (NPRWUM results, USBR 2005).





North Platte River from Gray Reef Dam to Glendo Reservoir Without the Program

This 131-mile reach flows through a wide alluvial valley with only a few short sections constrained by canyons. Consequently, this reach supports some of Wyoming's best developed plains cottonwood riparian forest. Although the river is highly regulated, high summer flows in conjunction with periodic flooding during high runoff years have maintained the health of riparian vegetation.

Several large tributaries enter the North Platte River in this reach: Bates Creek, Poison Spider Creek, Casper Creek, Deer Creek, Boxelder Creek, La Prele Creek, and La Bonte Creek. All but two enter from the south side of the river. These streams support healthy riparian corridors of cottonwood, willow, and boxelder that provide habitat for a diverse fish and wildlife community. All support irrigated agriculture although only one, La Prele Creek, has a large storage reservoir. Flows from these tributaries significantly alter flows below Gray Reef Dam to produce a more natural hydrograph.

Sagebrush grassland is the most common upland vegetation type found adjacent to the river. North of the river around Casper sand hills plant communities include giant sandreed, sand bluestem, and sand sage. Irrigated cropland acreage increases downstream toward Glendo Reservoir.

This river reach has been designated by the Service as very high value nationally (Resource Category 1) for: (1) migrating and nesting mallards; (2) nesting Canada geese; (3) piscivorous bird reproduction (ospreys, great blue herons, double-crested cormorants, and white pelicans); (4) its Blue Ribbon trout fishery from Gray Reef Dam to the Dave Johnson Power Plant; and (5) wintering and nesting bald eagles. The reach also has high regional value (Resource Category 2) for its mature riparian cottonwood forest.

Aquatic Resources

Because of its length and proximity to population centers, this river reach receives heavy fishing pressure. The 32-mile reach between Gray Reef Dam and Goose Egg (Bessemmer Bend) has been designated a trout fishery of national importance by WGFD. This fishery is dominated by rainbow trout and has the highest standing crop of (pounds per mile) of any stream in Wyoming. Walleye also are found in this reach. The fishery is managed under the *Trophy Concept*– management primarily directed towards providing the fisherman with the opportunity to catch larger than average size fish. Fisheries management includes restrictive creel limits and an eight-mile reach with terminal tackle restrictions.

The 39-mile reach from Mills Bridge to the Dave Johnston Power Plant above Glenrock is rated as a Blue Ribbon trout fishery of national importance. From Dave Johnston Power Plant to Glendo Reservoir, this 61 mile reach of the North Platte River is primarily a warm water fishery supporting channel catfish and walleye. Game species include channel and flathead catfish, black bullhead, rainbow trout, brown trout, stonecat, walleye, yellow perch, and green sunfish.

Native nongame fish from Gray Reef Dam to Glendo Reservoir include the white and longnose sucker, longnose dace, shorthead redhorse, river carpsucker, creek chub, flathead chub, lake chub, plains killifish, central stoneroller, Iowa darter, Johnny darter, fathead minnow, brassy minnow, red shiner, bigmouth shiner, common shiner, and sand shiner. Introduced nongame species include the carp, gizzard shad, emerald shiner, golden shiner, and spottail shiner (Conder and Deromedi 1998).

Upstream dam releases are more than adequate to maintain these fisheries during the irrigation season. The federally-mandated minimum flow of 330 cfs for pollution abatement in the Casper area helps to sustain the fishery during the winter months. According to WGFD, in order to optimize this fishery stream flows should be maintained at 600 cfs or greater from March 15 through May 30. Additionally, flows should not be rapidly increased or reduced to protect rainbow trout redds (Vogt 1991). Based on these recommendations, USBR attempts to maintain winter flows between 500-700 cfs on a voluntary basis.

Since 1993, Pathfinder Reservoir output has been managed to produce rapidly fluctuating flows below Gray Reef Dam during 5 days in march and 5 days in October to redistribute and flush fine sediment from spawning gravel (Wenzel 1993). This effort has improved trout habitat as far down as Casper. Ongoing watershed projects attempt to correct the conditions leading to excessive input of fine sediment from the Bates Creek drainage (Conder and Deromedi 1998).

Terrestrial Resources

Pronghorn antelope, mule deer, and white-tailed deer are the primary big game animals along this river reach. White-tailed deer are particularly dependent upon the cottonwood riparian zone. The river and adjacent wetlands support a good population of migratory and nesting waterfowl. Nesting densities average from five to ten pairs of ducks and one to two pairs of geese per river mile (Saul, Pers. Comm. 1988).

The upper reaches of this section support a small number, 2 to 8, of trumpeter swans during "normal" winters. Soda Lake is very important for migrating waterfowl including tundra and trumpeter swans, lesser scaup, redheads, ruddy ducks and canvasbacks. Small concentrations of ducks and geese occur during winter on the North Platte River from Alcova Reservoir to Glendo Reservoir. The eight-year average, from the Mid-winter Waterfowl Survey for the years 1996 through 2003, of winter concentrations of ducks was 760 and Canada geese 35 for Grey Reef Reservoir. From Grey Reef Dam to Robertson Road (Casper) the average number of ducks was 4,200 and geese 750. From Byron Stock Trail (Casper) to the Dave Johnson Power Plant dam the average was 1,100 ducks and 275 geese. From the Dave Johnson Power Plant dam to Glendo Reservoir the average was 1,400 and 2,700 Canada geese. The average number of waterfowl on Soda Lake was 320 ducks and 45 Canada geese (Roberts, Pers.Comm., 2003).

The riparian cottonwood forest of this reach is essential to the diversity of fish and wildlife. Cottonwoods are well known for providing migratory and nesting habitat for neotropical migrant and resident birds, furbearers, and nongame mammals (Knopf et al. 1988). Woody debris added to the river provides substrate for aquatic invertebrates and habitat diversity for fish, and leaves provide significant organic inputs (Murphy and Koski 1989).

Successful cottonwood recruitment requires continued creation of sites bare of vegetation, moist during the June seed fall, and safe from scouring by water or ice until the trees are several years old (Scott et al. 1996). Much of the riparian cottonwood and willow community in this reach appears to have colonized portions of the formerly active channel after it narrowed and degraded following regulation by Seminoe, Pathfinder, and Alcova reservoirs (Wenzel 1993).

The reach between Glenrock and Casper also contains an ecologically unique cottonwood mixing zone where plains and narrow-leaf cottonwoods hybridize to form lance-leaf cottonwoods. Studies of similar mixing zones have shown they provide habitat for unique suites of species, and are therefore of special conservation significance (Whitham et al. 1999).

The abundance of fish found within this stream reach provides excellent forage for piscivorous birds. In 1996, a statewide inventory found 11 great blue heron and double-crested cormorant rookeries. Large heron rookeries are located on the North Platte River at Glenrock, Deer Creek, Bedtick Creek near Douglas, and above Glendo Reservoir. A large rookery of double-crested cormorants and black-crowned night-herons is located on Soda Lake near Casper. White pelicans and double-crested cormorants use the 10-mile river reach below Gray Reef Dam for foraging (Derby 1995). The Pathfinder pelican and cormorant nesting colony (approximately 800 pairs) utilize this river reach for approximately 45 percent of their foraging. Osprey nest near Casper and have nested in the past near Bessemmer Bend above Casper.

There is some concern that foraging by large numbers of piscivorous birds limits the productivity of sport fish in this reach. The diets of the two most abundant piscivorous species, the double-crested cormorant and the American white pelican, were found to contain mostly nongame fish species with only small numbers of trout during most of the year. While the cormorant switched to trout after stocking (from 17% of its diet before stocking to 60% of its diet after stocking) the pelican's diet remained unchanged (Derby 1995, Derby and Lovvorn 1997). Wyoming Game and Fish is studying improved stocking methods to reduce levels of predation.

This reach of the North Platte River supports one of the largest wintering concentrations of bald eagles in Wyoming. According to the Midwinter National Wildlife Federation Bald Eagle Survey, the North Platte River supports fifty percent or more of the total wintering bald eagle population in Wyoming. Cottonwood trees along the river are important perch sites and are used as night roosts. Communal bald eagle roosts near the river include Boxelder Creek (T32N, R75W, Sec. 13), Jackson Canyon (T32N, R80W, Sec. 7, 12, 18), Little Red Creek (T32N, R80W, Sec. 26), and Pine Mountain (T35N, R83W, Sec. 24 and 34). Roost counts conducted by the Bureau of Land Management found use of these roosts peaked in the winter of 1984-85, with an average of 43 eagles per count, and a maximum of 70 eagles counted on December 20, 1994 (all roosts combined; Fitzgerald, Pers. Comm. 1999). Eagles using these roosts hunt for fish and waterfowl along the river and associated reservoirs, hunt in the desert for small game, and scavenge in the desert for winter-killed big game and livestock (USBR 1981a). Bald eagles have nested along the river at Edness K. Wilkins State Park and near Caryhurst, although neither of these nests has been active in recent years.

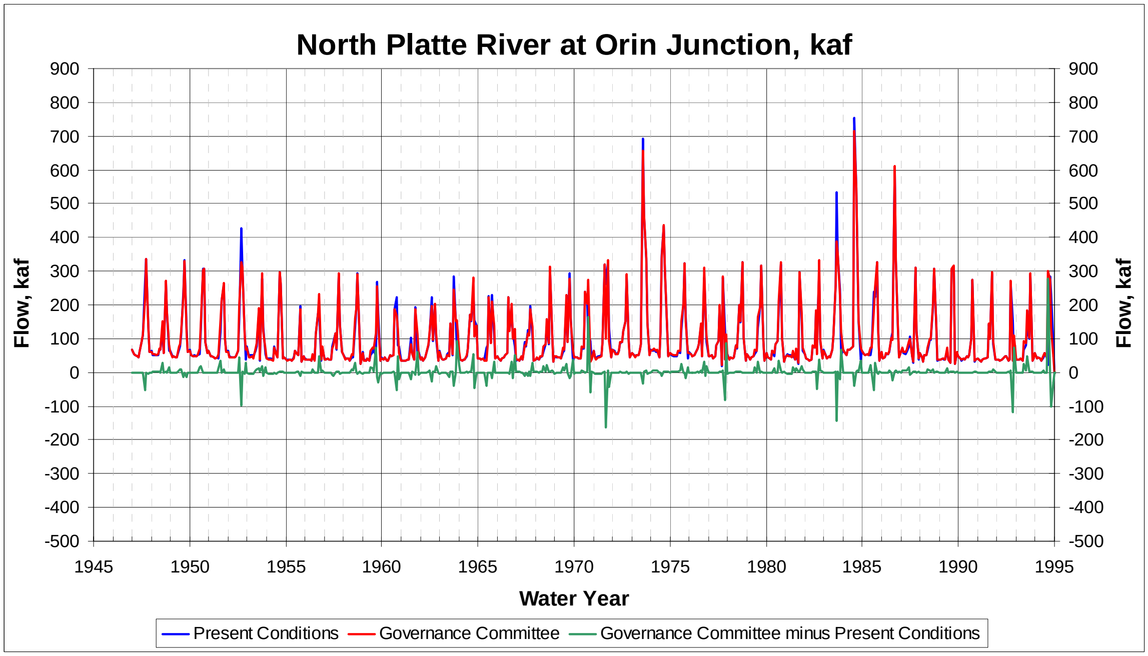
The federally listed Preble's meadow jumping mouse is an obligate riparian species that occupies tall, dense vegetation along the North Platte River and its tributaries below Casper. It has been found along the mainstem of the river at Douglas and on Bedtick Creek, a nearby tributary. Suitable, unsurveyed, habitat occurs along the North Platte River and its tributaries in this reach including Horseshoe Creek, La Bonte Creek, La Prele Creek, Boxelder Creek, and Deer Creek.

<u>North Platte River from Gray Reef Dam to Glendo Reservoir With the Program</u>

Aquatic Resources

Flows ranged from a low of 366 cfs to a high of 9,591 cfs over the period of record. Average annual flow for the period of record was 1342 cfs (977 af), with 2 months during which flow was below 500 cfs. A minimum flow of 330 cfs below Gray Reef Reservoir is required by law, but a flow of 500 cfs is maintained by BOR when possible. Overall percent change from Present Conditions is a 1.25% increase in average annual flow.

Figure 62. Average annual flow (thousand acre-feet) changes for North Platte River at Orin Junction,1947-1994, for Present Conditions, the Proposed Program, and their difference (NPRWUM results, USBR 2005).



Orin Flows: The average number of years over the period of record during which flow decreased was 26 of 48 (54%). For the times during which flow decreased over the period of record, the average drop was 9% compared with Present Conditions, ranging from a 18 to an 910 cfs decrease. There were a total of 22 times over the period of record during which flow decreased >500 cfs (May through September); the average flow decrease for these years was 1059 cfs, representing an average 35% decrease compared with Present Conditions. There were no events over the 48 year period of record during which flows were less than 500 cfs. The management strategy of WGFD for this reach is a maintenance flow of 500 cfs, and a management goal of 600+ cfs.

The average number of years over the period of record during which flow *increased* was 20 of 48 (42%). For the times during which flow increased over the period of record, the average gain was 14% compared with Present Conditions, ranging from a 45 to a 318 cfs increase. There were a total of 32 times over the period of record during which flow increased >500 cfs (13 of which occurred in the month of September); the average flow increase for these years was 1141 cfs, representing an average 79% increase compared with Present Conditions.

For protection of fishery resources in this reach, WGFD recommended maintaining minimum flows of 600 cfs for adult rainbow trout at all times, and maintaining stable or gradually increasing flows from March 15, through June 1, for rainbow trout redds (Vogt 1991, Dey and Annear 1993, Conder and Deromedi 1998).

The existing condition of the river in this reach is highly modified from the pre-dam condition. At least in some areas, the channel has narrowed, degraded, and straightened (Wenzel 1993). These influences tend to reduce physical habitat diversity such as pools and backwaters. Productivity is reduced because flooded backwaters no longer may provide prey and nursery habitat for larval and juvenile fish.

Peak flows are reduced and base flows have been increased through reservoir operations. Because the reservoirs greatly reduce the threat of flooding, human development is now right on the river bank in many places, necessitating active channel stabilization to avoid property loss. These factors together reduce the power of the river to create and maintain a diversity of channel features. Woody debris accumulation is reduced as riparian trees are less likely to be undercut and washed into the channel. Spawning gravel habitat is reduced as the dam cuts off bedload input and decreased power reduces inputs from bank erosion (Wenzel 1993). Ultimately, production of riparian trees is diminished, reducing sources of woody debris input.

Possible limiting factors for rainbow trout populations in the reach from Gray Reef Dam to Bessemmer Bend include spawning habitat (Vogt 1991), predation, occurrence of channel maintenance flows, seasonal pattern of flow releases, and interactions among these factors (Dey and Annear 1993). Monitoring has shown that strong year classes of rainbow trout do not necessarily follow years of high spawning habitat availability, suggesting that other factors are more important (Dey and Annear 1993). Strong year classes were produced in 1986 and 1991, but not in 1990 (Figure 63).

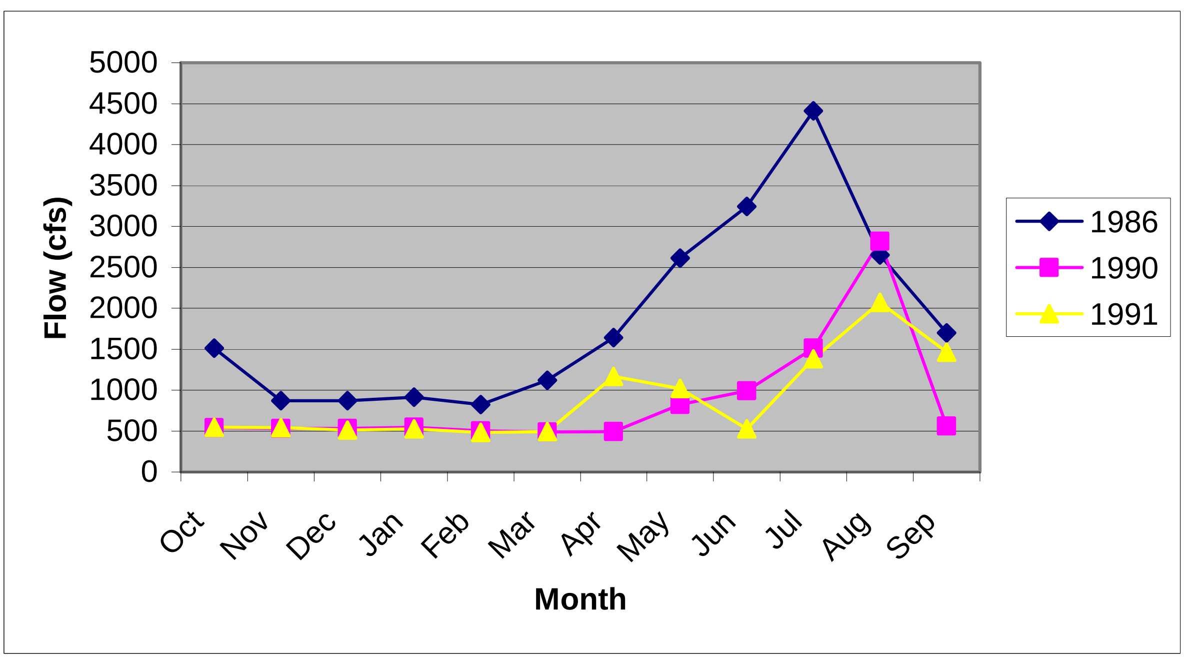


Figure 63. Average monthly flow below Gray Reef Dam during years of high rainbow trout reproduction (1986 and 1991) and low reproduction (1990). From USBR Hydromet Database Res 070 and Dey and Annear (1993).

Terrestrial Resources

Studies have shown various changes of riparian vegetation and channel morphology in response to upstream water development. Williams (1978) documented channel narrowing and associated development of new cottonwood forest in the abandoned channel of the North Platte and Platte rivers in Nebraska following water development. Looking at a number of water projects, Williams and Wolman (1984) found a diversity of downstream channel responses based on the type of project and other factors. Friedman et al. (1998) generalized the nature of response below a large number of projects based on the initial channel morphology (braided or meandering) and physiographic region. The North Platte River in Wyoming is complex, varying from a braided to a meandering channel in different reaches with transition zones of intermediate condition. The response of the channel is likely to have been equally complex.

While the current flow regime maintains the existing stands of riparian cottonwood, the channel is probably failing to provide suitable sites or hydrology for recruitment of younger stands. Recruitment appears limited to a narrow band along the current active channel. As the existing forest becomes increasingly decadent and dies off, it will not be replaced and declines in the riparian forest should be expected.

Glendo Reservoir Without the Program

Glendo is a large, mesotrophic reservoir that fluctuates significantly on an annual basis. Operating criteria are to draw the reservoir down from a capacity of over 500,000 af (pool elevation 4,653 ft.) in the spring to below 64,000 af (pool elevation 4,570 ft.) by the end of September.

The major source of inflow is controlled by USBR's upstream dams. However, several tributaries to this reach of the river contribute appreciable amounts of water and nutrients to the system. The majority of adjacent terrestrial lands surrounding the reservoir are managed for public use by the Wyoming Recreation Commission. Vigorous stands of cottonwoods and willows are found adjacent to the reservoir. Sediment deposition and the timing of reservoir drawdown provide the necessary conditions for seedling establishment and survival to maintain these stands. Sagebrush grassland, rock outcrops, and some agricultural lands are the predominate upland habitat types.

Bald eagles winter in the area, using the cottonwood trees adjacent to the reservoir for perching and preying on the abundant fish and waterfowl. Glendo Reservoir was designated by the Service as moderate to high value (Resource Category 3) for: (1) migrating waterfowl and shorebirds; (2) nesting and wintering mallards and Canada geese; (3) its walleye fishery, both on a national and ecoregion basis; (4) nesting great blue herons; and (5) summering white pelicans.

Aquatic Resources

Glendo Reservoir is managed under a *Wild Concept*– management primarily directed toward providing the fisherman with the opportunity to catch fish from a fishery totally supported by natural reproduction– for walleye and yellow perch. Native species include the channel catfish, shorthead redhorse, white sucker, longnose sucker, quillback, fathead minnow, Iowa darter, johnny darter, river carpsucker, red shiner, bigmouth shiner, and sand shiner. Exotic species include the rainbow trout, walleye, yellow perch, black and white crappie, carp, gizzard shad, and the emerald, golden, and spottail shiner. Channel catfish are stocked annually to provide angling opportunities and gizzard shad are stocked as forage fish for predators (Conder and Deromedi 1998).

Trout are not stocked due to competition with walleye and nongame fish, and because of unfavorable habitat conditions resulting from reservoir fluctuations. However, a good walleye and yellow perch fishery has developed and is heavily fished. Walleye are the primary game fish and fishing is typically best in may and June. Channel catfish fishing becomes more popular as numbers build from stocking programs. Fishing for catfish is best in early spring in the upper end of the reservoir and in mid to late summer throughout the reservoir. Black and white crappies were introduced in 1992 and 1993 to diversify angling opportunities (Conder and Deromedi 1998).

Conder and Deromedi (1998) have reported that reservoir operation for irrigation annually reduces reservoir volume by 87%, severely reducing available habitat. This late summer drawdown stimulates forage and game fish to emigrate downstream in the outflow.

Terrestrial Resources

The riparian and upland habitat surrounding the reservoir provides important habitat for white-tailed and mule deer, pheasants, mourning doves, numerous species of nongame birds and small mammals. As the reservoir pool elevation drops throughout the summer, large mud flats are exposed which provide important habitat for migrating shorebirds in August and September. As these flats become vegetated with annual grasses and forbs, they are grazed by Canada geese and ducks. White pelicans use the reservoir extensively during the summer. Two great blue heron rookeries are located on the reservoir.

Glendo Reservoir is an important waterfowl production area supporting 30-40 nesting pairs of geese and 5,000 pairs of ducks, primarily mallards. The reservoir supports a wintering population of 6,000-7,000 geese and 10,000-15,000 ducks until ice-up, which normally occurs by early December. According to Roberts (Pers.Comm., 2003) Glendo Reservoir has been totally frozen once in the last eight years, at least on the day of the Mid-winter Waterfowl

Survey. For the other seven years there was enough open water to support an average of 2,100 ducks and 350 Canada geese.

