

**SPECIES RECOVERY OBJECTIVES FOR FOUR
TARGET SPECIES IN THE CENTRAL AND LOWER
PLATTE RIVER
(WHOOPIING CRANE, INTERIOR LEAST TERN,
PIPING PLOVER, PALLID STURGEON)**

June 26, 2002

Prepared for:

U.S. FISH AND WILDLIFE SERVICE

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EXECUTIVE SUMMARY

The Fish and Wildlife Service (FWS) believes it is important to know more specifically the number of individuals or other measurable biological responses that could be supported by the central Platte River and contribute to the recovery of the least tern, piping plover, and whooping crane and that could be supported by the lower Platte River and contribute to the recovery of the pallid sturgeon. Pursuant to its responsibilities under the Endangered Species Act of 1973 (ESA), the FWS initiated an effort to determine if species recovery objectives specific to the Platte River could be developed.

Establishing species recovery objectives is not being done as part of the Platte River Cooperative Agreement (CA) process. This report identifies recovery objectives, to the extent possible, and makes other recommendations for the least tern, piping plover, and whooping crane in the central Platte River and for the pallid sturgeon in the lower Platte River. Achieving recovery objectives alone, however, does not determine species recovery. "Recovery" only occurs when the reasons for listing the species (e.g., threats) have been removed. The information and recommendations in this report can be used by the FWS and others in focusing recovery activities for these species along the Platte River, including future monitoring and research activities and long-term planning efforts. This report can also be utilized by the respective species recovery teams when preparing future amendments to species recovery plans. Information and recommendations in this report are based on pooled expert opinion and are subject to modification when new information indicates that change is appropriate.

The FWS identified a number of individuals who possess broad knowledge and expertise about the four target species, and the subcontractor conducted workshops to gather expert opinion and data in developing species objectives. The purpose was to select a manageable number of experts (approximately eight to ten per species) that were very knowledgeable of the biology and needs of the species throughout their entire ranges and/or on the Platte River. The subcontractor used the workshop results, scientific data, and collaboration with the FWS in preparing this report and its recommendations.

A major contribution to this report was a workshop of species experts for all four target species that was conducted on September 26-27, 2000, at the Platte River Whooping Crane Habitat Maintenance Trust facility near Wood River, Nebraska. Sessions were held with three separate species groups (whooping crane, pallid sturgeon, and least tern/piping plover). All three groups operated by consensus, with minority and majority opinions recorded. The groups used the best available scientific data, knowledge and judgements in their deliberations. There were 34 individuals who participated in all or part of the workshop. There were eight species experts that were unable to attend the workshop.

In addition, a follow-up workshop to further discuss the whooping crane was held at the same location on February 15, 2001. The results of that workshop were a significant contribution to the whooping crane section of this report.

Not all the recommendations made in this report were necessarily agreed to by all of the workshop participants. Most minority opinions that were expressed were disputed by the species experts identified by the FWS. Therefore, the information and recommendations in this report tends to rely on the opinions and data presented by those species experts.

This report follows the Scope of Work and Consulting Agreement dated June 23, 2000. The subcontractor completed a draft report on October 22, 2001. The draft report was distributed to workshop participants and the 8 species experts that were unable to attend a workshop for their technical review and comment. A copy of the draft was also distributed to the CA's Governance Committee. All comments received were considered in preparing this report.

Interior Least Tern and Piping Plover

The Recovery Plan for the Northern Great Plains population of piping plovers states a goal of 465 piping plover pairs for all of Nebraska and 140 pairs (280 adults) maintained for 15 years for the Platte River. The Recovery Plan for the interior least tern states a goal of 1520 adults for all of Nebraska and 750 adult breeding birds maintained for 10 years for the Platte River. It is recommended that the FWS continue to recognize these as valid population recovery goals unless they are changed through the FWS recovery planning process. Both recovery plans were written without much knowledge or consideration of least tern and piping plover activity on the North Platte River (including Lake McConaughy) and the South Platte River in Nebraska. Therefore, the goals for the Platte River in the existing recovery plans exclude North and South Platte River birds. However, birds on the North Platte River (including Lake McConaughy) and the South Platte River should not be ignored for their potential contribution to the overall species recovery goals.

The purpose of this report is to identify species recovery objectives for the "central" Platte River because it is this area where intensive management and monitoring will be directed under the Platte River Cooperative Agreement and eventual Recovery Program. Identifying objectives for the central Platte River is not intended to ignore the importance of the Lower Platte River, North Platte River or South Platte River for their contribution to least tern and piping plover recovery. It is recognized that terns and plovers in the Platte River system interact with each other, and birds on the central Platte River should not be considered a separate population. The central Platte River for this report is defined as from Lexington to Columbus, Nebraska, because Columbus is where major tributaries, principally the Loup River, enter the Platte River and where the Platte River changes character.