Glendo Reservoir With the Program

Aquatic Resources

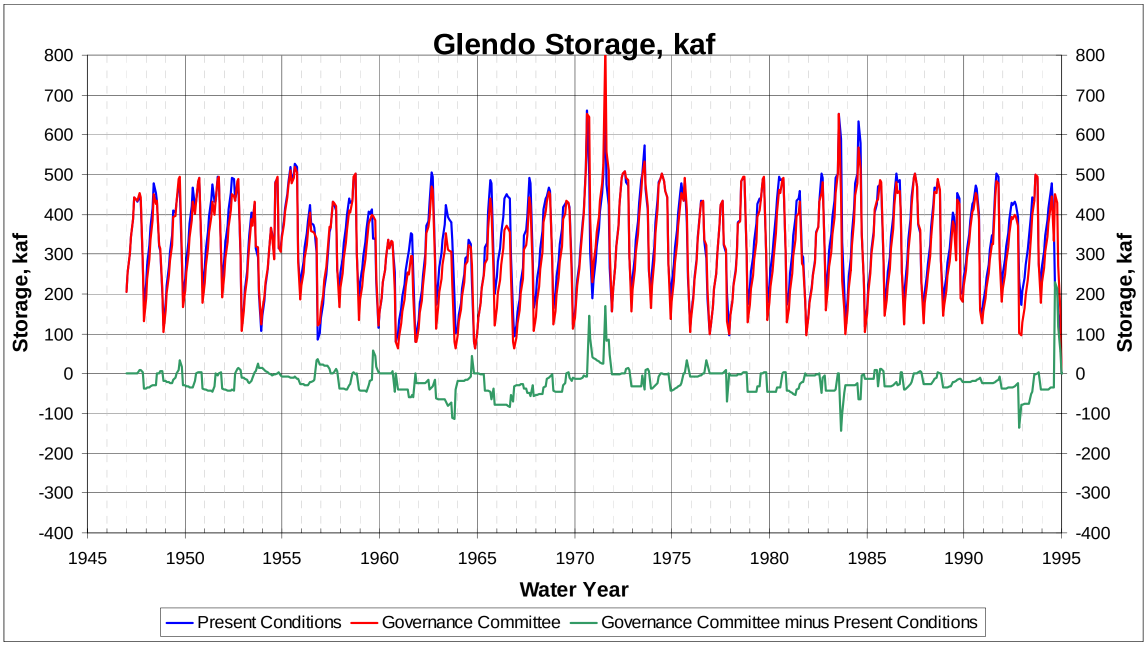
The average end-of-month storage for the 48-year period of record was 312,300 af, approximately 4% less than Present Conditions. There were 11 water years (23%) during which storage was less than 100,000 af– the minimum maintenance pool management goal for WGFD. The largest single month drawdown was 271,100 af (2% greater drawdown than for Present Conditions) occurring during August, 1992. There were no months over the period of record for which reservoir content was less than 63,000 af.

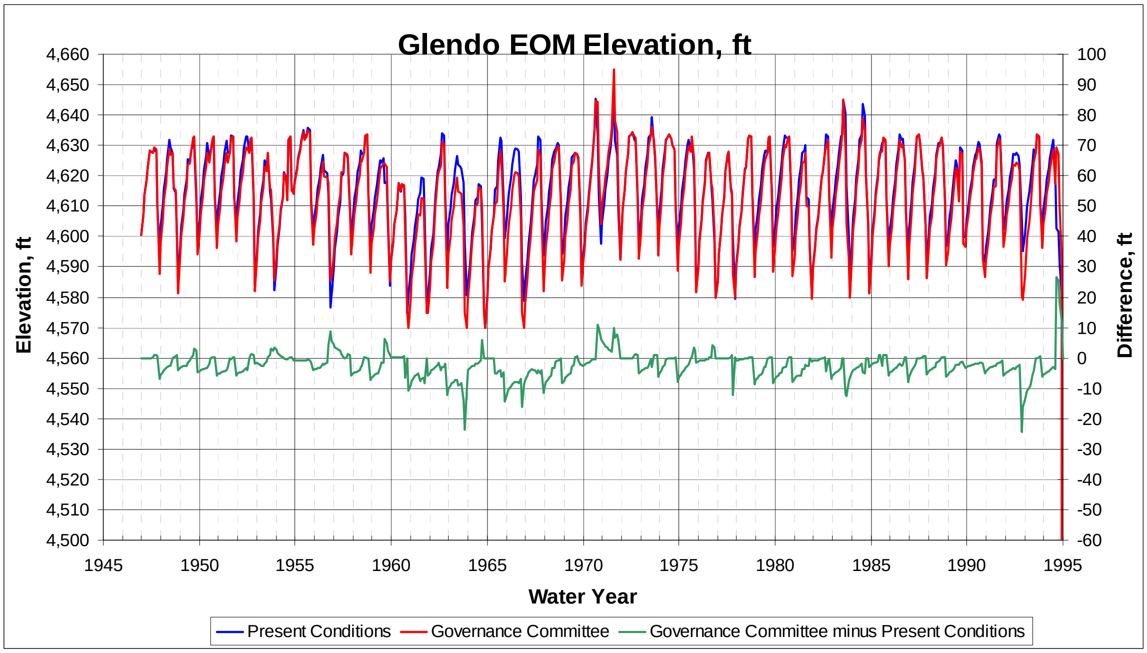
Overall, approximately 72% of water years, averaged across all months for the period of record, experienced elevation level decreases. *Largest* elevation decreases for any given month over the period of record ranged from 8 to 25 feet, with the greatest decrease occurring in the month of July. The overall *average* elevation decrease, across all months for the period of record, is approximately 4 feet, an approximate 4% decrease from Present Conditions. Elevation *increased* approximately 21% of water years, represented by an average increase in elevation of 2% (2ft.), and a 7% increase in content (18,000 af), compared with Present Conditions.

Elevation decreases greater than 10 feet occurred, on average across all months and years, 2 of 48 water years (4%). Overall average elevation decreases greater than 10 feet, across all months and water years, was approximately 13 feet. Elevation decreases greater than 10 feet occurred, on average for all months and water years, with a 13% greater frequency than Present Conditions. September was the month with the highest number of years (6 of 48 or 12.5%) during which elevation decreased greater than 10 feet. For those elevations less than 4,580 feet (corresponding to storage of approximately 100,000 af) the Program, compared with Present Conditions across all months and water years, exhibited: (1) an average decrease of 1.7% in maximum depth; and (2) an average decrease of 5% in average content.

Values of MEI for the Program (mean of 13.2 and 71.6 lb/acre standing crop biomass) exhibited a net increase over Present Conditions (mean of 12.86 and 69.7 lb/acre standing crop biomass). However, while there were 20 years during which Present Condition MEI was higher than the Program over the 34-year period of the MEI Analysis, there were 14 years during which the opposite occurred. Furthermore, standing crop biomass estimates were multiplied by average reservoir area in terms of acres to arrive at a total fish standing crop estimate for each reservoir year (converted to tons for convenience). Total average annual standing crop biomass for Glendo is approximately 302 tons under Present Conditions and 294 tons for the Program. Thus, total average fish production is lower under the Program compared with Present Conditions. Modeling indicates that DO in waters released from Glendo should not change from historic conditions.

Figures 64 and 65. Average annual end-of-month storage (thousand acre-feet) and elevation (feet) changes for Glendo Reservoir,1947-1994, for Present Conditions, the Proposed Program, and their difference (NPRWUM results, USBR 2005).





Terrestrial Resources

No significant wildlife impacts were identified

North Platte River from Glendo Dam to Guernsey Reservoir Without the Program

This 20-mile river reach flows through a steep-sided canyon whose walls are vegetated with Rocky Mountain juniper, ponderosa pine, and mountain shrub communities. The river then traverses an alluvial floodplain characterized by cropland and riparian cottonwood stands before entering Wendover Canyon above Guernsey Reservoir. The river fluctuates between winter low flows of 25 cfs to irrigation season peaks up to 7,000 cfs.

Bald eagles are common winter residents prior to ice-up. Peregrine falcons migrate through the general area, which contains potential nesting habitat for this species. The Service has designated this stream reach as having moderate to high value (Resource Category 3) for: (1) migrating and nesting mallards; (2) nesting Canada geese; and (3) its rainbow/brown trout fishery. If adequate stream flows are maintained throughout the year, the existing fishery could be elevated to a high, and possibly unique and irreplaceable, resource of national importance.

Aquatic Resources

The river between Glendo Dam and Guernsey Reservoir is rated as a Yellow Ribbon fishery by WGFD (trout fishery of regional importance). This reach of the North Platte River is managed under the Basic Yield concept for rainbow trout, the primary game species (Conder and Deromedi 1998). Anglers also take brown trout, channel catfish, walleyes, and yellow perch. Nongame fish include carp, white sucker, longnose suckers, fathead minnow, central stoneroller, longnose dace, darters, plains killifish, quillback, river carpsuckers, and other cyprinids.

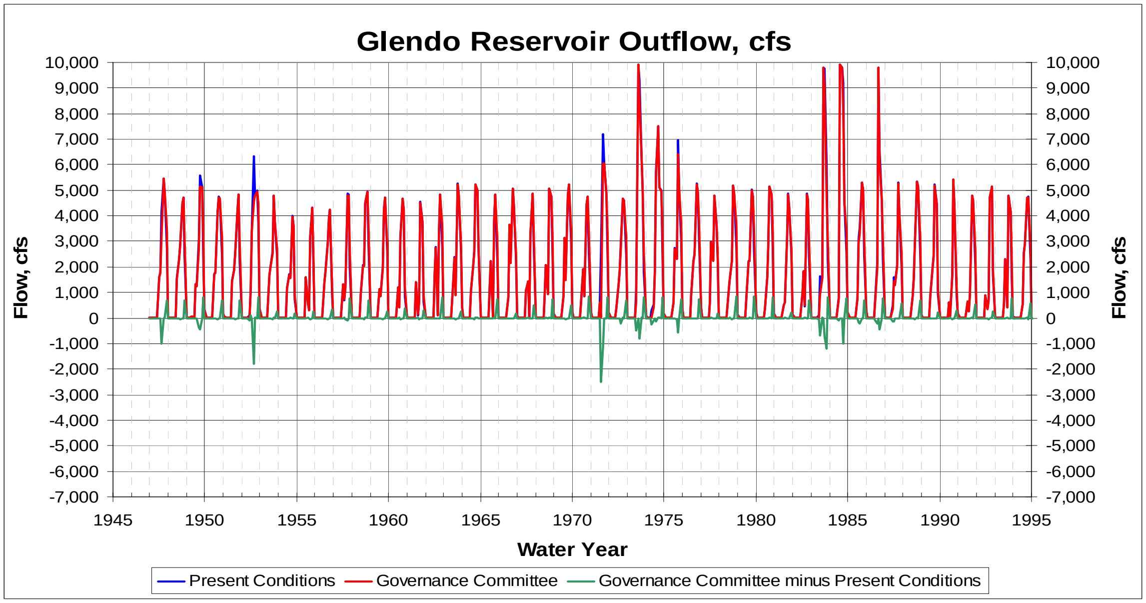
A low-flow valve, capable of providing 25-40 cfs, was installed in Glendo Dam in 1992 and has been providing 25 cfs flows ever since. These flows maintain wetlands that have developed across most of the 2 miles of the formerly dewatered North Platte River channel between the dam and the powerplant outlet works. Instream flow studies demonstrate that this 25 cfs flow provides little additional physical habitat for trout, though it probably improves water quality and nutrient cycling beneficial to trout (Wolff 1992). Conder and Deromedi (1998) state that the sport fishery below Glendo Dam is limited by fluctuating water flows. To prevent possible spills from Guernsey Reservoir, only 25 cfs is released from the dam during the non-irrigating seasons, as described above.

Terrestrial Resources

Mule deer are the dominant game species in the area. Waterfowl use the North Platte River from Glendo Dam to Guernsey Reservoir all winter. On average, approximately 30% of this river reach is open water during the Mid-winter Waterfowl Survey (Roberts, Pers. Comm., 2003).

This river reach supports five pairs of nesting geese and between five and ten nesting pairs of mallards per stream mile (Saul, Pers. Comm.1988).

<u>North Platte River from Glendo Dam to Guernsey Reservoir With the Program</u>



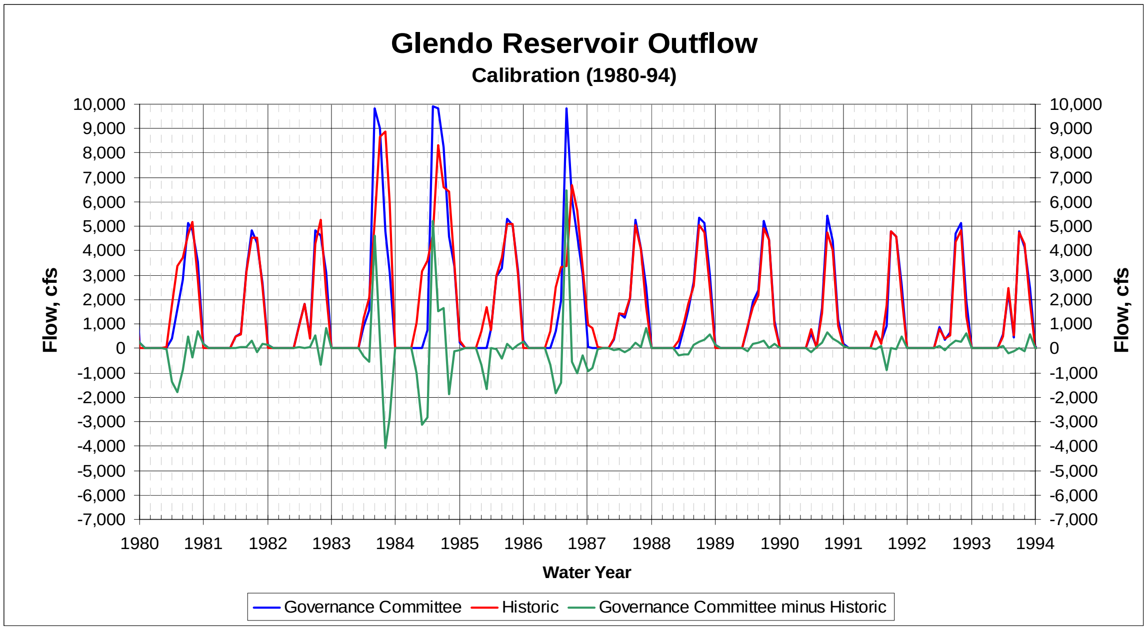


Figure 66 and 67. Average annual outflow (cfs) changes for Glendo Dam, 1947-1994, for Present Conditions, the Proposed Program, and their difference and for Historic Conditions, Present Conditions, and their difference (NPRWUM results, USBR 2005).

Aquatic Resources

The average number of years over the period of record during which flow decreased was 2.8 of 48 (6%). For the times during which flow decreased over the period of record (February through September), the average flow decline was 25% compared with Present Conditions, ranging from a 86 to an 888 cfs decrease. There were a total of 12 times over the period of record during which flow decreased >500 cfs (5 of which occurred in June); the average flow decrease for these years was 1,214 cfs, representing an average 43% decrease compared with Present Conditions. At no time over the 48 year period of record were flows less than 25 cfs, consistent with the management strategy of WGFD. Wyoming Game and Fish would further like to see improved winter habitat conditions through this reach, with the greatest benefit to fish habitat beginning at 200 cfs (Wolff 1992).

The average number of years over the period of record during which flow *increased* was 17 of 48 (35%). For the times during which flow increased over the period of record (April through September), the average gain was 7.5% compared with Present Conditions, ranging from a 19 to a 545 cfs increase. There were a total of 29 times over the period of record during which flow increased >500 cfs (all of which occurred in the month of September); the average flow increase for these years was 724 cfs, representing an average 25% increase compared with Present Conditions.

Terrestrial Resources

No significant wildlife impacts were identified

<u>Guernsey Reservoir Without the Program</u>

Guernsey Reservoir is the fifth in a string of large, mesotrophic, manmade impoundments on the North Platte River in Wyoming. This reservoir fluctuates severely from a summer irrigation pool of 46,000 af to less than 5,000 af in July for the annual silt run and again by the end of September. This corresponds to an elevation change of approximately 45 feet in pool elevation.

Breaks and rock outcrop areas adjacent to Guernsey Reservoir are primarily vegetated with ponderosa pine and Rocky Mountain juniper, with an understory of bitterbrush, mountain mahogany, and grasses. There is very little riparian vegetation development along the shoreline. Bald eagles are common winter residents prior to ice-up. Peregrine falcons migrate through the general area, which contains potential nesting habitat for this species. Guernsey Reservoir has been designated by the Service as moderate value (Resource Category 4) for: (1) wintering Canada geese and mallards; and (2) nesting for great blue herons, double-crested cormorants, and summering white pelicans. However, according to WGFD (Roberts, Pers.Comm., 2003) Guernsey Reservoir has very low value for wintering Canada geese and mallards. The reservoir is usually totally frozen and there are no local forage resources.

Aquatic Resources

Severe reservoir fluctuations prevent establishment of a viable fishery. For this reason, WGFD does not actively manage or stock the reservoir. Flow releases from Seminoe and Pathfinder Reservoirs limit the fishery in the North Platte River below Guernsey Reservoir to areas with deep pools where fish may overwinter. Due to extremely limited and poor quality habitat, no fish are stocked from below Guernsey Reservoir to the confluence with the Laramie River. Previous management efforts to establish trout and channel catfish have failed. In addition to the dewatering conditions in the winter, high summer irrigation flows caused downstream drift and stocked fish were lost through the canal system. Aquatic macroinvertebrates are greatly reduced during the silt run and recovery to pre-run conditions is slow following the reduction in turbidity. A variance in state water quality standards was granted to allow the silt run to continue without citations (Conder and Deromedi 1998). Guernsey Reservoir is quite scenic and is used heavily for water sports during summer.

Terrestrial Resources

The upland habitat surrounding the reservoir provides important habitat for turkeys, mule deer and numerous nongame and small mammal species. A cottonwood stand, located where the North Platte River enters the reservoir, contains a great blue heron rookery and double-crested cormorant colony, as well as an intermittently used bald eagle nest. Wintering waterfowl use is limited due to the drawdown of the reservoir during the non-irrigation season.

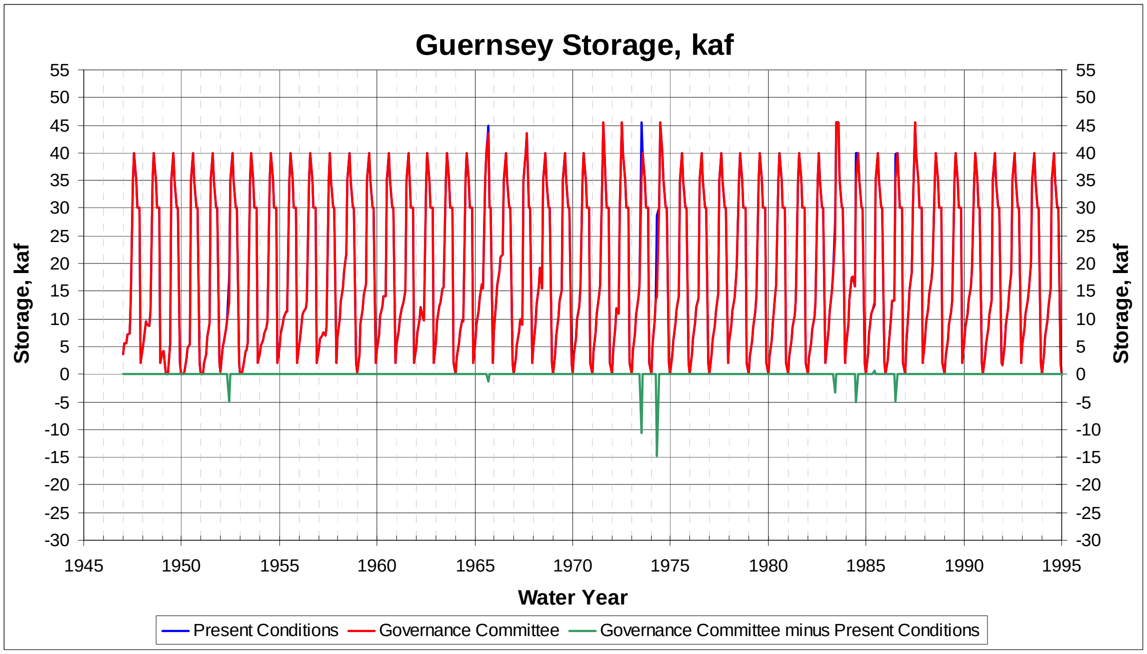
Guernsey Reservoir With the Program

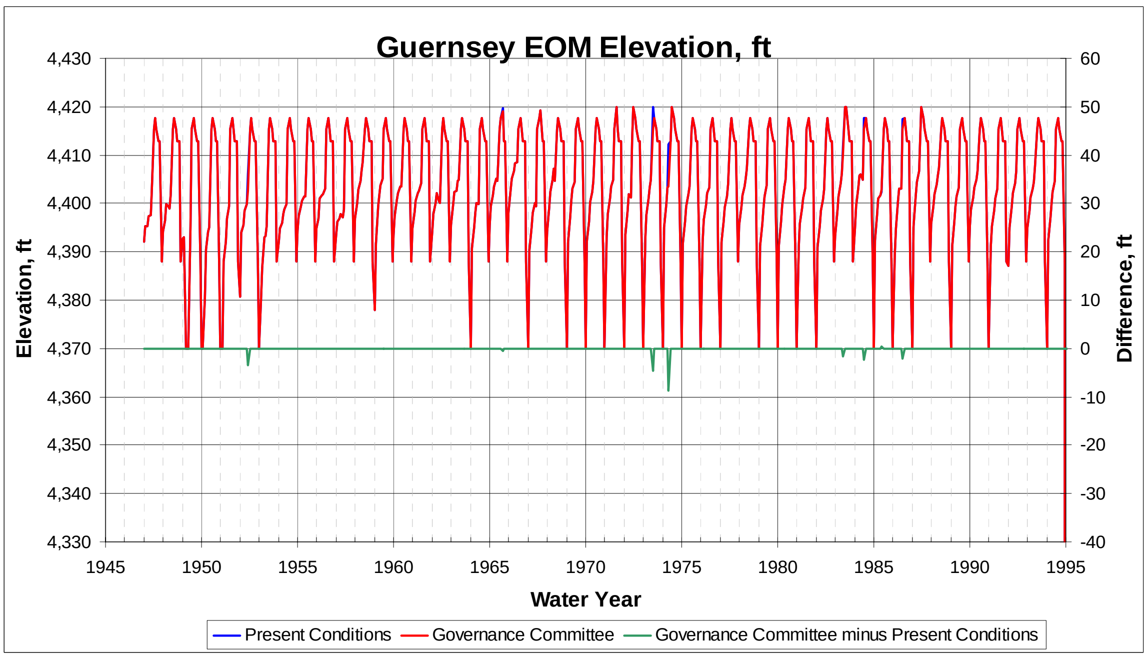
Aquatic Resources

The average end-of-month storage for the 48-year period of record was 18,900 af, approximately 1% greater than Present Conditions. The largest single month drawdown was 28,000 af, no greater than for Present Conditions, occurring during September, 1947.