There is evidence that least terns and piping plovers existed and nested historically on the Platte River. Changes to the hydrology of the river and other factors have significantly reduced natural sandbar habitat on the North Platte, South Platte, and central Platte Rivers desired by least terns and piping plovers for nesting. The current habitat situation is a limiting factor on these rivers for the recovery of least tern and piping plover populations.

The vast majority of terns and plovers occur along the Platte River proper (including adjacent sand pits). The majority of birds on the North Platte River occur along the shoreline of Lake McConaughy. Very few birds occur along the South Platte River in Nebraska. Based on survey data, there is a long-term average of 166 piping plovers and 549 least terns on the Platte River (upper, central, and lower Platte River).

Least terns and piping plovers declined on the central and lower Platte Rivers during the period 1987-1998. The decline for both species is significant on sandpit sites on the central Platte River where most terns and plovers nested. The decline was significant for least terns on sandbar habitat in the lower Platte River. The upper Platte River supports very few terns and plovers and most occur on sandpits because the river channel in that stretch is extremely degraded. The shoreline of Lake McConaughy is not a significant nesting area for least terns but is relatively important for piping plovers.

The population trends for terns and plovers on Lake McConaughy are slightly positive for piping plovers and slightly negative for least terns. Statewide in Nebraska, least terns and piping plovers are undergoing a significant population decline.

This report recommends objectives for numbers of birds, distribution, and fledge rates for least terns and piping plovers on the central Platte River. The recommended numbers objective for piping plovers is 126 birds on the central Platte River. The objective for least terns is 300 birds on the central Platte River. These recommendations are based on the existing recovery plans for the species, data regarding their population status and trends on the Platte River, existing literature, and professional judgements of species experts at the September 2000 workshop.

The recommended distribution objective for both least terns and piping plovers on the central Platte River is that no fewer than 25 percent and no greater than 75 percent of the birds occur above Kearney, Nebraska over a 10 year average. Nesting habitat can occur at both sand pits and instream sites. These recommendations are based on Nebraska Game and Parks Commission survey data and professional opinions of species experts at the September 2000 workshop.

The recommended fledge rate objectives for the central Platte River is 1.13 chicks per pair for a 3-year running average for piping plovers and 0.70 chicks per pair for a 3-year running average for least terns. These recommendations are based on data presented by

agencies that track these birds on the Platte River, existing literature and reports, and professional opinions of species experts at the September 2000 workshop.

Sand pits, created by commercial sand and gravel operations, provide artificial, alternative nesting areas (nesting substrates) for least terns and piping plovers. Sand pits that are managed for tern and plover production are important for recruiting birds into the population, especially when riverine habitats are not available for nesting and fledging. Both riverine habitats and sand pits should be managed for tern and plover production, however sand pits should not be considered a substitute for river habitat.

Since there does not appear to be a comprehensive description of sand pit habitat, especially foraging habitat, on the Platte River, it is recommended that such an investigation be conducted and reported. Data should be gathered on the characteristics of successful tern and plover nesting, fledging and foraging on sand pits along the Platte River. In addition, the investigation should assess the features of sand pit habitat that would best facilitate their role in assisting to achieve recovery levels for terns and plovers.

All breeding adults and fledged piping plover and least tern chicks, whether they fledge from sand pits or riverine habitats, should count towards recovery and fledge rate objectives. All agencies and organizations that report tern and plover data on the Platte River should use standardized reporting of fledge rates by reporting tern and plover “chicks per pair” rather than “chicks per nest.” In addition, how numbers of pairs are determined and how numbers of young fledged are determined should be standardized among reporting agencies and organizations.

Whooping Crane

This report confirms the goal in the existing Recovery Plan that the minimum viable population for the Aransas/Wood Buffalo Population (AWP) is 1000 individuals, including 250 breeding pairs, sustained for a minimum of a decade until the species is downlisted to threatened. Given that the recovery goal for the AWP is 1000 whooping cranes, this report recommends that habitat on the central Platte River be managed for 100 percent of the recovered AWP (1000 birds).

The AWP (the species’ only self-sustaining wild migratory flock) is experiencing a gradual positive population trend overall, although some years exhibit stationary or negative results. It was essentially a declining population in 2000 to 174 individuals in spring 2001 and also in February 2002.

Whooping cranes historically used the Platte River as a major stopover area. Numerous studies have documented the physical changes to the central Platte River which has

resulted in habitat loss for whooping cranes. The Platte River from Lexington to Denman was designated as critical habitat for whooping cranes on May 15, 1978.

Although this report is not being done under the Platte River Cooperative Agreement, whooping crane experts considered proposed habitat protection scenarios in relation to habitat needs for migratory whooping cranes in the AWP that stop over on the Platte River. The location of suitable whooping crane habitat may be more important than the amount of habitat. From a spacial distribution standpoint, suitable habitat in each of the 10 bridge segments seems sufficient if it were available. The approximately 2900-acre habitat complex per each of 10 bridge segments (such as that described in the Platte River Management Joint Study and referenced in the Cooperative Agreement) is preferred over smaller units. However, smaller units may still be beneficial to whooping cranes if they contain suitable whooping crane habitat and are sufficient in number and spacing to be detectable to cranes flying over the Platte River. These habitat complexes should not be a substitute for maintaining the ecological integrity of the Platte River system. Existing suitable habitat should remain along the central Platte River exclusive of future restored and managed habitat.

The migration pathway of whooping cranes through Nebraska is approximately 150 miles wide, with a north-south orientation, approximately 15 degrees west of “true” north. The 150-mile corridor along the Platte River extends from roughly North Platte to Grand Island, although the “central” Platte River covers only 80 miles at the eastern end of the 150-mile corridor. About 83 percent of the sightings in Nebraska occurred within the 150-mile corridor, with the remaining (17 percent) occurring west of that corridor. In the 80-mile migration corridor from Lexington to Grand Island, 74 percent of the confirmed statewide sightings from 1942-2001 occurred.

Since whooping cranes pass over the upper Platte River, provisions for their stopover needs should not be excluded west of the central Platte River (North Platte to Lexington). However, the feasibility of habitat development and management in this area is questionable. If it is determined at a future time that some habitat development and management is feasible in the upper Platte River area, a 90:10 split in terms of the proportion of whooping crane use or stopovers could be selected as a revised objective at that time. That is, management could occur for 90 percent of whooping crane stopovers on the central Platte River and for 10 percent of stopovers west of the central Platte River. The rationale for the 90:10 split is that if 10 habitat complexes are developed along bridge segments from Lexington to Chapman, as currently proposed, and if at least one habitat development occurred west of the central Platte River, then roughly 90 percent of new recovered suitable habitat would be available in the central Platte River and 10 percent would be available west of the central Platte River. This report stresses that existing suitable habitat should remain on the central Platte River exclusive of future restored and managed habitat.

Population ratios are difficult to establish and monitor because the detection of bird stopovers varies with effort and the efficiency of detecting stopovers is really not known. Recognizing this problem, this report recommends that population ratios be tested as indices of whooping crane use of the Platte River and to estimate the potential changes in use. Separate ratios would be calculated for fall and spring populations. There is also a need to use an index of whooping crane use on the river as an additional measure of habitat attractiveness. Habitat suitability models should be used as additional tools to evaluate habitat and habitat changes for whooping cranes.

In addition, several research and monitoring needs are recommended:

1. Continue current monitoring of whooping crane use and associated habitat.
2. Continue to refine the habitat roost model and techniques for evaluating habitat quality for whooping cranes as a management tool.
3. Continue to monitor sandhill crane use as one measure of habitat suitability and management progress.
4. Whooping crane behavior, habitat use, and time-budget data should be studied regarding use of the central Platte River.

Pallid Sturgeon

The Pallid Sturgeon Recovery Plan is currently undergoing an update. The existing Recovery Plan includes both short-term and long-term recovery objectives. The short-term goal is to prevent extinction by removing adults from the wild and establishing captive broodstock populations. The long-term recovery objective is to downlist or delist the species by 2040 through protection and habitat restoration activities, provided that certain criteria are met. The Recovery Plan designates six Recovery Priority Management Areas (RPMA) within the historical range of the pallid sturgeon. One of the RPMA's is the Missouri River at the mouth of the Platte River. Confluences with tributaries were emphasized in selecting some Recovery Priority Management Areas because of their known importance as feeding and nursery areas for large river fish.

Historical and recent records document the existence of pallid sturgeon in the lower Platte River (defined in this report as from the mouth of the Loup River to the confluence with the Missouri River). Hatchery-propagated pallid sturgeon have recently been released in the lower Platte River. Tracking data suggests that some sturgeon released into the Platte River moved out into the Missouri River and subsequently returned to the Platte River. Some sturgeon also over-wintered in the lower Platte River. This indicates the likelihood that habitat in the lower Platte River is suitable for sub-adult pallid sturgeon. In addition, larval sturgeon species have been collected in the lower Platte River indicating that suitable spawning conditions and habitat for sturgeon exist. The lower Platte River is a free-flowing stretch without barriers that would impede migration or movement of adult, juvenile or larval sturgeon. The available data indicate that the lower Platte River is used by pallid sturgeon. The extent of use and the relative

importance of the Platte River to pallid sturgeon are unknown at this time. Based upon the best available knowledge and the current understanding of the requirements of the pallid sturgeon, the lower Platte River, from the confluence with the Elkhorn River to the mouth of the Platte River at the Missouri River, should be included in the Recovery Priority Management Area unit and should be considered when implementing recovery actions for the pallid sturgeon.