Overall, just 1% of water years, averaged across all months for the period of record, experienced elevation level decreases. For those months during which elevation decreased (February, March, April and June) *largest* elevation decreases for any given month over the period of record ranged from1 to 9 feet, with the greatest decrease occurring in the month of February. The overall *average* elevation decrease, for those months during which elevation decreased (February, March, April and June), is approximately 3.75 feet, an approximate 8.75% decrease from Present Conditions. Elevation decreases greater than 10 feet did not occur over the period of record. Elevation *increased* for 1 year in the month of March over the entire period of record, representing less than 1% of water years overall.

Figure 68 and 69. Average annual end-of-month storage (thousand acre-feet) and elevation (feet) changes for Guernsey Reservoir,1947-1994, for Present Conditions, the Proposed Program, and their difference (NPRWUM results, USBR 2005).





No significant wildlife impacts were identified

North Platte River from Guernsey Dam to the Nebraska State Line Without the Program

The riparian zone along this 54-mile river reach is well developed and dominated by cottonwoods. Unlike some upstream reaches, cottonwood and willow recruitment is maintaining these riparian forests. Upstream water retention during the nonirrigation season dewaters the river from Guernsey Dam to the mouth of the Laramie River except for approximately 3-5 cfs of seepage from the dam and a small amount of irrigation return flow. Below the Laramie River, mandatory instream-flow releases from Grayrocks Dam maintain a minimum flow of 22 cfs in the North Platte River during winter months. Gains from tributaries and groundwater return flow bring winter flows to around 250 cfs at the Wyoming-Nebraska state line. During the irrigation season (April-September) flows typically vary between 2,000 and 5,000 cfs above the Whalen diversion. Below Whalen, irrigation season flows vary between 1,500 and 2,500 cfs.

The annual "silt run" below Guernsey Dam severely degrades this riverine habitat. The silt run delivers fine sediment, for 10-14 days each summer, from Guernsey Reservoir to the Interstate and Gering-Fort Laramie canals beginning at the Whalen Diversion Dam. This fine sediment lines the canals to reduce seepage and erosion caused by clear water flowing through the canals, increasing system efficiency. This practice was initiated in 1936 and practiced intermittently until 1959, when it became an annual practice, now considered integral to system operation by the irrigation districts. In 1982, USBR estimated that the effectiveness of the silt run would begin to diminish after 15 years (USBR 1983).

A side effect of the silt run is an annual episode of excessive turbidity in the North Platte River from Guernsey Dam to the Whalen Diversion. This is highly detrimental to aquatic life in the river (McDonald and McKnight 1977) and would violate the state water quality standards for turbidity if not for a permanent exemption from this standard by the Wyoming Department of Environmental Quality (USBR 1983). An additional detriment of the silt run is lost power production from Guernsey and Glendo powerplants as the Guernsey reservoir pool is drawn down and rapidly refilled, costing the irrigation districts an average of $20,000 in power interference charges annually (USBR 1983).

Bald eagles are common winter residents (USBR 1981b) feeding on fish and abundant wintering waterfowl in the area. Peregrine falcons migrate through the general area and an historic eyrie is located on the Goshen Rim, east of the town of Chugwater.

This stream reach was designated by the Service as high resource value (Resource Category 2) to: (1) wintering and nesting Canada geese; (2) migrating, wintering, and nesting mallards; (3) nesting great blue herons; and (4) nesting wood ducks, both on a national and ecoregion basis (U.S. Fish and Wildlife Service 1988). The area also has high resource value for wintering bald eagles.

Aquatic Resources

The river below Guernsey Reservoir to the Wyoming-Nebraska border is considered an Orange Ribbon fishery, supporting warmwater and coolwater game fish. In addition to the silt run and the dewatered winter condition of the river, high summer flows cause downstream drift and loss of fish in the canal system. Based on the most current data (Peterson and McMillan 1976), fishermen spent approximately 60 days per river mile on this river reach annually. Primary game fish sought were walleye, channel catfish, flathead catfish, black bullhead, yellow perch, largemouth bass, green sunfish, pumpkinseed sunfish, bluegill, and a few rainbow and brown trout. The river also supports nongame fish including carp, white suckers, longnose suckers, fathead minnows, brassy minnows, longnose dace, central stoneroller, creek chub, flathead chub, darters, plains killifish, short-head redhorse, river carpsuckers, quillback, gizzard shad, bigmouth shiners, common shiners, emerald shiners, sand shiners, and red shiners. Attempts at establishing flathead catfish appear to have been unsuccessful. Limited stocking is done in the Torrington area. Catchable-sized rainbow trout are stocked in the fall for put-and-take fishery in the fall, winter, and spring (Conder and Deromedi 1998). Channel catfish are stocked annually to provide for additional angling opportunties (Conder, Pers. Comm. 2002).

Terrestrial Resources

The river bottom and adjacent croplands support good populations of mule deer and white-tailed deer, pheasants, cottontail rabbits, and waterfowl. Numerous species of nongame birds and mammals utilize the riparian zone. There are 5 heron rookeries located within this river reach (Cerovski, Pers. Comm. 2000).

The North Platte River drainage from Guernsey Dam to the Nebraska state line, and the Laramie River drainage below Gray Rocks dam, winters on average 36,500 ducks and 27,000 Canada geese; 27,000 of those ducks and 10,000 of the geese are dependent upon the North Platte River. These averages were determined from the Mid-winter Waterfowl Survey for the years 1996 through 2003 (Roberts, Pers. Comm. 2003).

<u>North Platte River from Guernsey Dam to the Nebraska State Line With the Program</u>

Aquatic Resources

Flows ranged from a low of 3 cfs to a high of 10,516 cfs over the period of record. Average annual flow for the period of record was 1,600 cfs (1,167 af). Overall percent change from Present Conditions is an 18.5% decrease in average annual flow. The objective of WGFD for this reach is to obtain a maintenance flow during the non-irrigation season.

The average number of years over the period of record during which flow decreased was 3 of 48 (6%). For the times during which flow decreased over the period of record (from March through September), the average drop was 21% compared with Present Conditions, ranging from a 135 to an 784 cfs decrease. There were a total of 12 times over the period of record during which flow decreased >500 cfs (5 of which occurred in June); the average flow decrease for these years was 1,180 cfs, representing an average 37% decrease compared with Present Conditions.

May through September over the period of record flows *increased* an average of 41 of 48 years (85%). For the times during which flow increased, the average gain was 5% compared with Present Conditions, ranging from a 19 to a 545 cfs increase. There were a total of 29 times over the period of record during which flow increased >500 cfs (all of which occurred in the month of September); the average flow increase was 723 cfs, representing an average 24% increase compared with Present Conditions.

Terrestrial Resources

No significant wildlife impacts were identified

COLORADO FISH AND WILDLIFE RESOURCES

Fish and Wildlife

Species of concern within the CDOW's prioritization system that may be affected by the Program include the state threatened brassy minnow and the state and federally threatened bald eagle. Upland game species commonly hunted within the project area include mule deer, white-tailed deer, ring-necked pheasant, wild turkey, bobwhite quail, mourning dove, coyote, and cottontail rabbit. The State Wildlife Areas are also used for waterfowl hunting, fishing, and non-consumptive uses such as wildlife watching and photography.

Habitat

Riparian plant communities like those found on the State Wildlife Areas support some of the most productive and diversified ecosystems in the western United States. In Colorado, riparian zones represent less than 10% of the landscape, yet over one-third of all vertebrate species that inhabit the state have been recorded in riparian zones.

It is found that the "habitat to be impacted is of high to medium value for evaluation species and is relatively abundant on a national basis" (USFWS 1987). Based upon this definition, the area in and around TRSWA and PESWA would fall into the *Resource Category 3*, which carries with it a mitigation goal of "No net loss of habitat value while minimizing loss of in-kind habitat value (USFWS 1987).

Soils

The following has been summarized from the CDOW (1998). The pond sites and the majority of the pipelines on the TRSWA will be located in deep, excessively drained soils on upland sandhills. The sand deposits parallel the river the south and have slopes that are gently rolling to strongly rolling. Permeability of these soils is very rapid. Effective rooting depth is 60 inches or more. The available water capacity is low. Surface runoff is slow, the soil-blowing hazard is high, and the erosion hazard is slight. Valent loamy sands and Dailey loamy sands are the prominent soil types. Soils near the proposed wells are mostly deep, somewhat poorly drained soils on low terraces and bottomlands. Permeability is slow. Effective rooting depth is 60 inches or more. Available water capacity is moderate. Surface runoff is slow, and erosion hazard is slight. A fluctuating water table occurs between 12 and 24 inches during winter and spring months. A moderate saline condition is common. Soil type here include Westplain silty clay loam, Westplain Alda complex, Manter loamy sand and Fluvaquentic Haplaquol.

Proposed ponds and pipelines on PEWSA also occur on deep, excessively drained soils. The soil is characterized by blowouts and dune topography. These soils absorb water rapidly but have very rapid internal drainage and low water-holding capacity. Natural fertility is low and there is no surface runoff. Valentine fine sands and Elmere loamy fine sands comprise most of the project area soils. Proposed well sites border Wet Alluvial land, which is found directly adjacent to the river. This soil type is an accumulation of sand and gravel that contain thin lenses of silty and clayey materials over deep gravel. These materials make up sandbars and islands that are wet most of the time.

Tamarack State Wildlife Area Without the Project

The following has been summarized from the CDOW (1998). Warm water riverine habitat like those found on TRSWA and PESWA are characterized by highly fluctuating, and turbid flows-characteristics which favor native fish populations. Aquatic inventory studies conducted by the CDOW identified 24 species of fish inhabiting the lower sections of the South Platte River in Colorado. Plains killifish were the most abundant species captured followed by sand shiner, fathead minnow, and creek chub. Common species included bigmouth shiner, brook stickleback, and red shiner. Although the natural aquatic habitats associated with the lower South Platte River cannot support viable populations of game fish, several introduced species occur as a result of human stocking efforts and impoundments. These include carp, bluegill, and largemouth bass.
Some common species associated with the upland sites of the project include mule deer, white-tailed deer, wild turkey, cottontail rabbit, coyote, western box turtle, lesser earless lizard, bull snake, meadow lark, mourning dove, bobwhite quail, ring-necked pheasant, black-billed magpie, and American kestrel.

The following native fishes in the valley of the South Platte River have been given special status in Colorado: suckermouth minnow, northern redbelly dace, common shiner, lake chub, brassy minnow, and plains minnow. Of the species, historical records indicated that the suckermouth minnow, brassy minnow, and plains minnow inhabited the lower South Platte River in the vicinity of the affected State Wildlife Areas, and were likely more common in distribution and abundance than at present. Both suckermouth minnow and plains minnow have been found in the South Platte main-stem during and since the CDOW's 1993-1996 Inventory Project. The reasons for the declines are unknown, but degraded water quality, altered water flows, and pollution in portions of these species' historical ranges may be factors in the declining distribution and abundance. Strategies including this project may be used as initial recovery efforts for these species.

The Colorado Natural Heritage Program identified four migrant bird species that are not threatened or endangered, but are rare in that part of their range that includes the project vicinity. The eastern bluebird and black-billed cuckoo are considered imperiled because of their rarity. Bell's vireo is extremely rare, and the upland sandpiper is classified as vulnerable. Occasional wintering bald eagles are probably the only terrestrial threatened or endangered species within the State Wildlife Areas; they are also known to nest along the South Platte in other locations.

TRSWA and PESWA are currently being managed to provide wildlife-related recreation. Hunting, fishing and wildlife observation are the main uses of the property. During fall and winter, hunting is the primary form of public use. Current demands for public hunting are such that a reservation system that limits hunter numbers and locations has been adopted on the TRSWA. A small pond in this area has historically been stocked by the Colorado Division of Wildlife with warm water and cold water sportfish to provide fishing opportunity during the spring and summer. Non-consumptive wildlife recreationists use the State Wildlife Areas mainly in the spring and fall to watch and photograph wildlife, especially bird species. Appendix B contains a list of species that have been identified by the CDOW as being present in the State Wildlife Areas.

<u>Tamarack Ranch and Pony Express State Wildlife Areas With the Project</u>

The following has been summarized from the CDOW (1998). The Program projects will: elevate water tables in riparian meadows, increase groundwater return flows to the sloughs and river channels at the State Wildlife Areas, and generate open water surfaces at the recharge ponds. In turn, these hydrological changes will serve to maintain and enhance existing riparian and wetland habitats at the State Wildlife Areas in a manner that will benefit waterfowl and fish species of concern, and will continue to contribute to creation of needed wetland and wet meadow complexes.

When the Tamarack Plan is implemented, Colorado will be credited with contributing to the reduction of water flow shortages in central Nebraska because the Tamarack Plan operations are estimated to increase flows in the South Platte River and the Colorado-Nebraska State line during the April through September time period by an average of approximately 10,000 af each year over the flows that would otherwise occur during that period. In addition, wells at the State Wildlife Areas will also pump to re-regulate or recycle flows that historically were not available, such as return flows from additional trans-basin diversions or pumping of non-tributary aquifers to meet future population growth in the South Platte Basin.

After the water is pumped from the wells into the recharge ponds farther from the river in the upland areas, seepage form these ponds into the groundwater aquifer will increase groundwater elevations. These elevated groundwater levels will extend all the way back to the river causing increased return flows into the river channels. The riparian meadow areas between the river and the upland areas where the recharge ponds exist will experience elevated water tables with the resulting establishment of wetland characteristics. The enhanced wetland functionality resulting from these higher water tables under the riparian meadows will be utilized in creating wetland complexes. Wetlands in the riparian meadows will provide nesting and brood habitat for numerous waterfowl.

The wells will pump mainly to the recharge ponds during the late fall, winter and early spring periods. Wetlands are created around these recharge ponds, and the warm groundwater supplied by the wells provides open water surface at the recharge ponds, which usually creates a suitable environment (e.g., resting areas) for waterfowl during migration and wintering. However, monitoring of site conditions at the State Wildlife Areas is needed to verify that pumping operations do not negatively impact site habitat. Well operations may need to be changed or structures moved should any well impacts to habitat be identified.

Construction activities that would cause disturbance to vegetation include installation of wells, excavation of pipeline trenches, and road building. Potential impacts may also occur as the result of soil compaction and/or crushing of individual plants by machinery for road building, well drilling, and maintenance. Since the vegetation to be impacted is not unique to the area, but similar to surrounding plant communities, these impacts would not be considered significant. Re-contouring the disturbed sites with the surrounding topography and seeding with appropriate native grasses will help minimize impacts. Disturbed areas will provide the opportunity for tall annual plants like the wild sunflower to grow until grasses are established. These plants would be considered desirable for some wildlife species such as bobwhite quail and pheasant. At the new pond sites, plant species composition will change as the area becomes more mesic. Wetland type plants will replace upland species. Exact changes in plant composition will be dependant on the amount and timing of water deposited. Changes to the soil over time will also affect plant species. This conversion from grassland to wetland is considered to be a benefit to wildlife and a positive aspect of the Program projects.

Potential negative impacts to wildlife include human disturbance from increased access on service roads and wells located within the riparian zone limiting wildlife movement along this corridor. During construction of the projects, temporary disturbances including increased noise and activity levels would be present. There will be a temporary displacement of wildlife from the vicinity of the construction sites. These impacts should not be permanent nor should they have significant effects on the viability of any local wildlife populations.

Potential benefits of the projects to wildlife and wildlife habitat, including the creation of new ponds, should have a positive impact on local wildlife populations. Responses to habitat changes by waterfowl and shorebirds using the ponds will be most noticeable, but many other species from amphibians to big game will also benefit from the newly created wetlands. If pump placement is effective, an increase in alluvial flows in the areas below the new pond sites should enhance existing sloughs and riparian habitats for both aquatic and terrestrial species. The projects, however, should be monitored for impacts both positive and negative to wildlife and habitat within the project area. The CDOW must have the ability to determine impacts and act accordingly to preserve and enhance wildlife resources throughout the life of the Program.

Currently, construction of the projects should not pose any negative impacts to any threatened or endangered species or their habitats. Bald eagles nest and winter along the South Platte, but there are no known nests within the construction area at the time of this report. However, care should be taken to avoid construction during nesting and rearing periods, and to locate any well sites at least a half-mile away from any eagle nests that are discovered.

Benefits to special status species from the Program projects include:

1) Enhancing and/or maintaining habitat for native Colorado fish species; and

2) Re-regulating the timing of flows in the South Platte River will incidentally benefit the Federally listed whooping crane, interior least tern, piping plover and pallid sturgeon. by reducing shortages to target flows in the "associated habitats" in Nebraska, as that term is defined in the Platte River Cooperative Agreement.

Anticipated impacts on wildlife-related recreation on the State Wildlife Areas are positive. The creation of new wetland habitats increases the potential for both consumptive and non-consumptive users to enjoy wildlife. The construction phase would be completed during the summer months to avoid high use periods by the public.

DISCUSSION AND RECOMMENDATIONS

NEBRASKA

A summary of impacts to the resources of concern are identified in Appendix B.

In developing parcel-specific water action or land management plans, the Program will where practical select restoration, maintenance and other management measures for the target species that do not harm or may benefit other "species of concern," when such activities are consistent with the needs of the target species and are within the Program budget. The species of concern list consists of (1) species known to occur or have the potential to occur naturally in the associated habitats within the central Platte River valley; and (2) species listed by the state or federal government as endangered, threatened or candidate species; were delisted and are in an initial five-year monitoring period; are ranked as G1, G2, or G3 by Nebraska Natural Heritage Program; or use habitat within the associated habitats in the central Platte River valley that is essential to species survival. When developing parcel-specific water action or land management plans, the State of Nebraska, represention by the NGPC, can provide recommendations that will avoid or offset site specific impacts to resources of concern and their habitats.

The following text discusses necessary measures needed to avoid or offset impacts to the remaining resources of concern identified in the Fish and Wildlife Coordination Act report.

Flow Related Impacts to the Finescale Dace and Northern Redbelly Dace

Decreases in monthly flow during the months of June and July may negatively impact both species of dace by affecting habitats with slow or still pools, such as those that could be provided by connected backwaters or side channels. Impacts occur during the spawning period from April to August. It is unknown how the finescale and northern redbelly dace would respond to the negative affects created by the GC Alternative; therefore, it is recommended that Program affects to both species on the North Platte River be studied through an integrated species and habitat monitoring program before any offsets to impacts are proposed.

Flow Related Impacts to the Sandhill Crane

In the North Platte River, crane roosting habitat above Lake McConaughy in and west of the Clear Creek Wildlife Management Area would likely be least affected by the GC Alternative. Changes in flow regime within the Sutherland to North Platte reach may be problematic for sandhill cranes using these sites. Current flow-related impacts to sandhill crane habitat in the North Platte River is difficult to quantify because established survey sites exist within the Sutherland to North Platte reach, but have not been surveyed since the early 1980s. Current survey information is needed for this reach.

Sandhill cranes using the Lexington to Chapman reach of the Platte River may benefit from some management activities (increased roosting depth abundance at some sites, increased unobstructed channel width, and increased lowland grassland) performed at specific sites for target species. Analysis of roosting depth under the GC Alternative indicates that for most of the river channel between Lexington and Chapman (as represented by the all transects and non-managed transects categories), some small reduction in roosting depth may occur, although analysis of channels greater than 500 feet indicate a small increase for all transects. The conversion of cropland to wet meadows would likely result in the decrease of less than one percent of total cropland acres in the central Platte.

It is unknown how the sandhill crane would collectively respond to the positive and negative affects created by the GC Alternative; therefore, it is recommended that Program affects to the sandhill crane on the North Platte and Platte Rivers be studied through an integrated species and habitat monitoring program before any offsets to sandhill crane impacts are proposed.

Flow Related Impacts to Waterfowl and Waterbirds

The Service has identified target flows necessary to maintain habitat suitability to waterfowl and waterbirds (Bowman 1994). The February/March and April/May peak flows play critical roles for providing flows that will subirrigate wet meadows benefiting numerous species of waterfowl, waterbirds, and shorebirds. April/May peak flows serve another purpose by maintaining vegetation free sandbars and maintaining a wide channel. The GC Alternative reduces the 7-day peaks in which an 8,000 cfs or 12,000 cfs threshold would be reached. In addition, the GC

Alternative is anticipated to reduce the 30-day April to June peak flows.

Although the aforementioned GC Alternative flow impacts may negatively affect waterfowl and waterbirds, several positive affects are created by the GC Alternative and were identified in the FWCA report. It is unknown how the waterfowl and waterbirds would respond to the collective positive and negative affects created by the GC Alternative; therefore, it is recommended that Program affects to the waterfowl and waterbirds along the central Platte be studied through an integrated species and habitat monitoring program before any offsets to impacts are proposed.

Lake McConaughy/Ogallala Impacts

Implementation of the Program results in a wide range of impacts to the resources of concern in Lake McConaughy, Lake Ogallala, and the Platte River. For a number of resources (Lake McConaughy littoral habitat, white bass, and channel catfish, central Platte fisheries, and lower Platte shovelnose sturgeon and catfish), impacts range from none to very slight. For the remaining resources (Lake McConaughy open water habitat, walleye, smallmouth bass, and gizzard shad, and Lake Ogallala trout), impacts range from potentially significant to substantial.

For those resources where more substantial impacts can reasonably be anticipated to occur, mitigation strategies will be recommended. A number of different mitigation strategies were investigated with the NGPC to reach a final set of required mitigation measures. The resources expected to be substantially impacted, for which mitigation will be necessary, are Lake McConaughy walleye, smallmouth bass, and gizzard shad, and Lake Ogallala trout.

Annual walleye stocking rates into Lake McConaughy fluctuate widely as does their success in recruiting a year class, based on a number of factors including low water levels. NGPC will evaluate the effectiveness of fish stockings as a potential mitigation strategy as well as various ecosystem based and watershed – level approaches to improving walleye habitat under lowered water conditions. NGPC will also explore a number of alternative funding sources to aid in financing these mitigation needs.

Smallmouth bass mitigation would not likely be accomplished via stocking, as fluctuations in habitat availability could serve to negate the benefits gained through such a strategy. Instead, it is proposed that changes in management of the fishery be put into place, to manage it as a trophy fishery with the smaller total number of fish, instead of the current harvest fishery. The details of this change in management would be developed by NGPC fishery managers.

Gizzard shad mitigation similarly would not be able to be accomplished through hatchery propagation. In this instance, it is not due to habitat availability, but rather, due to the impracticality of raising large numbers of gizzard shad in a hatchery setting. In this instance, it is most appropriate to address the parameter most impacted by Program implementation, that is, gizzard shad winter survival. The primary thermal refugia for the population in Lake McConaughy is at the mouth of Otter Creek. Aside from lake level fluctuations, the foremost contributing factor to loss of that refugia is through siltation. As a result, given the inability to both implement the program and avoid reservoir fluctuations, the best option available to address loss of winter refugia is to address of the siltation issue through changes in management practices in the watershed. The Service and NGPC will pursue with other federal, state, and local agencies, opportunities to work with private landowners within the watershed to institute land management practices that would result in decreases in silt load entering the stream, particularly exclusion of cattle from the stream.

Trout stocking rates in Lake Ogallala fluctuate from year to year, similar to walleye stocking. The average annual stocking rate for the last ten years is approximately 6,000 rainbow trout and 1,600 brown trout annually. At this average rate, an increase of 10% would be approximately 600 and 160 fish respectively. These hatchery produced trout are typically stocked at about 9.5 inches. Given this, based on accepted costs for replacement per fish at that size, this would require approximately $700 per year in increased production costs, or $9,100 over the course of the first increment.

Channel Restoration and Flow Consolidation Impacts

The NGPC recognizes channel restoration activities, as proposed in the GC Alternative, as an acceptable method for restoring braided channels within the central Platte River. It is recognized that channel restoration activities would result in the potential loss of side channels and backwaters. Side channels and backwaters provide habitat for many biotic resources such as the river otter, new species of caddisfly, mussels, waterfowl, waterbirds, herptiles, and fish. Side channels and backwaters also increase the vegetative edge of a river reach. Vegetative edge provides high nutrient loads that produce insects and other aquatic invertebrates at a rate much higher than main sand bed channel habitat. The NGPC recognizes that the proposed channel restoration activities will return natural riverine function by reverting accreted islands back to ephemeral sandbar habitat; therefore, the NGPC does not propose offsets for channel restoration activities.

Flow consolidation activities, as proposed in the GC Alternative, results in creating an unnatural condition to create braided river channels. Reaches of anastomosed channels and backwaters provide habitat for resources of concern as well as the production of food sources for these resources (Patton and Hulbert 1993). Unvegetated widths of side channels are maintained by peak flows, and blocked side channels will eventually aggrade and become vegetated. The loss of these peripheral channels have unknown consequences to interrelated resources such as aquatic invertebrate production and adjacent wet meadow hydrology. The NGPC recommends that any flow consolidation plan should be constructed so that peak flows can be alternated across multiple anastomosed channels every two to three years. If alternating peak flows does not maintain open side channels, then subsequent land management activities should be implemented to reconnect side channels. Another concern of the NGPC is that consolidated flow, in combination with armored downstream banks, could result in serious reduction to riverine function similar to the present day Missouri River; therefore, the NGPC recommends that any flow consolidation activity be combined with the destabilization of woody vegetation downstream of the proposed consolidation site.

Impacted Woodland and Shrubland Habitat

Woodland and shrubland vegetation cover in the central Platte River will be removed as a result of channel and nonchannel restoration activities. The impacts that occur would be relatively small compared to total acres of combined woodland and shrubland. The FEIS identified an approximate loss of 3,500 acres of woodland and shrubland which represents approximately 9% of the total acres in the central Platte River. Such restoration activities benefit many wetland and grassland species of concern including grassland birds which have experienced the steepest population declines of any North American bird group (Davis 2005).

The expansion of woody vegetation as a consequence of upstream water development has been well documented (National Research Council 2005). The expansion of woody vegetation has resulted in the encroachment of woodland generalist species. Examples of mammalian range expansions along the Platte River valley have been documented for the white-footed mouse *(Peromyscus leucopus)*, and the bog lemming *(Synaptomys cooperi)* (Freeman et al. 1993). Several studies have found that most birds in the Platte River riparian forest are abundant in eastern deciduous forests, and being generalists, can readily expand into new habitats (Colt 1997, Davis 2005, Davis *In Review*). Johnson (1995) also documented the tendency for edge and generalist species invade grasslands when woody vegetation becomes available. Johnson (1995) also stated that grassland species have much more restricted habitats compared to habitat generalists. The expansion of riparian forests along prairie streams and rivers has effectively created linear forests that have favored the movement of many species into and across grasslands (Knopf 1994, Coppedge et al. 2001). Both authors expressed concern that as a consequence of riparian forest development on the Great Plains, invading species not only establish contact with closely related species resulting in potential hybridization, but also displace native species. The expansion of white tailed deer along the Platte River has resulted in the NGPC developing a special "seasons choice" permit that allows for the additional harvest of anterless white tailed deer along a reach of the Platte River from Gothenberg to Central City (NGPC 2005). The loss of 3,500 acres would represent approximately 9% of existing woodland and shrubland in the central Platte River. The 3,500 acres in converted habitat would occur in multiple locations spread throughout the central Platte River. The NGPC has not historically required mitigation for lost woody habitat occurring from central Platte River restoration activities because of the absence of woodland resources in need of conservation. No mitigation would be required by the Program to offset lost woodland habitats.

Impacted Cropland Loss

It is estimated in the FEIS that approximately 1,100 acres of cropland will be converted to nonchannel and non-complex habitats. The loss of cropland habitats will affect primarily waterfowl and sandhill cranes that feed on grain residue from croplands (primarily from cornfields). Waterfowl and sandhill cranes are subject to existing pressures of reduced post-harvest waste grains (Krapu et al. 2004), and an increase in Canada and snow goose use in the central Platte River resulting in increased inter- and intraspecific competition for waste grain.

The conversion of 1,100 acres would represent approximately four tenths of one percent of existing agricultural land in the central Platte River. The 1,100 acres in converted habitat would also occur in multiple locations spread throughout the central Platte River. The NGPC recognizes that the conversion of cropland habitats will result in a relatively minor impact to foraging waterfowl and cranes within the central Platte. Because the impacts to croplands are minor compared to the potential benefit from increased wet meadows, NGPC will not require mitigation for converted cropland habitats.

Wetland Conversion

Cases may occur when GC Alternative land management actions will result in impacts to wetlands. Waters of the United States, including wetlands, are under the jurisdiction of the U.S. Army Corps of Engineers (Corps) under Section 404 of the Clean Water Act of 1977. Corps Section 404 permitting may be required where dredge and fill activities associated with proposed habitat restoration in the central Platte River. GC Alternative land management actions may result in the conversion of a wetland's subclass or water regime. Wetland mitigation is not required for any actions that would be considered by the Service or NGPC as restoration projects. Any wetland creation project that would result in the conversion of wetlands (jurisdictional and isolated) to a different wetland subclass of water regime would require in-kind mitigation (i.e., wetlands of the same subclass and water regime to replace those converted by land management actions). The Corps will identify Department of Army permit conditions necessary for mitigation on jurisdictional based on creation/restoration determinations provided by the Service and NGPC.

WYOMING

The North Platte River Water Utilization Model (NPRWUM) indicates that over the 48-year period of record, there likely will be significant impacts to the aquatic resources in the North Platte River episodically. The model predicts, for example, that for 7 months during one year (1965) over the period of record that the WGFD flag level for loss of the reservoir fishery in Seminoe Reservoir (50,000 af) was exceeded; this likely would result in collapse of the fishery. Similarly, there were 8 such months for Pathfinder Reservoir for which the flag level was exceeded, with the likely result of losing the fishery.

Modeling suggests that there will be relatively little or no discernible impacts on waterfowl. Impacts to fisheries, however, may be significant particularly within Seminoe and Pathfinder Reservoirs. The Morphoedaphic Index (MEI) Analysis demonstrates that, after making adjustments for total reservoir habitat availability, that Seminoe could experience substantial impacts particularly during years of low reservoir levels: fishery production may be as much as 21 tons less under the Program (109 tons) compared with Present Conditions (130 tons) during low storage years. Pathfinder could experience substantial impacts during average reservoir levels, as illustrated by the 5 ton difference in total fish standing crop biomass for the Program (221 tons) compared with Present Conditions (226 tons). Glendo could sustain substantial impacts to the fishery, as shown by the 8 ton difference between the Program (294 tons) and Present Conditions (302 tons). Little impact was shown for Alcova Reservoir.

Modeling the effects of temperature and dissolved oxygen (DO) on Pathfinder Reservoir and its downstream fishery indicates that temperatures should remain suitable for coldwater fish in the conditions exemplified during the critical years of 1961 and 1964. Results showed little difference exists in temperatures of reservoir surface and bottom for the Program and Present Conditions. However, the Program would result in a smaller cold bottom layer due to overall smaller reservoir size.

Modeling results for DO indicates that there is a lower probability that the hypolimnion will contain adequate dissolved oxygen during the late summer suitable to coldwater fishes under the Program compared with Present Conditions. While results show that catastrophic loss of a coldwater fishery would not likely occur, there would be an adverse effect on the fishery due to stress related to low DO levels in Pathfinder associated with the Program. Similar effects may occur in Seminoe, although to a lesser extent because of the smaller reduction in the reservoir level. A comparision of historic profiles of times of low DO in Seminoe and Pathfinder reservoirs indicates that conditions for coldwater fishes could become very stressful.

Because of the reduced probability of adequate DO in the hypolimnion during late summer, there would be a concomitant increased likelihood of anoxic water released below Pathfinder and Seminoe reservoirs. Historic data suggest that low DO in Seminoe water releases could extend into the upper end of Miracle Mile. Low DO in the Fremont Canyon bypass below Pathfinder Dam would likely not extend as far given the nature of the outlet to Fremont Canyon. DO in waters released from Alcova and Glendo reservoirs should not change from historic conditions.

When viewed over the long-term, modeling predicts that over the 48-year period of record for Seminoe Reservoir, the fishery would be lost once due to the Program in 1965. Similarly, the model predicts the Pathfinder Reservoir fishery will be lost twice in the 48-year period of record (1966 and 1962). The trout fisheries in the reservoirs are primarily composed of stocked rainbow trout and these rainbow trout typically survive 3 years post stocking. Thus, if the reservoir fishery is lost, it will require a minimum of 3 years for this trout fishery to recover to its typical state after the first year of stocking. Using Seminoe Reservoir and model year 1965, Seminoe Reservoir's trout fishery would be much less than its typical quality fishery for 1965, 1966, 1967 and 1968.

The walleye fishery will take far longer to re-establish. Nearly 5 years is required for a walleye to reach 15 inches. An additional one to two years is required for a forage base to establish to support walleye. Therefore, 7 years are required to provide a 15-inch walleye in Seminoe and Pathfinder reservoirs and 17 years for a trophy (>30 inches) walleye. Consequently, for 7 of the 48 years (i.e., 15 percent) during which time it is re-establishing, the fishery in Seminoe would be substantially impacted by the Program; similarly, for 11 of the 48 years (i.e., 23 percent) the fishery at Pathfinder would be substantially impacted. Episodic loss of a fishery is a catastrophic event that should be avoided to the maximum extent practicable, and mitigated if it occurs.

The NPRWUM model is designed to examine system-wide impacts to the Platte Basin, and it is difficult to predict the magnitude of localized impacts within short time periods. Between the unpredictable climatic conditions and current manner in which some North Platte Reservoirs are managed for energy production through hydropeaking of "active" pools (e.g., Alcova Reservoir), distinguishing cause-effect relationships between status and health of North Platte resources and the Program, precipitation, and current reservoir management, is difficult at best. For example, drought related low flows in the North Platte over the past five years have resulted in conditions that may result in substantial impacts to North Platte fisheries and waterfowl habitat use during 2005, prior to implementation of the Program.

Research and Monitoring

The NPRWUM model is useful for evaluating large scale, basinwide, impacts to the North Platte System due to the Program. Although less than ideal, to the Service's knowledge there is no better tool with which to address such impacts and provide recommendations and plans for mitigation. Importantly, while a clear picture of cause-effect relationship may never be possible concerning the Program, climate, and concomitant impacts to fish and wildlife resources, implementation of research and monitoring in the North Platte in conjunction with the Program will provide a better understanding of ways in which water may be managed for the maximum protection of these resources. Thus, because no modeling effort can adequately address all questions concerning impacts to fish and wildlife in the North Platte System, the Service strongly recommends that research and monitoring, and an adaptive management approach within the North Platte River, be taken with Program implementation.

The Service will work with WGFD to complete an outline of this research and monitoring plan by the end of 2006 in order to ensure implementation with the Program during the 2007 water year. As data collection and analysis of Program effects on aquatic resources continues during the 2007 water year, the Service will work with WGFD to complete this research and monitoring plan. As research and monitoring inform the Service and WGFD of how reservoir releases and North Platte flows may be managed to meet the needs of the reservoir and river fisheries at the same time as meeting the requirements of the Program, the Service and USBR will work with WGFD to meet the needs of the fisheries to the maximum extent feasible. Implementation of management based on such a research and monitoring effort would enable the Service and WGFD to address needs of North Platte fisheries on a localized basis not possible under current NPRWUM model constraints.

Research and monitoring efforts should be implemented based on reservoir levels and associated outflows. As reservoir levels and mainstem river flows approach the threshold levels WGFD has identified beyond which impacts to fisheries are likely to occur, monitoring should be implemented. Trout condition (Wr) and water temperature would be monitored in the river reaches. North Platte Basin water levels during early spring will be used to predict water levels for August of that year, since water levels during August are important determinants of reservoir fishery survival. If predictions for August indicate water levels approaching WGFD threshold levels for fishery impacts, intensive monitoring should be conducted monthly from May through October during that year. Reservoir biological characterization should be established at 10,000 af increments of storage. Variables to monitor would include temperature and dissolved oxygen profiles, biological oxygen demand, chlorophyll a, turbidity and dissolved organics.

Recommendations

To the maximum extent practicable, the Service recommends maintaining all reservoir pools within the North Platte above those flag levels recommended by WGFD to ensure the maintenance and survival of fisheries. *Goals* have been identified which are regarded as water levels below which impacts to fisheries begin to occur, and which must be maintained to the extent practicable; *minimum levels* are those identified as necessary to ensure survival of the fishery below which would result in complete loss of the fishery.

The goal for Seminoe and for Pathfinder would be a minimum maintenance pool of 200,000 af, with an absolute minimum to be determined by research and monitoring. The goal for Alcova Reservoir is maintenance of a pool of 150,000 af. The goal for Glendo Reservoir is minimum maintenance of a pool of 100,000 af with an absolute minimum pool of 63,400 af during extreme low water years. The goal for Guernsey Reservoir is 9,000 af.

In addition to reservoir levels, the Service recommends maintaining North Platte River mainstem flows at or above those levels recommended by WGFD to ensure maintenance and survival of fisheries. The goal for Kortes outflow is a minimum of 500 cfs; for Fremont Powerplant bypass (supporting the Cardwell fishery), the goal is 75 cfs, all water years; from Gray Reef to Glendo Reservoir the goal is minimum maintenance of 600 cfs, with an absolute minimum of 500 cfs; for Glendo outflow the goal is 200 cfs with a minimum of 25 cfs.

Mitigation

Three categories of mitigation measures are provided below to address impacts to the North Platte River fish and wildlife resources due to Program implementation. These categories provide mitigation measures that: (a) can be implemented relatively quickly and easily; (b) require further analysis and logistical consideration prior to implementation; and (c) are impractical or financially infeasible given current constraints, but that should be considered as future possibilities under different circumstances. A *Memorandum of Agreement For North Platte River and Mainstream Reservoirs, Platte River Recovery Implementation Program* between the Wyoming Water Development Office and Wyoming Game and Fish Department was finalized on December 12, 2005 in order to address funding needs for mitigation.

1) Expedite recovery of lost reservoir fishery

When loss of a reservoir fishery occurs, the Service recommends restocking the fishery and working closely with WGFD to ensure its long-term maintenance. Such a process may take several years depending on the species involved. For example, a trout fishery may take 4+ years to be fully restored, whereas walleye may take 5+ years.

Mitigation measures most feasible for which cost estimates can be developed and implemented without additional evaluation

• Measures should be taken to identify and address limitations within the WGFD hatchery system in order to enhance its ability to respond to reservoir fishery loss and improve its restocking capability. Wyoming Game and Fish Department annually stocks about 40,000 pounds of rainbow trout in Pathfinder Reservoir and slightly more in Seminoe Reservoir. A request for the fish is made 3 years in advance to allow for the planning and growth of these fish. If a reservoir fishery is lost and then refilled to a level to support a fishery, it is unlikely to expect to have 3 years to plan for the fish to restock for the recovery of the fishery. Limitations to the current restocking program range from brood stock capabilities, egg production, and space for rearing fish in hatcheries.

Mitigation measures for which additional work will be required to determine feasibility for implementation

• Manage the impacted reservoir to enhance the rehabilitation of the fishery through elimination of all fish species once water storage becomes critical and the ability to support game fish is lost. Once storage is at a critical level, the reservoir should be drained as quickly as possible to as low a level as possible.

• Populations of undesirable species could be reduced using: (a) a weir (possibly electric) as a barrier to discourage fish from migrating upstream as reservoir approaches critical levels; (b) a chemical barrier as reservoir reaches critically low level, such as potassium permanganate drip stations, to prevent migration upstream; and (c) Rotenone to chemically treat any isolated waters to control undesirable species.

2) Reservoir habitat enhancement

Mitigation measures for which additional work will be required to determine feasibility for implementation

• La Prele Reservoir- Obtain a maintenance pool and public access. This option is likely not feasible if water leasing from La Prele Reservoir is implemented as part of the Wyoming portion of the Program's Water Action Plan.

• Goldeneye Reservoir near Casper- (a) Obtain a water management agreement to improve the water quality to enhance the fishery value of the reservoir; (b) obtain a water right management agreement to outlet works to provide the capability to better management water levels; and (c) manage for walleye to mitigate the potential reduction in walleye opportunity in Pathfinder and Seminoe reservoirs

• East Allen Lake- Increase quantity of storage by (a) a temporary change of use of WGFD's irrigation water right on the Wick Unit to that of use for fish propagation, piping this water from the downstream end of Wick Unit to East Allen Lake at least once every five years, or as needed, to maintain East Allen Lake at ≥ 75% of capacity at all times; and (b) purchase a temporary change of use of irrigation water rights adjacent to East Allen Lake and fill the lake to ≥ 75% of its capacity at least once every five years in perpetuity

• Diamond Lake- Increase quantity of storage by (a) purchase a temporary change of use of irrigation water rights from Wheatland Irrigation District and fill the lake to ≥ 75% of its capacity at least once every five years in perpetuity; and (b) finance the conveyance of WGFD Carlson Creek irrigation water from Rock Creek to Diamond Lake

• Potential enhancements to the North Platte System- Reduce fish entrainment out of Glendo Reservoir by: (a) screening the outlet; and (b) water conservation

Mitigation measures viewed as impractical given current conditions, but which should be considered for future potential under different circumstances

• Maintenance of a minimum pool in Guernsey Reservoir of 20% of storage capacity, or 9,000 acre-feet

• Improved fishery and reservoir access to Kortes Reservoir

• Lining of irrigation canals to improve water transport efficiency and reduce water loss to seepage

3) Riverine habitat replacement and/or enhancement

Mitigation measures most feasible for which cost estimates can be developed and implemented without additional evaluation

• Identify potential riverine habitat enhancement opportunities

Mitigation measures for which additional work will be required to determine feasibility for implementation

• Reduce impacts to all aquatic habitats by improving the delivery system through water conservation activities, and enhance water yield through watershed treatments (e.g., mechanical or controlled burn) to restore aspen stands and the hydrologic function in the basin.

Mitigation measures viewed as too expensive or impractical given current conditions, but which should be considered for future potential under different circumstances

• Glendo Reservoir: Provide maintenance flow below reservoir. ≥ 25 cfs would improve winter habitat, with the significant benefits accruing at ≥ 200 cfs.

• Guernsey Reservoir: (a) Provide maintenance flow below reservoir; while there are no data available to quantify benefits from winter releases, any water released in the winter would be of some value; (b) line irrigation canals to improve water transport efficiency and discontinue silt run at Guernsey Reservoir

4) Recreation opportunity replacement and/or enhancement

Mitigation measures most feasible for which cost estimates can be developed and implemented without additional evaluation

• For reservoir recreation facilities, measures include: (a) boat ramp extension; (b) improvement of existing ramps; and (c) addition of new facilities

• For river recreation facilities, measures include: (a) addition of river access areas; and (b) development of new river access areas

COLORADO

The Tamarack projects will provide Colorado with a rare opportunity to supplement flows to the Platte River system. The timing and location of these supplemental flows can be varied through project operation so as to produce benefits for declining native species in Colorado as well as benefit the target species in Nebraska. The additional water will help to reduce the annual shortfall the Platte River experiences between April and September and potentially at other times of the year. The federally listed species that utilize the Platte River in Nebraska will benefit by reducing this shortfall.

The location of project features for Tamarack Project Phase II and Phase III have not been identified as of the date of this FWCA report. As more information regarding these features become available, additional coordination between the CDOW and the Service will be necessary. The CDOW and the Service will prepare a site-specific FWCA report or supplement this programmatic report.

Enhancing and/or maintaining habitat for native Colorado fish species during the annual April-September shortfall in the South Platte is presumed at this point and should be a priority in the evaluation of the project during the Program's first increment. The impact of a reach or landscape application of pumped-pond recharge systems on main-channel and tributary habitats and fish populations are the primary conservation concern, and should be evaluated on the reach-wide or larger scale. Currently, plains minnow and suckermouth minnow are presumed to be largely main channel inhabitants that exploit tributary confluences. Suckermouth minnow appear to be attracted to gravel substrates created at tributary inflows as well as irrigation returns. This may be for spawning purposes. The eggs of plains and suckermouth minnow are neutrally buoyant and disperse downstream while incubating. What habitat these larval fish use upon hatching is not presently known. It would be deleterious for these eggs or larvae to be pumped into recharge ponds. Timing of species reproduction to flow patterns remains to be discovered, but would yield guidance on pumping scenarios required to minimize mortality. Brassy minnow, in contrast, appears to be a tributary species whose populations rely on the main-channel for linkage among populations for gene flow and recolonization. Return flow from recharge ponds may maintain or enhance flow in tributary streams unless the pumps were located in a manner that create a cone of depression that reduces stream flow relying on groundwater sources. It is likely that instream barriers also inhibit the dispersal of young fish back upstream to recruit into adult populations and tributary habitats, or recolonize upstream populations and habitats that are periodically decimated by drought conditions, or intensive diversion for human uses.

In a Tamarack pilot study to create an artificial living stream, the CDOW (Tom Nesler, personal communication) did not find any evidence of useful habitat created that could sustain any of the special status species mentioned above. The Tamarack stream, recreated in an old irrigation canal, was small and prone to abundant algal mat growth, which may have affected diel O_2 fluctuation to low levels; and, fish populations were vulnerable to predation from lack of cover via water depth. No survivors of any fish species transplanted to the stream were recovered at the cessation of pumping at the project site. Preliminary conclusions suggested it would be more useful to improve tributary and main channel habitats with reliable stream flow.

Recharge ponds in general do not appear particularly well suited to supporting minnow populations due to their high, flow-through turnover, which promoted high water clarity and visibility of the fish to avian predators. It is uncertain how productive these ponds are in promoting fish survival, growth and reproduction under the high turnover regime. However, recharge ponds may have a role in recovery of a species such as the brassy minnow, especially if connected to natural streams; a stable population of this species was discovered in a pond nearby to the Tamarack project area.

The projects also allow for the creation of new wetlands in northeast Colorado. These new wetlands would be utilized by waterfowl and shore birds and would be another source of water that would be used by upland species in the area. However, the evaporative losses of the new ponds would have to be examined and possible adjustments to the return rates and amounts may have to be made as a result. Also, it is expected that there will be an increase in the opportunity for consumptive and non-consumptive wildlife use in the area. Any significant increase in the public use of the State Wildlife Areas would result in the need for more regulation of the areas and enforcement of the rules. This would necessitate more manpower, time, and expense to the state.

Recommendations

- Complete and implement the projects to the fullest extent possible as the benefits to wildlife and their habitat would seem to outweigh any foreseeable negative impacts that may occur.
- Project implementation should allow for/include an adequate development of baseline data in the lower South Platte and main tributaries; from this, comparisons of distribution and abundance of special status species may be accomplished with some rigor at each developmental stage of recharge pond construction.
- Develop hydrologic modeling that would provide a means of determining how stream flows will respond to broad-scale recharge pond operations.
- Use tracking and accounting methods to verify stream flow improvements
- Develop a partnership to address fish and wildlife issues in the South Platte River basin. This partnership might include representatives from the CDOW, the Colorado Department of Natural Resources, other Colorado State agencies, wildlife agencies from other affected states, the Service, U.S. Forest Service, other Federal agencies, private land owners and other users of South Platte River water.
- Develop operational agreements with owners/operators of future Tamarack project components that will allow for modification of component operations as necessary to protect and/or improve habitat conditions for special status species in Colorado.

<u>Other Activities</u>

Currently, the State is negotiating a Memorandum of Understanding with a newly formed non-profit corporation known as the South Platte Water Related Activities Program, Inc. (SPWRAP). The Corporation is organized and will be operated exclusively for charitable, scientific, and educational purpose. SPWRAP was incorporated for the general purposes of:

- Assisting in the recovery of species listed as threatened or endangered under the Endangered Species Act (ESA) through the development and operation of the Colorado Program component of the Platte River Recovery Implementation Program (PRRIP) in a manner that ensures the State of Colorado's compliance with PRRIP;
- Negotiating with federal resource agencies, other states, and other stakeholders on behalf of or in coordination with the State of Colorado in connection with the implementation of the first increment of PRRIP and the formulation and implementation of future increments thereof;
- In the event the efforts to create the PRRIP are not successful, to assist in development and operation of a Colorado-Only Program or other programmatic ESA compliance approach in Colorado, approved by the appropriate federal agencies, that assists in the recovery of designated Platte River species; and
- To conduct such other business as is reasonably necessary to accomplish the above purposes.

Literature Cited

Baxter, G. T., and M. D. Stone. 1995. Fishes of Wyoming. Wyoming Game and Fish Department.

Baxter, G. T., and M. D. Stone. 1980. Amphibians and Reptiles of Wyoming. Wyoming Game and Fish Department.

Becker, G. C.1983. Fishes of Wisconsin. Univ. of Wisconsin Press, Madison.

Berry, J. W. 1959. Climates of States - Colorado. In, *Climatography of the United States:60-65.* U.S. Department of Commerce, Environmental Data Service, Washington D.C.

Bowman, D.B. 1994. Instream flow recommendation for the central Platte River, Nebraska. U.S. Fish and Wildlife Service, Grand Island, NE. May 23, 1994.

Brooking, T. E., L. G. Rudstam, M. H. Olson, and A. J. VanDeValk. 1998. Size-dependent alewife predation on larval walleyes in laboratory experiments. North Am. J. Fisheries Manage. 18:960-965.

Cerovski, A. 2000. Nongame Bird Biologist, Wyoming Game and Fish Department, Lander. Pers. Comm., Sept. 30, 2000.

Cerovski, A., M. Gorges, T. Byer, K. Duffy, and D. Felley. 2000. Wyoming Bird Conservation Plan, Version 1.0. Wyoming Partners In Flight, Lander, WY.

Colorado Division of Wildlife. 1998. Environmental Assessment for the Tamarack Managed Groundwater Recharge Project at Tamarack Ranch State Wildlife Area and Pony Express State Wildlife Area.

Colt, C. J. 1997. Breeding bird use of riparian forests along the central Platte River; a spatial analysis. Masters Thesis. University of Nebraska, Lincoln. 104 pp.

Conder, A. 2000. Regional Fish Supervisor, Wyoming Game and Fish Department, Casper. Pers. Comm.

Conder, A. 2001 Regional Fish Supervisor, Wyoming Game and Fish Department, Casper. Pers. Comm.

Conder, A. 2002 Regional Fish Supervisor, Wyoming Game and Fish Department, Casper. Pers. Comm.

Conder, A. and J. Deromedi. 1998. Level 1 analysis of fishery impacts from the proposed Pathfinder modification. Wyoming Game and Fish Department, Casper Regional Office, Casper, Wyoming.

Cooperative Agreement. 1997. Cooperative agreement for Platte River Research and other efforts relating to endangered species habitats along the central Platte River, Nebraska, July 1997. Including attachments.

Coppedge, B. R., D. M. Engle, R. E. Masters, and M. S. Gregory. 2001. Avian response to landscape change in fragmented southern Great Plains grasslands. Ecological Applications. 11(1): 47-59.

Currier, P. J., G. R. Lingle, and J. G. VanDerwalker. 1985. Migratory bird habitat of the Platte and North Platte Rivers in Nebraska. The Platte River Whooping Crane Critical Habitat Maintenance Trust, Grand Island, NE. 177 pp.

Czaplewski, N.J., J.P. Farney, J.K. Jones, Jr., and J.D. Druecker. 1979. Synopsis if bats of Nebraska. Occasional Papers: The Museum, Texas Tech University. No. 61, November 1979. 24 pp.

Davis, C. A. 1991. The ecology of macroinvertebrates inhabiting native grasslands and their role in the feeding ecology of sandhill cranes. Masters Thesis. Iowa State University, Ames. 88pp.

Davis, C. A. and P. A. Vohs. 1993. Role of macroinvertebrates in spring diet and habitat use of sandhill cranes. Transactions of the Nebraska Academy of Sciences XX:81-86.

Davis, C. A. and J. Austin. 2000. Ongoing cooperative wet meadow invertebrate study by the USGS and Platte River Whooping Crane Trust. Unpublished data.

Davis, C. A. 2001. Nocturnal roost site selection and diurnal habitat use by sandhill cranes during spring in central Nebraska. Proceedings North American Crane Workshop 8: 48-56.

Davis, C. A. 2005. Breeding bird communities in riparian forests along the central Platte River, Nebraska. Great Plains Research: 15: 199-211.

Davis, C. A. In Review. Breeding and migratory bird use of a riparian woodland along the Platte River in South-central, Nebraska. North American Bird Bander. 16 pages.

Derby, C.E. 1995. Food habits and estimation of fish consumed by cormorants and pelicans in a coldwater river. M.S., Department of Zoology and Physiology, University of Wyoming, Laramie. 66 pp.

Derby, C.E. and J.R. Lovvorn. 1997. Predation on fish by cormorants and pelicans in a cold-water river: a field and modeling study. Can. J. Fish . Aquat. Sci. 54:1480-1493.

Dey, P.D. and T.C. Annear. 1993. North Platte River below Gray Reef Reservoir: instream flow assessment for spawning rainbow trout. Administrative Report on Project #IF-5593-07-9001. Wyoming Game and Fish Department Cheyenne, Wyoming.

Erlich, P.R., D.S. Dobkin, and D. Wheye. 1988. The Birder's Handbook. Simon and Schuster, Inc. New York. 785 pp.

Fitzgerald, William, Area Biologist. Memorandum of August 24, 1999. Casper Area Office, Bureau of Land Management. Mills, Wyoming.

Freeman, P. A. and R. A. Benedict. 1993. Mammals of the Platte River valley. Final Report to the U.S. Fish and Wildlife Service. 6 pp.

Freeman, P. W., and K. Perkins. 1994. Survey of mollusks of the Platte River. Unpublished report to the U.S. Fish and Wildlife Service. 15 pages with enclosures.

Friedman, J.M., W.R. Osterkamp, M.L. Scott, G.T. Auble. 1998. Downstream effects of dams on channel geometry and bottomland vegetation: regional patterns in the Great Plains. Wetlands 18: 619-633.

Goldowitz, B. S. and M. T. Whiles. 1999. Investigations of fish, amphibians and aquatic invertebrate species with the middle Platte River system. Final Report. University of Nebraska, Lincoln, subcontract agreement LWF 63-121-11007. 32 pp.

Helzer, C. J. 1996. The effects of wet meadow fragmentation on grassland birds. Masters Thesis. University of Nebraska, Lincoln. 65 pp.

Herkert, J.R., D.W. Sample, and R.E. Warner. 1995. Management of midwestern grassland landscapes for the conservation of migratopry birds. In: F.R. Thompson, editor. Management of Midwestern Landscapes for the Conservation of Neotorpical Migratory Birds. U.S. Department of Agriculture, Forest Service. General Technical Report NC-187.

Hesse, L.W. 1994. Status of Nebraska fishes in the Missouri River. Transactions of the Nebraska Academy of Sciences. Vol.21:99-108.

Hoffmann, R. 2000. High bank trout. Nebraskaland May:18-23.

Hulsman, K. 1981. Width of gape as a determinant of size of prey eaten by terns. Emu 81:29-32.

Hurr, T. R. 1983. Ground-water hydrology of the Morman Island Crane Meadows wildlife area near Grand Island, Hall County, Nebraska. Pages H1-H12, in Hydrologic and Geomorphical studues of the Platte River Basin, U.S. Geological Survey Professional Paper 1277, Washington, D.C.

Johnson, D.H. 1995. Management of northern prairies and wetlands for the conservation of neotopical migratory birds. Pages 53-67. In: F.R. Thompson, editor. Management of Midwestern Landscapes for the Conservation of Neotorpical Migratory Birds. U.S. Department of Agriculture, Forest Service. General Technical Report NC-187.

Johnson, T. R. 1992. The amphibians and reptiles of Missouri. Missouri Department of Conservation, Jefferson City, MO. 369 pp.

Jones, J. Knox, Jr., D.M. Armstrong, R.S. Hoffmann, and C. Jones. 1983. Mammals of the northern great plains. University of Nebraska Press, Lincoln. 375 pp.

Knopf, F.L. 1994. Avian assemblages on altered grasslands. Studies in Avian Biology 15:247-257.

Knopf, F.L., R.R. Johnson, T. Rich, F.B. Samsom, and R.C. Szaro. 1988. Conservation of riparian ecosystems in the Unites States. Wilson Bulletin 100:272-284.

Lingle, G.R. 1995. Birding crane river: Nebraska's Platte. Harrier Publishing, Grand Island, NE. 121 pp.

Madole, R. F. 1995. Spatial and Temporal Patterns of Late Quaternary Eolian Deposition, Eastern Colorado, U.S.A. *Quaternary Science Reviews* 14:155-177.

Madsen, T. I. 1985. The status and distribution of the uncommon fishes of Nebraska. Masters Thesis. University of Nebraska, Omaha. 97 pp.

Mavrakis, P.H. and D.L. Yule. 1998. North Platte comprehensive fisheries study: creel survey and stocking evaluation, 1995-1996. Wyoming game and Fish Department, Fish Division. Cheyenne, Wyoming. 180 pp.

McDonald, L.R. and R.C. McKnight. 1977. Effects of silt releases from Guernsey Reservoir on the North Platte River. Wyoming Game and Fish Department, Cheyenne, Wyoming.

McKnight, R.C. 1977. North Platte River use investigations - Miracle Mile, 1976. Administrative Report for Project 5576-00-015-14, Wyoming Game and Fish Department, Fish Division. Cheyenne, Wyoming.

McGregor, R. L., T. M. Barkley, R. E. Brooks, and E. K. Schofield. 1986. Flora of the Great Plains. University Press of Kansas, Lawrence, KS. 1392 pp.

McMillan, J. October 1984. Evaluation and enhancement of the trout and walleye fisheries in the North Platte River system of Wyoming with emphasis on Seminoe Reservoir. Completion Report, Wyoming Game and Fish Department - Fish Division, Cheyenne, Wyoming.

Murphy, M.L. and K.V. Koski. 1989. Input and depletion of woody debris in Alaska streams and implications for streamside management. North American Journal of Fisheries Management 9: 427-436.

National Research Council. 2004. Endangered and Threatened Species of the Platte River Interim
Report. Washington, DC: National Academy Press.

Nebraska Game and Parks NGPC. 2005. Big game hunting gtuide and applications. Public information brochure. 39 pages.

Oakleaf, B., A. O. Cerovski, and B. Luce. 1996. Nongame Bird and Mammal Plan: A Plan for Inventories and Management of Nongame Birds and Mammals in Wyoming. Wyoming Game and Fish Department. Nongame Program, Biological Services Section, Lander. 167pp.

Opler, P.A., H. Pavulaan, and R.E. Stanford (Coordinators). 1995. Butterflies of North America. Jamestown, ND: Northern Prairie Wildlife Research Center Home Page. http://www.npwrc.usgs.gov/resource/distr/bflyusa/bflyusa.htm (version 23 Feb. 2001)

Palmer, R. S. 1962. Handbook of North American Birds. Volume I. Loons Through Flamingos. Yale University Press, New Haven, Connecticut.

Patton, T. M. and W. A. Hubert. 1993. Reservoirs on a Great Plains stream affect downstream habitat and fish assemblages. J. Freshwater Ecology 8 (4):279-286.

Peterson, L. and J. McMillan. 1976. Fisherman use survey - Dave Johnston Power Plant near Glenrock to Douglas area - North Platte River, Wyoming. Completion Report, Project: 0000020001. Wyoming Game and Fish Department, Cheyenne, Wyoming.

Peyton, M. M., and J. L.Maher. 1992. Bivalves in central Nebraska irrigation systems and associated reaches of the Platte River. Unpublished Report. 9 pages.

Reinecke, K. J. and G. L. Krapu. 1986. Feeding ecology of sandhill cranes during spring migration in Nebraska. J. Wildl. Manage. 50(1):71-79.

Roberts, L. 2003. Waterfowl Biologist, Wyoming Game and Fish Department. Personal Communication.

Saul, D., 1988. Waterfowl Biologist, Wyoming Game and Fish Department, Personal Communication.

Scott, M.I., J.M. Friedman, and G.T. Auble. 1996. Fluvial process and the establishment of bottomland trees. Geomorphology 14: 327-339.

Stebbins, R. C. 1985. A field guide to western reptiles and amphibians. Peterson Field Guide Series. Houghton Mifflin Company, Boston. 336 pp.

Stewart, D. D. 1981. The biology of the sturgeon chub *Hybopsis gelida* in Wyoming. Masters Thesis. University of Wyoming, Laramie. 54 pp.

Summers, B. 1996. Missouri orchids. Missouri Department of Conservation Natural History Series, No. 1. 112 pp.

Tacha, T. C., P. A. Vohs, and G. C. Iverson. 1984. Migration routes of sandhill cranes from mid-continental North American. J. Wildl. Manage. 48 (3):1028-1033.

U.S. Bureau of Reclamation. 1981a. Limnology of the upper North Platte reservoir system, Wyoming. Technical Report # REC-ERC-81-10, July 1981. Engineering and Research Center, Denver, Colorado.129 pp.

U.S. Bureau of Reclamation. 1981b. A survey of wintering bald eagles and their habitat in the Lower Missouri Region. U.S. Department of the Interior, Bureau of Reclamation, Denver Federal Center. Denver, Colorado. 96 pp. and appendices.

U.S. Bureau of Reclamation. 1983. Special Report on the North Platte Project: Rehabilitation and Betterment Program Investigations. U.S. Department of the Interior, Bureau of Reclamation. Wyoming-Nebraska. Mills, Wyoming. 85 pp.

U.S. Bureau of Reclamation. 1994. Environmental assessment for the North Platte River Safety of Dams Corrective Action Study. North Platte River Projects Office, Mills, Wyoming.

U.S. Bureau of Reclamation. 1995. North Platte River Water Utilization Model: draft documentation. Wyoming Area Office, Mills, Wyoming.

U.S. Department of Interior, Water and Power Resources Service. 1981. Project Data. USDOI, Water Resources Technical Bulletin, Engineering and Research Center, Denver Federal Center, P.O. Box 25007, Denver, Colorado 80225.

U.S. Fish and Wildlife Service 1964. Western Division, MRBP, Wyoming - fishery study of experimental flows in ten miles of the North Platte River between Kortes Dam and Pathfinder Reservoir, 1963. Memorandum of March 16, to the Regional Director, Bureau of Reclamation, Region 7, Denver, Colorado.

U.S. Fish and Wildlife Service Mitigation Policy, Federal Register, Volume 46, No. 15, January 23, 1981 (as corrected in Federal Register, February 4, 1981).

U.S. Fish and Wildlife Service. 1987. Fish and Wildlife Coordination Act Report, Two Forks Reservoir and William's Fork Gravity Collection System Projects, Colorado.

U. S. Fish and Wildlife Service. 1988. Transmittal of North Platte River Summary of Fish and Wildlife Values by River Segment. Cheyenne, WY.

U.S. Fish and Wildlife Service. 1993. Pallid sturgeon recovery plan. U.S. Fish and Wildlife Service, Bismarck, ND. 55 pp.

U.S. Fish and Wildlife Service. 1995. Migratory nongame birds of management concern in the United States: the 1995 list. Office of Migratory Bird Management, U.S. Fish and Wildlife Service, Washington, D.C. 15 pp.

U.S. Fish and Wildlife Service. 1997. Biological Opinion on the Federal Energy Regulatory NGPC's Preferred alternative for the Kingsley Dam Project (Project No. 1417) and North Platte/Keystone Diversion Dam Project (Project No. 1835). U.S. Fish and Wildlife Service, Grand Island, NE. 165 pp + Appendices

U.S. Geological Survey. 2000. Water Resources Data for Wyoming, Water Year 1999, Vol. 1, Surface-water data. USGS-WDR-WY-99-1, National Technical Information Service, Springfield, Virginia.

Vogt, G.F., Jr. 1991. North Platte River systems operation study, Gray Reef instream flow report. Project Number IF-5590-09-8801. Wyoming Game and Fish Department, Fish Division Administrative Report. Cheyenne, Wyoming. 8 pp.

Wenzel, C. 1993. Flushing flow requirements of a large regulated Wyoming River to maintain trout spawning habitat quality. M.S., University of Wyoming, Laramie.

Werdon, S. J. 1992. Population status and characteristics of *Macrhybopsis gelida, platygobio gracilis,* and *Rhinichthys cataractae.* Materters Thesis. South Dakota State University, Brookings.

Whiles, M. R., B. S. Goldowitz, and R. E. Charlton. 2000. Life history and production of a semi-terresrtial limnephilid caddisfly in an intermittent Platt River wetland. J. North Am. Benthological Society 18 (4):533-544.

Whitham, T.G., G.D. Martinsen, and K.D. Floate. 1999. Plant hybrid zones affect biodiversity: tools for a genetic-based understanding of community structure. Ecology 80: 416-428.

Williams, G.P. 1978. The case of the shrinking channels - the North Platte and Platte rivers in Nebraska. U.S. Geological Survey Circular 781.

Williams, G.P. and M.G. Wolman. 1984. Downstream effects of dams on alluvial rivers. U.S. Geological Survey Professional Paper 1286.

Wolff, S. W. 1992. North Platte River Below Glendo Reservoir Instream Flow Report. Project IJ-5591-07-9101. Fish Division—Adminsistrative Report. Wyoming Game and Fish Department. Cheyenne, WY. 46pp.

Wyoming Game and Fish Department. 1987. Wyoming Trout Stream Classification Map. Fish Division, Cheyenne, Wyoming.

Wyoming Rare Plant Technical Committee. 1994. Wyoming rare plant field guide. Bureau of Land Management, Wyoming State Office. Cheyenne, Wyoming.

Zafft, D.J. and G.F. Vogt, Jr.. 1992. Evaluation of the effects of rapid flow fluctuations on potential trout production in the Miracle Mile. Wyoming Game and Fish Department, Project IF-5591-07-9101. Cheyenne, Wyoming. 14 pp.

Appendix A

Nebraska Species Lists

Table 1. Mammals documented or possible within the floodplains of the North Platte, South Platte, or Platte rivers in Nebraska. (NGPC Heritage Program, Lingle 1995, Jones et al. 1983, Czaplewski et al. 1979)

Species	Scientific name	Habitat
Virginia Opossum	*Didelphis virginiana*	woodlands along streams and rivers
Masked Shrew	*Sorex cinereus*	moist forests, riparian areas
Northern Short-tailed Shrew	*Blarina brevicauda*	riparian communities
Least Shrew	*Cryptotis parva*	upland prairie, meadows
Eastern Mole	*Scalopus aquaticus*	along rivers, streams, ponds
Big Brown Bat	*Eptesicus fuscus*	forage over water, riparian edge
Red Bat	*Lasiurus borealis*	wooded riparian communities
Hoary Bat	*Lasiurus cinereus*	forage over water
Silver-haired Bat	*Lasionycteris noctivagans*	forage over grassy areas with water
Evening Bat	*Nycticeius humeralis*	wooded riparian communities
Brazilian Free-tailed Bat	*Tadarida brasiliensis*	
Eastern Pipistrelle	*Pipistrellus subflavus*	limestone quarries adj. to Platte
Little Brown Myotis	*Myotis lucifugus*	urban, rural, natural, all near water
Northern Myotis	*Myotis septentrionalis*	wooded riparian areas, quarries
Eastern cottontail	*Sylvilagus floridanus*	mesic riparian areas, dense veg
Black-tailed Jackrabbit	*Lepus calaifornicus*	open short grass, scattered shrubs
White-tailed Jackrabbit	*Lepus townsendii*	prairies, open areas
Woodchuck	*Marmota monax*	
Franklin's Ground Squirrel	*Spermophilus franklinii*	tall and mid-grass prairies
Thirteen-lined Ground Squirrel	*Spermophilus tridecemlineatus*	areas with well drained soils
Black-tailed Prairie Dog	*Cynomys ludovicianus*	short-grass prairie
Fox Squirrel	*Sciurus niger*	broad-leafed deciduous for., riparian
Plains Pocket Gopher	*Geomys bursarius*	prefers moist deep sandy soils
Olive-backed Pocet Mouse	*Perognathus fasciatus*	open country, sandy soils,
Plains Pocket Mouse	*Perognathus flavescens*	grasslands with sandy soils
Silky Pocket Mouse	*Perognathus flavus*	grasslands, loamy soils,
Hispid Pocket Mouse	*Perognathus hispidus*	uplands, loamy soils w\bare ground
Ord's Kangaroo Rat	*Dipodomys ordii*	uplands, sandy soils, w\ bare ground
Beaver	*Castor canadensis*	permanent water with woody veg.
Western Harvest Mouse	*Reithrodontomys megalotis*	wide variety of habitats
Plains Harvest Mouse	*Reithrodontomys montanus*	well developed upland grasslands
White-footed Mouse	*Peromysucs leucopus*	woodlands and brushy areas
Deer Mouse	*Peromyscus maniculatus*	wide variety of habitats
Northern Grasshopper Mouse	*Onychomys lewcogaster*	semiarid grasslands and shrublands
Eastern Woodrat	*Neotoma floridana*	primarily riparian woodlands
Prairie Vole	*Microtus ochrogaster*	upland prairie, dry swales/ riparian

Table 1. Continued.

Meadow Vole	*Microtus pennsylvanicus*	moist, wet meadows with lush veg.
Muskrat	*Ondatra ziebethicus*	shallow water with emergent veg.
Southern Bog Lemming	*Synaptomys cooperi*	wet grasslands with sedges, marshes
Meadow Jumping Mouse	*Zapus hudsonius*	moist areas with dense vegetation
House Mouse	*Mus musculus*	urban and rural / human habitations
Norway Rat	*Rattus norvegicus*	urban / human habitations
Porcupine	*Erethizon dorsatum*	forests and woodlands
Coyote	*Canis latrans*	wide variety of habitats
Red Fox	*Vulpes vulpes*	wide variety, meadows, forest edge
Racoon	*Procyon lotor*	forests / grasslands along
watercourses Long-tailed weasel	*Mustela frenata*	grasslands and forest, often near
water Least weasel	*Mustela nivalis*	meadows, mashy areas, grasslands
Mink	*Mustela vison*	river banks, marshes
Badger	*Taxidea taxus*	grassland, forest edge
Striped skunk	*Mephitis mephitis*	woodland edge, wide variety of areas
Eastern spotted skunk	*Spilogale putorius*	rip. woodland, thicket, fence rows
River Otter	*Lutra canadensis*	permanent water
Bobcat	*Felix rufus*	wide variety of habitats
Mule Deer	*Odocoileus hemionus*	wide variety of habitats
White-tailed Deer	*Odocoileus virginianus*	woodland, forest edge, riparian areas

Table 2. Water bird species which utilize the Platte River and/or Lake McConaughy. A=Abundant, C=Common, U=Uncommon, O=Occasional, R=Rare, Acc=Accidental, Sp/Fall=Spring and Fall Migrant through area, B=Breeds in area, NB=Non-Breeders, Res.= Residents of area. Lake McConaughy is abbreviated as Lk. M.C.

Common Name	Scientific Name	Coded Habitat Use
Clark's Grebe	*Aechmophorus clarkii*	Acc. / B on Lk. M.C.
Western Grebe	*A. occidentalis*	C- Sp/Fall - NB on Lk. M.C.
Horned Grebe	*Podiceps auritus*	U- Sp/Fall
Eared Grebe	*P. nigricollis*	U- Sp/Fall - Res. and B
Pied-billed Grebe	*Podilymbus podiceps*	C- Sp/Fall - Res. and B
American White Pelican	*Pelecanus erythrorhynchos*	C- Sp/Fall - NB on Lk. M.C.
Double-crested Cormorant	*Phalacrocorax auritus*	C- Sp/Fall - Res. Near North Platte
Least Bittern	*Ixobrychus exilis*	U- Sp/Fall
American Bittern	*Botaurus lentiginosus*	C- Sp/Fall - B
Black-crowned Night Heron	*Nycticorax nycticorax*	C- Sp/Fall - B
Yellow-Crowned Night H.	*N. violaceus*	U- Sp/Fall
Green Heron	*Butorides striatus*	C- Sp/Fall - B
Great Egret	*Ardea alba*	O- Sp/Fall
Great Blue Heron	*A. herodias*	C- Sp/Fall - B
Sandhill Crane	*Grus canadensis*	A- Sp/Fall, primarily in Spring
Common Crane	*G. grus*	Acc.
Whooping Crane	*G. americana*	U- Sp/Fall
Tundra Swan	*Cygnus columbianus*	U- Sp/Fall
Greater White-fronted Goose	*Anser albifrons*	C- Sp/Fall
Snow Goose	*Chen caerulescens*	A- Sp/Fall
Ross' Goose	*C. rossii*	C- Sp/Fall
Canada Goose	*Branta canadensis*	C- Sp/Fall - B and C Winter Res.
Mallard	*Anas platyrhynchos*	A- Sp/Fall - B and C Winter Res.
Gadwall	*A. strepera*	A- Sp/Fall - B and U Winter Res.
Green-winged Teal	*A. crecca*	A- Sp/Fall - B and Winter Res.
American Wigeon	*A. americana*	C- Sp/Fall - U Winter Res.
Northern Pintail	*A. acuta*	A- Sp/Fall - B and Winter Res.
Northern Shoveler	*A. cylpeata*	A- Sp/Fall - U Winter Res.
Blue-winged Teal	*A. discors*	A- Sp/Fall - B
Cinnamon Teal	*A. cyanoptera*	U- Sp/Fall
Ruddy Duck	*Oxyura jamaicensis*	C- Sp/Fall
Wood Duck	*Aix sponsa*	U- Sp/Fall - B
Canvasback	*Aythya valisineria*	U- Sp/Fall
Redhead	*A. americana*	C- Sp/Fall
Ring-necked Duck	*A. collaris*	U- Sp/Fall - O Winter Res.
Greater Scaup	*A. marila*	R- Winter
Lesser Scaup	*A. affinis*	U- Sp/Fall - U Winter & Sum. Res.

Table 2. Continued. Water bird species which utilize the Platte River and/or Lake McConaughy.

Common Name	Scientific Name	Coded Habitat Use
White-winged Scoter	*Melanitta fusca*	R- Sp/Fall, primarily in Fall
Oldsquaw	*Clangula hyemalis*	R- Sp/Fall
Common Goldeneye	*Bucephala clangula*	C- Sp/Fall - U Winter Res.
Bufflehead	*B. albeola*	C- Sp/Fall - O Winter & Sum. Res.
Common Merganser	*Mergus merganser*	C- Sp/Fall - C Winter Res.
Red-breasted Merganser	*M. serrator*	O- Sp/Fall
Hooded Merganser	*Lophodytes cucullatus*	U- Sp/Fall
American Coot	*Fulica americana*	C- Sp/Fall - B, and O Winter Res.
Osprey	*Pandion haliaetus*	U- Sp/Fall - B

Data were taken from Currier 1985 and Winter Waterfowl Survey data sheets completed by the NGPC.

Table 3. Shorebirds, gulls, and terns documented in the Platte River Valley, Nebraska. Bold font represents documented nesters, and species in regular font are transient whose migration routes intersect the Platte River valley and are known to stopover in this region. Species on the Service's "Migratory Nongame Birds of Management Concern in the United States: the 1995 List" are identified.

Common Name	Scientific Name	Species of Mng. Concern? Why?
Piping plover	*Charadrius melodus*	threatened species
Killdeer	*Charadrius vociferus*	
Black-bellied plover	*Pluvialis squaterola*	
Lesser golden plover	*P. dominica*	
Snowy plover	*Charadrius alexandrinus*	vulnerable habitat
Semipalmated plover	*C. semipalmatus*	
Spotted sandpiper	*Actitus macularia*	
Upland sandpiper	*Bartramia longicauda*	vulnerable habitat
Greater yellowlegs	*Tringa melanoleuca*	
Lesser yellowlegs	*T. flavipes*	
Solitary sandpiper	*T. solitaria*	
Willet	*Catoptrophorus semipalmatus*	
Whimbrel	*Numenius phaeopus*	
Hudsonian godwit	*Limosa haemastica*	
Marbled godwit	*L. fedoa*	
Ruddy turnstone	*Arenaria interpres*	
Semipalmated sandpiper	*Calidris pusilla*	
Western sandpiper	*C. mauri*	
Least sandpiper	*C. Minutilla*	
White-rumped sandpiper	*C. Fuscicollis*	
Baird's sandpiper	*C. Bairdii*	
Pectoral sandpiper	*C. Melanotos*	
Dunlin	*C. Alpina*	
Stilt sandpiper	*C. Himantopus*	
Buff-breasted sandpiper	*Tryngites subruficollis*	
Short-billed dowitcher	*Limnodramus griseus*	
Long-billed dowitcher	*L. Scolopaceus*	
Long-billed curlew	*Numenius americanus*	small/restricted population
Common snipe	*Gallinago gallinago*	
American woodcock	*Scolopax minor*	
Wilson's Phalarope	*Phalaropus tricolor*	
American avocet	*Recurvirostra americana*	
Least tern	*Sterna antillarum*	endangered species
Black tern	*Chlidonias niger*	declining population
Caspian tern	*Sterna caspia*	
Forester's tern	*Sterna forsteri*	
Franklin's gull	*Larus pipixcan*	

Table 3. Continued. Shorebirds, gulls, and terns documented in the Platte River Valley, Nebraska.

Common Name	Scientific Name	Species of Mng. Concern? Why?
Ring-billed gull	*Larus delawarensis*	
Herring gull	*Larus argentatus*	

Table 4. Bird species which utilize forested riparian habitat along the Platte River, Nebraska. Species known to nest in this habitat are denoted by a bold font, winter residents and non-migratory species are identified with an *, and those in regular font are trainsient migratory species.

Common Name	Scientific Name	Species of Mng. Conern/Why?
Great Blue Heron	*Ardea herodias*	
Black-crowned Night Heron	*A. nycticorax*	
Green Heron	*Butorides striatus*	
Wood Duck	*Aix sponsa*	
Red-tailed Hawk	*Buteo jamaicensis*	
Bald Eagle	*Haliaeetus leucocephalus*	
Wild Turkey *	*Meleagris gallopavo*	
Yellow-billed Cuckoo	*Coccyzus americanus*	population decline
Black-billed Cuckoo	*C. erythropthalmus*	
Great Horned Owl *	*Bubo virginianus*	
Barred Owl *	*Strix varia*	
Eastern Screech Owl *	*Otus asio*	
Belted Kingfisher	*Ceryle alcyon*	
Red-bellied Woodpecker	*Melanerpes carolinus*	
Red-headed Woodpecker	*Melanerpes erythrocephalus*	population decline
Downy Woodpecker *	*Picoides pubescens*	
Hairy Woodpecker *	*P. villosus*	
Northern Flicker *	*Colaptes auratus*	population decline
Western Wood-pewee	*Contopus sordidulus*	
Eastern Wood-pewee	*C. virens*	
Western Kingbird	*Tyrannus verticalis*	
Willow Flycatcher	*Empidonax traillii*	
Least Flycatcher	*E. minimus*	
Great Crested Flycatcher	*Myiarchus crinitus*	
Tree Swallow	*Tachycineta bicolor*	
Black-capped Chickadee *	*Parus atricapillus*	
White-breasted Nuthatch *	*Sitta carolinensis*	
Red-breasted Nuthatch	*S. canadensis*	
Brown Creeper *	*Certhia americana*	
Bewick’s Wren	*Thryomanes bewickii*	
American Robin	*Turdus migratorius*	
Wood Thrush	*Hylocichla mustelina*	population decline
Gray Catbird	*Dumetella carolinensis*	
Brown Thrasher	*Toxostoma rufum*	
Bell’s Vireo	*Vireo bellii*	population decline
Red-eyed Vireo	*V. olivaceus*	
Warbling Vireo	*V. gilvus*	

Table 4. Continued. Bird species which utilize forested riparian habitat along the Platte River, Nebraska.

Common Name	Scientific Name	Species of Mng. Concern/Why?
Black-and-White Warbler	*Mniotilta varia*	
Yellow Warbler	*Dendroica petechia*	
Chestnut-sided Warbler	*D. pennsylvanica*	
Magnolia Warbler	*D. magnolia*	
Yellow-rumped Warbler	*D. coronata*	
Blackpoll Warbler	*D. striata*	
Mourning Warbler	*Oporornis philadelphia*	
Wilson's Warbler	*Wilsonia pusilla*	
Tennessee Warbler	*Vermivora peregina*	
Orange-crowned Warbler	*V. celata*	
Nashville Warbler	*V. ruficapilla*	
Ovenbird	*Seiurus aurocapillus*	
Common Yellowthroat	*Geothylypis trichas*	
American Redstart	*Setophaga ruticilla*	
Northern Cardinal *	*Cardinalis cardinalis*	
Lazuli Bunting	*Passerina amoena*	
Indigo Bunting	*P. cyanea*	
Rufous-sided Towhee	*Pipilo erythropthalmus*	
Orchard Oriole	*Icterus spurius*	
Baltimore Oriole	*I.*	
Bullock's Oriole	*I.*	
Purple Finch *	*Carpodacus purpureus*	
Pine Siskin *	*Carduelis pinus*	
Evening Grosbeak *	*Coccothraustes vespertinus*	

Table 5. Reptile and amphibian species documented along the Platte River and associated floodplain in central Nebraska (NGPC Natural Heritage Program data). An Asterik (*) denotes that the NGPC considers the species to be in need of conservation.

Common Name	Scientific Name	Habitat
Tiger Salamander	*Ambystoma trigrinum*	woodlands, floodplains, prairies
Striped Chorus Frog	*Pseudacris triseriata*	marshes, backwaters, ponds
Plains Leopard Frog	*Rana blairi*	floodplains, marshes, grassy areas
Bullfrog	*Rana catesbiana*	permanent water, marshes, ponds
Western Gray Treefrog	*Hyla chrysoscelis*	floodplain forests, wood lots
Northern Cricket Frog	*Acris crepitans*	
Woodhouse's Toad	*Bufo woodhousii*	river banks, prairies, riparian forest
Great Plains Toad	*Bufo cognatus*	open floodplains, avoids forests
Plains Spadefoot	*Spea bombifrons*	prairies, open floodplains
Snapping Turtle	*Chelydra serpentina*	permanent bodies of water
Painted Turtle	*Chrysemys picta*	backwaters, ponds, sloughs
Spiny Softshell Turtle	*Trionyx spiniferus*	permanent bodies of water
Smooth Softshell Turtle	*T. muticus*	permanent bodies of water
Blandings Turtle *	*Emydoides blandingii*	semi-aquatic, marshes and sloughs
Yellow Mud Turtle	*Kinosternon flavenscens*	semi-aquatic, rivers, sloughs, ponds
Ornate Box Turtle	*Terrapene ornata*	terrestrial, open woods
Common Garter Snake	*Thamnophis sirtalis*	wet meadows, forest, pond edges
Plains Garter Snake	*Thamnophis radix*	moist grassy areas along streams
Smooth Green Snake *	*Opheodrys vernalis*	wet meadows, moist prairies
Glossy Snake *	*Arizona elegans*	dry open sandy areas
Racer	*Clouber constrictor*	
Ringneck Snake	*Diadophis punctatus*	forest edges, open woods, under logs
Fox Snake	*Elaphe vulpina*	Lower Platte lowland forests
Western Hognose Snake	*Heterodon nasicus*	sandy prairie, floodplains, woodlands
Eastern Hognose Snake	*Heterodon platyrhinos*	sandy soils, floodplains, open woods
Common Kingsnake	*Lampropeltis getulus*	marsh and forest edges, moist prairie
Milk Snake	*Lampropeltis triangulum*	forest edges with logs,
Northern Watersnake	*Nerodia sipedon*	creeks, rivers, sloughs, ponds ...
Bull Snake	*Pituophis catenifer*	prairie
Massasayga Rattlesnake	*Sistrurus catenatus*	abundance peaks in grassy wetlands
Brown Snake	*Storeria dekayi*	moist environments, floodplains
Red-bellied Snake *	*Storeria occipitomaculata*	moist woodlands with logs and litter
Lined Snake	*Tropidoclonion lineatum*	prairie, woodland edge

Table 5. Continued.

Common Name	Scientific Name	Habitat
Six-lined Racerunner	*Cnemidophorus sexlineatus*	sandy areas along river floodplains
Prairie Skink	*Eumeces septentrionalis*	
Lesser Earless Lizard	*Holbrookis maculata*	

Table 6. Invertebrates characteristic of sloughs and wetlands of the central Platte River. Species listed in this table were collected from benthic and emergence traps at Morman Island Crane Meadows and Wild Rose Ranch (Hall County, Nebraska) during 1997-1998. [Whiles, Matt R. and Beth Goldowitz (Unpublished data, January 2000).] Information on crayfish (personal comm. Steve Schainost, NGPC, February 2000).

Class	Order	Family / Genus
Turbellaria	Tricladida	Planariidae (flatworms)
Oligiochaeta	Haplotaxida	Naididae
	"	Tubificidae (aquatic earthworms)
Hirundinea	Pharyngobdellida	Erpobdellidae / *Erpobdella sp.* (leeches)
Crustacea	Amphipoda	Hyalellidae / *Hyalella azteca* (scuds)
	Copepoda	(copepods)
	Ostracoda	(seed shrimp)
	Cladocera	(water fleas)
	Decapoda	Camberidae / *Orconectes spp.* (Crayfish)
Mollusca	Pelecypoda	Sphaeriidae / *Pisidium sp.* (fingernail clams)
	Gastropoda	Physidae (pond snails)
Arachnoidea	Hydracarina	(water mites)
Insecta	Ephemeroptera	Baetidae / *Callibaetis sp.* (minnow mayflies)
	Odonata	Aeshnidea / *Anax sp.* (darners)
	"	Libellulidae / *Libellula sp.* (common skimmers)
	"	Coenagrionidae / *Ischnura verticalis* (narrow- wing damselflies
	Hemiptera	Belostomatidae /*Belostoma sp.* (giant water bugs)
	"	Corixidae / (water boatmen)
	"	Gerridae / *Gerris* (water striders)
	"	Nepidae / *Ranatra sp.* (water scorpions)
	"	Notonectidae (back swimmers)
	"	Veliidae (broad shouldered water striders)
	Trichoptera	Leptoceridae / *Nectopsyche sp.*
	"	/*Oecetis sp.* (long-horned caddisflies)
	"	Limnephilidae / *Ironoquia plattensis*
	Coleoptera	Chrysomelidae / *Donacia sp.* (leaf beetles)
	"	Dytiscidae / (predaceous diving beetles)
	"	Gyrinidae / *Dineutus sp.* (whirligig beetles)
	"	Haliplidae / *Peltodytes sp.* (crawling water beetles)
	"	Hydrophilidae / *Hydrophilus* (water scavenger)
	"	/ *Tropisternus* (water scavenger)
	"	Staphylinidae / *Sternus sp.* (rove beetles)

Continued

Table 6. Continued. Invertebrates characteristic of sloughs and wetlands of the central Platte River.

Class	Order	Family / Genus
Insecta (continued)		
	Diptera	Ceratopogonidae / *Atrichopogon sp.* (biting midge)
	"	/ *Culicoides sp.* (biting midge)
	"	Chironomidae / *Chironomus sp.* (midge)
	"	/ *Corynoneura sp.* (midge)
	"	/ *Dicrotendipes sp.* (midge)
	"	/ *Micropsectra sp.* (midge)
	"	/ *Parachironomus sp.* (midge)
	"	/ *Polypedilum sp.* (midge)
	"	/ *Procladius sp.* (midge)
	"	/ *Psectrotanypus sp.* (midge)
	"	/ *Pseudochironomus sp.* (midge)
	"	/ *Rheotanytarsus sp.* (midge)
	"	Culicidae / *Culex sp.* (mosquito)
	"	*/ Psorophora sp.* (mosquito)
	"	Dolichopodidae / *Dolichopus sp.* (Long-legged fly)
	"	Empididae / *Hilara sp.* (dance fly)
	"	Ephydirdae / *Ilythea sp.* (shore fly)
	"	/ *Ochthera sp.* (shore fly)
	"	Muscidae / (house flies and others)
	"	Mycetophilidae / (fungus gnats)
	"	Psychodidae / *Threticus sp.* (moth fly)
	"	Sciaridae / *Scatopsciara sp.* (dark-winged fungus gnat)
	"	/ *Schwenkfeldina sp (" ")*
	"	Sciomyzidae / *Atrichomelina pubera* (marsh fly)
	"	/ *Elgiva sp.* (marsh fly)
	"	/ *Pherbellia sp.* (marsh fly)
	"	Tipulidae / *Erioptera sp.* (crane fly)
	"	/ *Helius sp.* (crane fly)

Table 7. Invertebrates collected to date from non-wetland components of Platte River wet meadows in Central Nebraska (Davis and Austin 2000).

Family	Common Name	Family	Common name
Acarina	ticks and mites	Delphacidae	delphacidae planthopper
Acrididae	short-horned grasshopper	Diapriidae	diapriid wasp
Alydidae	broad-headed bug	Dictyopharidae	dictyopharid planthopper
Anobiidae	death watch beetle	Diplocardia	----
Anthicidae	antlike flower beetle	Diplopoda	millipede
Anthomyiidae	anthomyiid fly	Diptera	fly
Aphididae	aphids	Dolichopodidae	long-legged fly
Aporrectodea	---	Drosophilidae	pomace fly
Araneida	spiders	Dryomyzidae	dryomyzid fly
Asilidae	robber fly	Dytiscidae	pred. diving beetle
Bethylidae	bethylidae wasp	Elateridae	click beetle
Bibionidae	march fly	Empididae	dance fly
Blattidae	cockroach	Encyrtidae	encyrtid wasp
Bombyliidae	beefly	Entomobryidae	entomobrid springtail
Braconidae	braconid wasp	Eucnemidae	false click beetle
Byrrhidae	pill beetle	Formicidae	ants
Calliphoridae	blowfly	Gastropoda	snails
Cantharidae	soldier beetle	Gryllidae	cricket
Carabidae	ground beetle	Halipidae	crawling waterbeetle
Cecidomyidae	gall gnat	Hebridae	velvet waterbug
Cerambycidae	long-horned beetle	Helodidae	marsh beetle
Ceratopogonidae	punkies	Heteroceridae	variegated mud-loving beetle
Cercopidae	froghoppers & spittle bugs	Histeridae	hister beetle
Chelonethida	pseduoscorpion	Hirundinea	leech
Chilopoda	centipede	Hydridae	hydra
Chironomidae	midge fly	Hydrophilidae	water scavenger beetle
Chrysomelidaae	leaf beetle	Hydroptilidae	micro-caddisflies
Cicadellidae	leaf hopper	Ichneumonidae	ichneumonid wasp
Cicindelidae	tiger beetle	Isopoda	sowbug
Cleridae	checkered beetle	Lampyridae	lighting beetle
Coleoptera	beetle	Lauzaniidae	lauxaniid fly
Coccinellidae	ladybird beetle	Lepidoptera	butterfly larvae
Corimelaenidae	negrobug	Leptodiridae	small carrion beetle
Corylophidae	minute fungus beetle	Limnephilidae	northern caddisfly
Cryptophagidae	silken fungus beetle	Lygaeidae	seed bug
Cucujidae	flat bark beetle	Lymnacidae	snail
Culicidae	mosquito	Mantispidae	---
Curculionidae	weavil	Melandryidae	false darkling beetle
Cydnidae	borrower bug	Meloidae	blister beetle

Table 7. Continued. Invertebrates collected to date from non-wetland components of Platte River wet meadows in central Nebraska (Davis and Austin 2000).

Family	Common Name	Family	Common Name
Melyridae	soft-winged flower beetle	Stratiomyidae	soldier fly
Miridae	leaf bug	Staphylinidae	rove beetle
Muscidae	muscid fly	Syrphidae	syrphid fly
Mutillidae	velvet ant	Tabanidae	deer / horse fly
Mycetophilidae	fungus gnat	Tachinidae	tachinii fly
Mydaidae	---	Tenebrionidae	darkling beetle
Mymaridae	fairy fly / wasp	Tenthredinidae	common sawfly
Nabidae	damsel bug	Tetrigidae	pygmy grasshopper
Nitidulidae	sap beetle	Tettigoniidae	long-horned grasshopper
Pedilidae	pedilid beetle	Therevidae	stiletto fly
Pentatomidae	stinkbug	Tiphiidae	tiphid wasp
Phalacridae	shining mold beetle	Tipulidae	crane fly
Phalangida	daddylong legs	Tridactylidae	pygmy mole cricket
Phoridae	humpbacked fly	Trixoscelidae	trixoscelid fly
Pipunculidae	big-headed fly	Trogulidae	harvestmen spider
Planorbidae	planorib snail	Valvatidae	roundmouth snail
Platygasteridae	platygasterid wasp	Vespidae	yellowjacket wasp
Podopidae	terrestrial turtle bug	Viviparidae	snail
Pompilidae	spider wasp		
Pselaphidae	short-winged mold beetle		
Psyllidae	psyllid whitefly		
Reduviidae	assassin bug		
Sarcophagidae	blowflies		
Scaphidiidae	shining fungus beetle		
Scarabaeidae	June beetle		
Scelionidae	sceliondid wasp		
Schizopteridae	jumping ground bug		
Sciaridae	dark-winged fungus gnat		
Scutelleridae	shield backedbug		
Scydmaenidae	antlike stone beetle		
Sepsidae	black scavenger fly		

Table 8. Moths and butterflies documented in Platte River valley counties in Nebraska. Information compiled from Opler et al. (1995).

Common name	Scientific name	Habitat use within Platte River valley
Pipevine Swallowtail	*Battus philenor*	Lower Platte: woodland edges, open areas
Zebra Swallowtail	*Eurytides marcellus*	Lower Platte: moist lowland woods near water
Black Swallowtail	*Papilio polyxenes*	Statewide: variety of open spaces
Two-tailed Swallowtail	*Papilio multicaudata*	Western: moist valleys, streamsides, woodlands
Eastern Tiger Swallowtail	*Papilio glaucus*	Statewide: river valleys, broadleaf woodlands
Palamedes Swallowtail	*Papilio palamedes*	Lower Platte: wet woodlands near rivers
Checkered White	*Pontia protodice*	Statewide: wide range of dryer habitats
Cabbage White	*Pieris rapae*	Statewide: any open area
Olympia Marbel	*Euchloe Olympia*	Statewide: open woodlands, meadows, prairies
Falcate Orangetip	*Anthocharis midea*	Lower Platte: open wet woods along waterways
Clouded Sulphur	*Colias philodice*	Statewide: any open area
Orange Sulphur	*Colias eurytheme*	Statewide: any open area
Southern Dogface	*Zerene cesonia*	Statewide: any open area
Cloudless Sulphur	*Phoebis sennae*	Statewide: disturbed open areas
Orange-barred Sulphur	*Phoebis agarithe*	Lower Platte: open lowlands
Large Orange Sulphur	*Phoebis agarithe*	Lower Platte: open lowlands
Mexican Yellow	*Eurema mexicana*	Statewide: prairies, open dry areas
Little Yellow	*Eurema lisa*	Eastern NE: dry open areas
Sleepy Orange	*Eurema nicippe*	Statewide: low elevation areas
Dainty Sulphur	*Nathalis iole*	Statewide: meadows, grasslands, open dry areas
Harvester	*Feniseca tarquinius*	Lower Platte: deciduous woods along streams
American Copper	*Lycaena phlaeas*	Lower Platte: disturbed patures, old fields
Gray Copper	*Lycaena dione*	Statewide: open flat areas, prairies, fields
Bronze Copper	*Lycaena hyllus*	Statewide: low wet areas, marshes, wet meadows
Purplish Copper	*Lycaena helloides*	Statewide: wet meadows, streamsides, marshes
Coral Hairstreak	*Satyrium titus*	Statewide: variety of areas
Acadian Hairstreak	*Satyrium acadica*	Statewide: willow lined streams, moist woodland
Banded Hairstreak	*Satyrium calanus*	Eastern NE: forest edges and fields
Striped Hairstreak	*Satyrium liparops*	Statewide: decid. forest openings, prairie streams
Juniper Hairstreak	*Callophrys gryneus*	Statewide: open areas with cedars or junipers
Gray Hairstreak	*Strymon melinus*	Statewide: disturbed weedy sites, open areas
Marine Blue	*Leptotes marina*	Statewide: variety of open areas
Reakirt's Blue	*Hemiargus isola*	Statewide: grasslands, meadows, creeksides
Eastern Tailed-Blue	*Everes comyntas*	Statewide: open sunny areas
Spring Azure	*Celastrina ladon*	Statewide: wooded marshes, wooded edges
Summer Azure	*Celastrina neglecta*	Statewide: stream valleys, any open area
Silvery Blue	*Glaucopsyche lygdamus*	Western NE: open woods, meadows, prairies
Melissa Blue	*Lycaeides melissa*	Statewide: open woody areas, prairies

Table 8. Continued. Moths and butterflies documented in Platte River valley counties in Nebraska.

Common name	Scientific name	Habitat use within Platte River valley
American Snout	*Kubttgeaba carinenta*	Statewide: forest clearings and edges
Gulf Fritillary	*Agraulis vanillae*	Statewide: pastures, fields, forest edges
Zebra	*Heliconius charitonius*	Scattered: moist forests, edges and fields
Variegated Fritillary	*Euptoieta claudia*	Statewide: open sunny areas, prairies, pastures
Great Spangled Fritillary	*Speyeria cybele*	Statewide: open moist areas, prairies, meadows
Aphrodite Fritillary	*Speyeria Aphrodite*	Statewide: moist prairies
Regal Fritillary	*Speyeria idalia*	Statewide: tall-grass prairies, damp meadows
Silver-bordered Fritillary	*Boloria selene*	Statewide: wet meadows, marshes
Meadow Fritillary	*Boloris bellona*	Lower Platte: wet places, meadows, pastures
Gorgone Checkerspot	*Chlosyne gorgone*	Statewide: open areas, prairies, streams, edges
Silvery Checkerspot	*Chlosyne nycteis*	Statewide: moist meadows, streams,
Pearl Crescent	*Phyciodes tharos*	Statewide: open areas
Painted Crescent	*Phyciodes pictus*	Statewide: stream edges, shortgrass prairies
Question Mark	*Polygonia interrogationis*	Statewide: wooded areas with open spaces
Eastern Comma	*Polygonia comma*	Statewide: deciduous woodlands by streams
Gray Comma	*Polygonia progne*	Statewide: variety of areas
Mourning Cloak	*Nymphalis antiopa*	Statewide: riparian areas
Milbert's Tortoiseshell	*Nymphalis milberti*	Western NE: wet areas near woods & fields
American Lady	*Vanessa virginiensis*	Statewide: open areas with low vegetation
Painted Lady	*Vanessa cardui*	Statewide: open and disturbed areas
West Coast Lady	*Vanessa annabella*	Western NE: open places
Red Admiral	*Vanessa atalanta*	Statewide: moist woods
Common Buckeye	*Junonia coenia*	Statewide: open sunny spots, some bare ground
Red-spotted Purple	*Limenitis arthemis*	Statewide: moist upland, valley bottom,woods
Viceroy	*Limenitis archippus*	Statewide: wet meadows, moist willow thickets
Goatweed leafwing	*Anaea andria*	Statewide: deciduous woods along waterways
Hackberry Emperor	*Asterocampa celtis*	Statewide: wooded streams
Tawny Emperor	*Asterocampa clyton*	Lower Platte: densly wooded riparian areas
Northern Pearly Eye	*Enodia anthedon*	Eastern NE: damp decid. woods near water
Eyed Brown	*Satyrodes eurydice*	Statewide: open sedge meadows, sloughs
Little Wood Satyr	*Megisto cymela*	Statewide: grassy woods/openings, limey soils
Common Wood Nymph	*Ceroyonis pegala*	Statewide: sunny grassy prairies, meadows
Silver-spotted Skipper	*Epargyreus clarus*	Statewide: prairie waterways, open woods
Northern Cloudywing	*Thorybes pylades*	Statewide: dry meadows
Hayhurst's Scallopwing	*Staphylus hayhurstii*	Statewide: weedy areas, roadsides, gardens
Horace's Duskywing	*Erynnis horatius*	Statewide: open woods, clearings, roadsides
Mottled Duskywing	*Erynnis martialis*	Lower Platte: open woods, prairie hills
Wild Indigo Duskywing	*Erynnis baptisiae*	Statewide: open woods, roadsides
Common Checkered-Skipper	*Pyrgus communis*	Statewide: meadows, pastures, open sunny areas

Table 8. Continued. Moths and butterflies documented in Platte River valley counties in Nebraska.

Common name	Scientific name	Habitat use within Platte River valley
Common Sootywing	*Pholisora catullus*	Statewide: open disturbed areas, landfills
Least Skipper	*Ancyloxpha numitor*	Statewide: moist or wet areas with tall grass
European Skipper	*Thymelicus lineola*	Scattered: open grassy meadows and fields
Fiery Skipper	*Hylephila phyleus*	Statewide: sunny open areas, lawns, gardens
Uncas Skipper	*Hesperia uncas*	Western NE: short-grass prairie, open woodlands
Western Branded Skipper	*Hesperia colorado*	Western NE: open sunny meadows, fields
Ottoe Skipper	*Hesperia ottoe*	Statewide: native tall-grass prairie
Leonard's Skipper	*Hesperia leonardus*	Statewide: meadows, prairies, open grassy areas
Peck's Skipper	*Polites peckius*	Statewide: meadows, lawns, vacant lots
Tawny-edged Skipper	*Polites themistocles*	Statewide: moist grassy prairie swales, pastures
Crossline Skipper	*Polites origenes*	Statewide: open grassy areas, forest openings
Little Glassywing	*Pompeius verna*	Lower Platte: moist areas near shaded woods
Sachem	*Atalopedes campestris*	Statewide: disturbed open areas, pastures
Arogos Skipper	*Atrytone arogos*	Statewide: undisturbed grasslands, sand prairies
Delaware Skipper	*Anatrytone logan*	Statewide: moist areas, prairies, roadsides
Hobomok Skipper	*Poanes hobomok*	Statewide: edges of moist woods, along streams
Zabulon Skipper	*Poanes zabulon*	Lower Platte: brushy sites by moist woods/creeks
Broad-winged Skipper	*Poanes viator*	Scattered: marshes
Dion Skipper	*Euphyes dion*	Lower Platte: open marshes
Two-spotted Skipper	*Euphyes bimacula*	Statewide: wet streamsides, wet sedge meadows
Dun Skipper	*Euphyes vestris*	Statewide: seeps, streams, woods w/ meadows
Dusted Skipper	*Atrytonopsis hianna*	Statewide: grasslands, prairies
Common Roadside Skipper	*Amblyscirtes vialis*	Statewide: open areas near streams and woods
Eufala Skipper	*Lerodea eufala*	Scattered: open sunny areas, roadsides
Yucca Giant Skipper	*Megathymus yuccae*	Western NE: open woodlands, grasslands
Streaker's Giant Skipper	*Megathymus streckeri*	Statewide: short-grass prairie, open woodlands

Appendix B

A Summary of Impacts to Nebraska Resources of Concern

A Summary of Impacts to Resources of Concern (TBD = to be determined when FEIS data is provided)

Resources of Concern	**GC Alternative Adverse Affect to Resource of Concern**
River Otter	
Flows Above McConaughy during October through March	No
Flows Above McConaughy during April through September	No
Months With Flows Less Than 500 cfs Above McConaughy	No
Frequency of 1,200 cfs or Lower Flows at GI	No
Frequency of Zero Flows at GI	No
Backwaters and Side Channels Quantity	**Yes**
Sandhill Crane	
Mean Monthly Flow at Lewellen During February, March, and April	**Yes**
Mean Monthly Flow at Lewellen During May, June, and July	**Yes**
Kingsley Dam Total Annual Spill	**Yes**
Frequency of Spills from Kingsley Dam	**Yes**
Annual Flow at North Platte, Nebraska	**Yes**
Mean Monthly Flow at North Platte During February, March, and April	**Yes**
Mean Monthly Flow at North Platte During May, June, and July	**Yes**
Mean Monthly February and March Flows at Overton	**Yes**
Mean Monthly February and March Flows Odessa/Kearney	**Yes**
Mean Monthly February and March Flows Grand Island.	**Yes**
Acres of Channel > 500 Feet	No
Acres of Grassland/Wet Meadow	No
Littoral Habitat Indicator	
June Ending Elevation Level	No
July Ending Elevation Level	No

Resources of Concern	**GC Alternative Potential for Adverse Affect to Resource of Concern**
August Ending Elevation Level	No
Lake McConaughy Walleye Reproduction	
April – May Elevation	**Yes**
April – May Minimum Elevation	**Yes**
Lake McConaughy Walleye Retention	
May Outflow	**Yes**
June Outflow	No
Lake McConaughy White Bass Reproduction	No
Lake McConaughy Smallmouth Bass Reproduction	
June Elevation	**Yes**
Acres of Rocky Habitat < 15 Feet Deep	**Yes**
Lake McConaughy Channel Catfish Reproduction	
April Inflow	No
May Inflow	No
June Inflow	No
March to April Inflow	No
April to May Inflow	No
Lake McConaughy Gizzard Shad Reproduction	**Yes**
Lake McConaughy Gizzard Shad Overwintering	**Yes**
Lake Ogallala Trout Indicator	
May – October McConaughy Elevation	**Yes**
June McConaughy Elevation	**Yes**
July McConaughy Elevation	**Yes**
August McConaughy Elevation	**Yes**
Finescale Dace and Northern Redbelly Dace	**Yes**

Resources of Concern	**GC Alternative Potential for Adverse Affect to Resource of Concern**
Waterfowl and Waterbirds	
Feb - April Shortages to Instream Target Flows at GI	No
Oct - Dec Shortages to Target Flows at GI	No
Annual 7-Day Peaks Exceeded 8,000 cfs Threshold	**Yes**
Annual 7-Day Peaks Exceeding 12,000 cfs Threshold	**Yes**
30-Day Mean River Water Surface Elevations (Mid-Feb to Mid-Mar)	No
30-Day Mean River Water Surface Elevations (Mid-Apr to June)	**Yes**
Backwater and Side Channels Quantity	**Yes**
Acres of Active Channel	No
Acres of Cropland	**Yes**
Sandpit Habitat Quantity	No
Riverine Fish Community	
Physical Habitat Analysis – Overton	No
Physical Habitat Analysis – Grand Island	No
Frequency of 1,200 cfs or Lower Flows at GI	No
Frequency of Zero Flows at GI	No
Massasauga Rattlesnake	No
Lower Platte River Catfish/Shovelnose Sturgeon Fish Community	No
Sturgeon Chub	
Average Monthly Flows at the Louisville Gage from February to July	No
Highest Monthly Flows at the Louisville Gage from February to July	No
Lake Sturgeon	
Average Monthly Flows at Louisville Gage from April to June.	No
Highest Monthly Flows at Louisville Gage from April to June.	No
Average Monthly Flows at Louisville Gage from February to July.	No

Resources of Concern	**GC Alternative Potential for Adverse Affect to Resource of Concern**
Highest Monthly Flows at Louisville Gage from February to July.	No
Grassland Species	No
Woodland Species	**Yes**
Mussel Species	
Water Action Plan Activities	**Yes**
Backwaters and Side Channels Quantity	**Yes**
A New Species of Caddisfly	**Yes**
Herptiles	
Backwaters and Side Channels Quantity	**Yes**
Acres of Grassland/Herbaceous	No
Acres of Woodland/Shrubland	**Yes**

Appendix C

Colorado Species Lists

According to the Colorado Division of Wildlife (1998), the following species are known to inhabit the Tamarack Ranch and Pony Express State Wildlife Areas.

Fish:

Plains killifish	*Fundulus zebrinus*
Sand shiner	*Notropis stramineus*
Fathead minnow	*Pimephales promelas*
Creek chub	*Semotilus atromaculatus*
White sucker	*Catostomus commersoni*
Longnose dace	*Rhinichthys cataractae*
Bigmouth shiner	*Notropis dorsalis*
Red shiner	*Cyprinella lutrensis*
Plains topminnow	*Fundulus sciadicus*
Brook stickleback	*Culaea inconstans*
Central stoneroller	*Campostoma anomalum*
Longnose sucker	*Catostomus catostomus*
Green sunfish	*Lepomis cyanellus*
Iowa darter	*Etheostoma exile*
Brassy minnow	*Hybognathus hankinsoni*
Black bullhead	*Ameiurus melas*
River carpsucker	*Carpiodes carpio*
Bluegill	*Lepomis macrochirus*
Common carp	*Cyprinus carpio*
Largemouth bass	*Micropterus salmoides*
Yellow Perch	*Perca flavescens*
Walleye	*Stizostedion vitreum*
Wiper	*Morone chrysops* (m) x *M. saxatilis* (f)
White crappie	*Pomoxis annularis*
Rainbow trout	*Oncorhynchus mykiss*

Amphibians:

Tiger salamander	*Ambystoma tigrinum*
Woodhouse's toad	*Bufo woodhousii*
Northern cricket frog	*Acris crepitans*
Striped chorus frog	*Pseudacris triseriata*
Northern leopard frog	*Rana pipiens*
Bullfrog	*Rana catesbeina*
Painted turtle	*Chrysemys picta*
Western box turtle	*Terrapene ornata*
Spiny softshell	*Trionyx spiniferus*
Snapping turtle	*Chelydra serpentina*
Lesser earless lizard	*Holbrookia maculata*

Short-horned lizard	*Phrynosoma douglassii*
Eastern fence lizard	*Sceloporus undulatus*
Many-lined skink	*Eumeses multivirgatus*
Six-lined racerunner	*Cnemidophorus sexlineatus*
Glossy snake	*Arizona elegans*
Racer	*Coluber constrictor*
Western hognose snake	*Heterodon nasicus*
Milk snake	*Lampropeltis triangulum*
Northern water snake	*Nerodia sipedon*
Bullsnake	*Pituophis melanoleucus*
Plains garter snake	*Thamnophis radix*
Common garter snake	*Thamnophis sirtalis*

Birds:

Greater prairie chicken	*Tympanuchus cupido*
Ring-necked pheasant	*Phasianus colchicus*
Bobwhite quail	*Colinus virginianus*
Rio Grande turkey	*Meleagris gallopavo intermedia*
Mourning dove	*Zendaida macroura*
American coot	*Fulica americana*
Common crow	*Corvus brachyrhynchos*
Sora rail	*Porzana corolina*
Virginia rail	*Rallus limicola*
Common snipe	*Capella gallinago*
Wood duck	*Aix sponsa*
Mallard	*Anas platyrhynchos*
Green-winged teal	*Anas crecca*
Blue-winged teal	*Anas discors*
Cinnamon teal	*Anas cyanoptera*
Pintail	*Anas acuta*
Northern shoveler	*Anas clypeata*
American wigeon	*Anas americana*
Canvasback	*Aythya valisneria*
Redhead	*Aythya americana*
Ring-necked duck	*Aythya collaris*
Lessor scaup	*Aythya affinis*
Common goldeneye	*Bucephala clangula*
Hooded merganser	*Lophodytes cucullatus*
Common merganser	*Mergus merganser*
Ruddy duck	*Oxyura jamaicensis*
Gadwall	*Anas strepera*
Bufflehead	*Bucephala albeola*
Canada goose	*Branta canadensis*

White-fronted goose	*Anser albifrons*
Snow goose	*Chen hyperborea*
Tundra swan	*Cygnus columbianus*
Pied-billed grebe	*Podilymbus podiceps*
Horned grebe	*Podiceps auritus*
Eared grebe	*Podiceps auritus*
Western grebe	*Podiceps nigricollis*
American while pelican	*Pelecanus erythrorhynchos*
Double-crested cormorant	*Phalacrocorax auritus*
American bittern	*Botaurus lentiginosus*
Least bittern	*Ixobrychus exilis*
Great blue heron	*Ardea herodias*
Snowy egret	*Egretta thula*
Cattle egret	*Bubulcus ibis*
Black-crowned night-heron	*Nycticorax nycticorax*
White-faced ibis	*Plegadis chihi*
Turkey vulture	*Cathartes aura*
Osprey	*Pandion haliaetus*
Bald eagle	*Haliaeetus leucocephalus*
Northern harrier	*Circus cyaneus*
Sharp-shinned hawk	*Accipiter striatus*
Cooper’s hawk	*Accipiter cooperii*
Northern goshawk	*Accipiter gentilis*
Swainson’s hawk	*Buteo swainsoni*
Red-tailed hawk	*Buteo jamaicensis*
Ferruginous Hwak	*Buteo regalis*
Rough-legged hawk	*Buteo lagopus*
Golden eagle	*Aquila chrysaetos*
American kestrel	*Falco sparverius*
Merlin	*Falco columbarius*
American peregrine falcon	*Falco peregrinus anatum*
Prairie falcon	*Falco mexicanus*
Plains sharp-tailed grouse	*Tympanuchus phasianellus jamesi*
Killdeer	*Charadrius vociferus*
Black-necked stilt	*Himantopus mexicanus*
American avocet	*Recurvirostra americana*
Greater yellowlegs	*Tringa melanoleuca*
Lesser yellowlegs	*Tringa flavipes*
Solitary sandpiper	*Tringa solitaria*
Willet	*Catoptrophorus semipalmatus*
Spotted sandpiper	*Actitis macularia*
Upland Sandpiper	*Bartramia longicauda*
Whimbrel	*Numenius Phaeopus*
Long-billed curlew	*Numenius americanus*

Marbled Godwit	*Limosa fedoa*
Ruddy trunstone	*Arenaria interpres*
Red knot	*Calidris canutus*
Sanderling	*Calidris alba*
Semipalmated sandpiper	*Calidris pusilla*
Western sandpiper	*Calidris mauri*
Least sandpiper	*Calidris minutilla*
White-rumped sandpiper	*Calidris melanotos*
Sharp-tailed sandpiper	*Calidris acuminata*
Dunlin	*Calidris alpina*
Stilt sandpiper	*Calidris himantopus*
Long-billed dowitcher	*Limnodromus scolopaceus*
Wilson's Phalarope	*Phalaropus tricolor*
Franklin's gull	*Larus pipixcan*
Ring-billed gull	*Larus delawarensis*
California gull	*Larus californicus*
Herring gull	*Larus argentatus*
Common tern	*Sterna hirundo*
Black-billed cuckoo	*Coccyzus erythropthalmus*
Yellow-billed cuckoo	*Coccyzus americanus*
Barn owl	*Tyto alba*
Eastern screech-owl	*Otus asio*
Great horned owl	*Bubo virginianus*
Burrowing owl	*Athene cunicularia*
Long-eared owl	*Asio otus*
Common nighthawk	*Chordeiles minor*
Broad-tailed hummingbird	*Selasphorus platycercus*
Belted kingfisher	*Ceryle alcyon*
Lewis' woodpecker	*Melanerpes lewis*
Red-bellied woodpecker	*Centurus carolinus*
Red-headed woodpecker	*Melanerpes erythrocephalus*
Yellow-bellied sapsucker	*Sphyrapicus varius*
Downy woodpecker	*Picoides pubescens*
Hairy woodpecker	*Picoides villosus*
Northern flicker	*Colaptes auratus*
Olive-sided flycatcher	*Contopus borealis*
Western wood-pewee	*Contopus sordidulus*
Eastern Phoebe	*Sayornis phoebe*
Other flycatchers	*Empidonax*
Great crested flycatcher	*Myiarchus crinitus*
Western kingbird	*Tyrannus verticalis*
Eastern kingbird	*Tyrannus tyrannus*
Horned lark	*Eremophila alpestris*
Tree swallow	*Tachycineta bicolor*

Violet-green swallow	*Tachycineta thalassina*
Cliff swallow	*Hirundo pyrrhonota*
Barn swallow	*Hirundo rustica*
Rough-winged swallow	*Stelgidopteryx ruficollis*
Blue jay	*Cyanocitta cristata*
Common raven	*Corvus corax*
Black-capped chickadee	*Parus atricapillus*
Red-breasted nuthatch	*Sitta canadensis*
White-breasted nuthatch	*Sitta carolinensis*
Brown creeper	*Certhia americana*
Bewick's wren	*Thryomanes bewickii*
House wren	*Troglodytes aedon*
Winter wren	*Troglodytes troglodyte*
Eastern bluebird	*Sialia sialis*
Townsend's solitaire	*Myadestes townsendii*
Veery	*Catharus fuscescens*
Swainson's thrush	*Catharus ustulatus*
Hermit thrush	*Catharus guttatus*
American robin	*Turdus migratorius*
Gray catbird	*Dumetella carolinensis*
Northern mockingbird	*Mimus polyglottos*
Brown thrasher	*Toxostomata rufum*
Bohemian waxwing	*Bombycilla garrulus*
Cedar waxwing	*Bombycilla cedrorum*
Starling	*Sturnus vulgaris*
Northern shrike	*Lanius excubitor*
Loggerhead shrike	*Lanius ludovicianus*
Bell's vireo	*Vireo bellii*
Blue-headed vireo	*Vireo solitarius*
Plumbeous vireo	*Vireo plumbeus*
Warbling vireo	*Vireo gilvus*
Red-eyed vireo	*Vireo olivaceus*
Orange-crowned warbler	*Vermivora celata*
Nashville warbler	*Vermivora virginiae*
Yellow warbler	*Dendroica petechia*
Magnolia warbler	*Dendroica magnolia*
Yellow-rumped warbler	*Dendroica coronata*
Black-and-white warbler	*Mniotilta varia*
American Restart	*Setophaga ruticilla*
Ovenbird	*Seiurus aurocapillus*
Northern waterthrush	*Seiurus noveboracensis*
Common yellowthroat	*Geothlypis trichas*
Wilson's warbler	*Wilsonia pusilla*
House sparrow	*Passer domesticus*

Scarlet tanager	*Piranga olivacea*
Western tanager	*Piranga ludoviciana*
Northern cardinal	*Cardinalis cardinalis*
Rose-breasted grosbeak	*Pheucticus ludovivianus*
Black-headed grosbeak	*Pheucticus melanocephalus*
Blue grosbeak	*Guirace caerulea*
Lazuli bunting	*Passerina amoena*
Indigo bunting	*Passerina cyanea*
Green-tailed towhee	*Pipilo chlorurus*
Eastern towhee	*Pipilo erythrophthalmus*
Spotted towhee	*Pipilo maculatus*
American tree sparrow	*Spizella arborea*
Chipping sparrow	*Spizella passerina*
Clay-colored sparrow	*Spizella pallida*
Brewer's sparrow	*Spizella breweri*
Vesper sparrow	*Pooecetes gramineus*
Fox sparrow	*Passerella iliaca*
Song sparrow	*Melospiza melodia*
Lincoln's sparrow	*Melospiza lincolnii*
Swamp sparrow	*Melospiza georgiana*
White-throated sparrow	*Zonotrichia albicollis*
White-crowned sparrow	*Zonotrichia leucophrys*
Harris' sparrow	*Zonotrichia querula*
Dark-eyed junco	*Junco hyemalis*
Red-winged blackbird	*Agelaius phoenice*
Western meadowlark	*Sturnella neglecta*
Yellow-headed blackbird	*Xanthocephalus xanthocephalus*
Rusty blackbird	*Euphagus carolinus*
Brewer's blackbird	*Euphagus cyanocephalus*
Common grackle	*Quiscalus quiscula*
Brown-headed cowbird	*Molothrus ater*
Orchard oriole	*Icterus spurius*
Baltimore oriole	*Icterus galbula*
Bullock's oriole	*Icterus bullockii*
House finch	*Carpodacus mexicanus*
Lesser goldfinch	*Carduelis psaltria*
American goldfinch	*Carduelis tristis*
Evening grosbeak	*Coccothraustes vespertinus*

Mammals:

Virginia opossum	*Didelphis virginiana*
Least shrew	*Sorex parva*
Masked shrew	*Sorex cinereus*

Eastern mole	*Scalopus aquaticus*
Little brown myotis	*Myotis lucifugus*
Red bat	*Lasiurus borealis*
Hoary bat	*Lasiurus cinereus*
Silver-haired bat	*Lasionycteris noctivagans*
Big brown bat	*Eptesicus fuscus*
Desert cottontail	*Sylvilagus audubonii*
Eastern cottontail	*Sylvilagus floridanus*
Black-tailed jackrabbit	*Lepus californicus*
White-tailed jackrabbit	*Lepus townsendii*
Spotted ground squirrel	*Spermophilus spilosoma*
Thirteen-lined ground squirrel	*Spermophilus tridecemlineatus*
Black-tailed prairie dog	*Cynomys ludocicianus*
Fox squirrel	*Sciurus niger*
Plains pocket gopher	*Geomys bursarius*
Plains pocket mouse	*Perognathus flavescens*
Silky pocket mouse	*Perognathus flavus*
Hispid pocket mouse	*Chaetodipus hispidus*
Ord's pocket mouse	*Dipodomys ordii*
American beaver	*Castor canadensis*
Plains harvest mouse	*Reithrodontomys montanus*
Western harvest mouse	*Reithrodontomys megalotis*
Deer mouse	*Peromyscus maniculatus*
Northern grasshopper mouse	*Onychomys leucogastor*
House mouse	*Mus musculus*
Norway rat	*Rattus norvegicus*
Meadow vole	*Microtus pennsylvanicus*
Prairie vole	*Microtus ochrogaster*
Common muskrat	*Ondatra zibethicus*
Common porcupine	*Erethizon dorsatum*
Coyote	*Canis latrans*
Swift fox	*Vulpes velox*
Red fox	*Vulpes vulpes*
Raccoon	*Procyon lotor*
Long-tailed weasel	*Mustela frenata*
Mink	*Mustela vison*
American badger	*Taxidea taxus*
Eastern spotted skunk	*Spilogale putrius*
Striped skunk	*Felis rufus*
Mule deer	*Odocoileus hemionus*
White-tailed deer	*Odocoileus virginianus*

Appendix D

State Game and Fish Agency Concurrence Letters

FINANCIAL IMPACT OF THE PLATTE RIVER RECOVERY IMPLEMENTATION PROGRAM TO THE PICK-SLOAN MISSOURI BASIN PROGRAM FIRM POWER CUSTOMERS

Provided by Western Area Power Administration

FINANCIAL IMPACT OF THE PLATTE RIVER RECOVERY IMPLEMENTATION PROGRAM TO THE PICK-SLOAN MISSOURI BASIN PROGRAM FIRM POWER CUSTOMERS

SUMMARY

The Western Area Power Administration (Western) markets hydroelectric power from the U.S. Bureau of Reclamation (Reclamation) and the U.S. Army Corps of Engineers projects in fifteen western states. The Platte River Recovery Implementation Program (Program) Environmental Impact Statement (EIS) compares action alternatives that would affect Reclamation's Pick-Sloan Missouri Basin Program (PSMBP) Western Division hydroelectric facilities on the North Platte River, which could ultimately increase the power costs paid by the Loveland Area Project (LAP) customers. The PSMBP Western Division includes Reclamation's Projects in the North Platte and Bighorn river basins in Wyoming along with the Colorado-Big Thompson Project in Colorado. The LAP rate includes the revenue requirements for both the PSMBP Western Division projects and the Fryingpan-Arkansas Project.

Western's analysis of the action alternatives shows that each action alternative can represent a cost to LAP customers. The changes to the LAP generation and dependable capacity caused by the alternatives will be a cost borne by the LAP customers. The customers could also bear a portion of the primary Program costs unless all Program costs assigned to the Federal Government are deemed to be non-reimbursable.

BACKGROUND

Western markets hydroelectric power from LAP facilities to rural and municipal power customers in Wyoming, Nebraska, Colorado, and Kansas. LAP power is sold as energy and capacity through long-term firm electric service contracts. These firm power contracts obligate Western to deliver the contracted amounts of monthly energy and capacity through September 2024, regardless of actual LAP generating capability in any given month.

The currently contracted LAP obligation is based on long-term hydrology studies and reservoir system modeling conducted by Reclamation; those studies and modeling were based on the current LAP system. Any modified operation of LAP facilities that changes the long-term monthly generated energy and capacity potentially changes the annual operating costs. Those costs are passed on to the LAP rate payers (i.e., customers) through Western's firm power rate.

ALTERNATIVES' ENERGY IMPACTS

The hydrologic modeling for the Program EIS shows that the LAP monthly generation is changed by all of the action alternatives. As already noted above, Western is obligated to deliver the energy contracted through its firm power contracts. Western has assumed that, to accommodate the Program changes, it must purchase energy on the open market for months of reduced generation, and will sell energy in months of increased generation. To place a value on the potential impact, Western estimated the lost generation (in Gigawatt Hours) by month. We then computed the lost generation's dollar value based on the average monthly energy sale and purchase prices. The monthly purchase prices are the actual average monthly prices paid by Western for LAP energy deficits. The sales prices are, likewise, the actual monthly prices received by Western for LAP energy surpluses. The prices are a combination of seasonal, monthly, daily, and hourly spot market transactions. The following table summarizes the potential financial impact of the generation changes:

Summary Table: Annual Cost/Benefit to LAP Firm Power Customers Based on Actual Monthly Prices (FYs 2002, 2003 and 2004, and 3-Year Average)

	Variance From Present Condition (Gigawatt-hours)	**Cost (-) Benefit Based on Actual FY 2002 Prices ($)**	**Cost (-) Benefit Based on Actual FY 2003 Prices ($)**	**Cost (-) Benefit Based on Actual FY 2004 Prices ($)**	**Cost (-) Benefit Based on 3-Year Average Actual Prices ($)**
Proposed Program	5.376	-25,771	56,842	-17,711	4,453
Water Emphasis	11.643	-159,349	114,481	-163,879	-69,582
Water Leasing	1.160	-260,811	-236,979	-373,959	-290,584
Wet Meadow	10.456	-125,098	125,519	-65,243	-21,607

The table above shows that all of the action alternatives can represent a net cost to LAP rate payers when actual average monthly purchase and sale prices are used to value the long term energy impacts. It should be noted that the modeling of the present condition for the North Platte projects indicates an average annual generation 83 gigawatt-hours less than what Reclamation modeled for Western when the current marketing plan was established. The analysis is sensitive to the monthly price distribution within a year and three alternatives represent a benefit to the rate payers when FY 2003 prices are assumed. The annual costs range from $17k to $374k and the annual benefits range from $57k to $126k. To put that in perspective, the PSMBP Western Division revenue requirement is currently about 42 million dollars. The analysis shows a higher likelihood that the alternatives will be a net cost to the rate payers. A cost is indicated even when the annual net generation change is positive. There are a couple of reasons for this. First, the action alternatives reduce generation in months when power is expensive and increase generation in months when power is generally less expensive. Further, Western buys firm energy on the open market to honor firm power contracts and sells non-firm energy on the open market when generation is surplus to firm power need. Unfortunately, Western does not sell surplus energy from the North Platte hydropower plants for as high a price as it buys energy. Reclamation directs the daily water releases; Western cannot store the energy to wait for a higher price. Since the energy can only be sold when it's available, this depresses the price buyers are willing to pay for the surplus energy from LAP hydropower plants.

The costs of the proposed Program or its alternatives will be very sensitive to changes in the monthly open market prices. For example, over the three year period from 2002 through 2004, monthly average selling prices ranged from $12 per megawatt-hour to $42 per megawatt-hour; monthly average purchase prices ranged from $27 per megawatt-hour to $57 per megawatt-hour. Recently, the purchase price has begun to climb while selling prices have remained relatively flat. The market price fluctuations add uncertainty to forecasting future costs of the Program.

LAP Operations Impacts (Capacity and Load Following Capability)

The EIS states that the LAP winter dependable capacity from the North Platte hydroelectric power plants would be reduced by about one half of a megawatt under the Wet Meadow and Water Emphasis alternatives, increased by three megawatts under the Water Leasing alternative, and remain the same under the Governance Committee alternative. The dependable capacity would be reduced by between nine and sixteen megawatts in the summer months. Dependable capacity is the maximum power available at any time to meet instantaneous electric load. Utilities must plan on having enough capacity available to meet the maximum foreseeable instantaneous peak load, plus a required reserve margin in order to assure reliable electric service.

The capacity losses caused by the action alternatives result from less water storage at reservoirs associated with two hydroelectric power plants that provide Western with load following capability. There would be less water stored in Seminoe Reservoir. The reduced elevation difference between Seminoe Reservoir and Kortes Reservoir, which serves as the regulating afterbay for the Seminoe power plant, means that less instantaneous power can be generated at the Seminoe plant for a given turbine flow and less energy can be generated to follow load during any given day. The same holds true for Pathfinder Reservoir, Alcova Reservoir, and the Fremont Canyon power plant.

The loss of the dependable capacity would be permanent. For the purpose of this analysis, the loss of capacity will be compensated by Western acquiring an equivalent share in a large peaking combustion turbine (CT) instead of purchasing capacity on an annual basis. The CT capacity would offset non-spinning reserves currently held at LAP projects. Those projects could then be used to follow load to a greater extent than they do now because less space would need to be kept available in regulating afterbays (or storage in forebays) on a daily basis. This displacement is possible only because the lost dependable capacity is a relatively small amount. The CT capacity would only be called on in the event of a reserve call. The capital cost of a large CT is about $430,000 dollars per mega-watt in this region with a design life of 30 years. That comes to about $28,000 per megawatt per year when amortized over 30 years at an assumed discount rate of 5 percent. The annual maintenance cost of a CT is about $4,400 per year per megawatt if it runs 5% of the time. Fuel costs are not considered in this analysis as the assumption is that the capacity will only be called upon for emergencies.

Program Costs

The EIS states that the Federal Government will pay fifty percent of the Program costs and the States will pay the other fifty percent. The EIS assumes that any action alternative will be fully funded but does not address the source of funding of the Federal Government’s share. The cost of implementing many of the alternatives is significant, with some in excess of $200 million. Such costs, if shared by Western’s rate payers, could be in the tens of millions of dollars.

Western assumes that the U.S. Government’s share will be considered non-reimbursable and, as such, will not in any part be considered a multipurpose cost of any LAP facility. As a non-reimbursable cost, it would not become a cost that must be recovered through the LAP rates.