Due to recent telemetry data on hatchery-reared pallid sturgeon, habitat quality and similarity to the conditions of the Platte River below the Elkhorn River, the area of the Platte River below the Loup River could also provide the conditions necessary for pallid sturgeon survival and should not be ruled out for future recovery efforts. The importance of this area to pallid sturgeon and its life history is currently unknown and may be important to pallid sturgeon. Further information should be obtained to further quantify its importance to the species.

Biologists are continually limited by the paucity of data available to answer two fundamental questions: 1.) What is the importance of the Platte River to pallid sturgeon? and 2.) How will recovery actions on the Platte River contribute to pallid sturgeon recovery? Without sufficient data to address these questions, defensible quantifiable recovery objectives for the pallid sturgeon in the Platte River are difficult to develop. Additional studies will be required in order to obtain the data necessary to establish specific quantifiable objectives for the pallid sturgeon in the lower Platte River.

The following recommendations are made regarding critical data needs in order to develop specific recovery objectives:

1. **Habitat Protection.** Preserve, or restore where appropriate, the hydro-geomorphic processes and functions that are responsible for creating or maintaining the physical habitat template characteristic of the lower Platte River: a dynamic, sandy, free-flowing, braided river. Recovery actions should attempt to restore or maintain natural hydrologic regimes, including sediment discharge relationships, and work to capture the extent of the natural variability inherent in these physical processes. Actions which alter these processes or limit system variability should be examined both incrementally and additively to determine the nature and extent of their impact to pallid sturgeon recovery.

2. **Document, Characterize and Assess Pallid Sturgeon Habitat.** Identify existing data and collect additional information to determine the historic and current chemical and physical habitat conditions and processes in the Platte River. Documentation and characterization of quantifiable parameters should include baseline information on hydrology, sediment transport, temperature, bed form, channel complexity and water quality. Habitat conditions and processes should be related to habitat used by pallid sturgeon. An assessment can then be conducted to determine the quality and quantity of habitat for pallid sturgeon in the Platte River.

3. Determine the Contribution of the Lower Platte River to Recovery of Pallid Sturgeon. Develop baseline information on pallid sturgeon for the Platte River, including the abundance, distribution and population structure of pallid sturgeon in the Platte River. Determine the importance of the Platte River for reproduction and document subsequent larval development and juvenile rearing through recruitment to the adult population.
4. Develop Quantifiable Population Recovery Objectives. Criteria addressing minimum viable population size and demography for Recovery Priority Management Area 4 must be determined to guide and monitor recovery actions.
5. Monitoring. Develop effective habitat assessment tools and effective sampling techniques for pallid sturgeon. Design an appropriate long-term monitoring program to collect baseline data and quantify biological responses and habitat changes in response to recovery actions.
6. Information Management and Education. Develop and distribute information and educational materials on the pallid sturgeon and its ecosystem. Encourage and support communication and publication of pallid sturgeon data and research.

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APPENDIX B - Participants at September 26-27, 2000 Workshop

APPENDIX C - Participants at February 15, 2001 Follow-up Whooping Crane Workshop

SPECIES RECOVERY OBJECTIVES FOR FOUR TARGET SPECIES IN THE CENTRAL AND LOWER PLATTE RIVER (WHOOPIING CRANE, INTERIOR LEAST TERN, PIPING PLOVER, PALLID STURGEON)

I. INTRODUCTION

A. Background

Pursuant to the July 1997 Cooperative Agreement for Platte River Research and Other Efforts Relating to Endangered Species Habitats Along the Central Platte River, Nebraska (Cooperative Agreement), a variety of monitoring and research studies, as well as habitat protection plans are being proposed and developed for the central and lower reaches of the Platte River in Nebraska. The Cooperative Agreement implements certain aspects of the Fish and Wildlife Service's (FWS) recovery plans for the target species (interior least tern, piping plover, whooping crane and pallid sturgeon) that relate to their associated habitats. However, it is not developing species recovery objectives for the target species. The Cooperative Agreement defines the central Platte River as from Lexington to Chapman, Nebraska, and it defines the lower Platte River as between its confluence with the Elkhorn River and its confluence with the Missouri River. The intent of the Cooperative Agreement is to develop and implement a basin-wide Recovery Program after appropriate analyses and reviews are complete.

The FWS recovery plans for the four target species may discuss species and habitat needs on the Platte River and may even have numerical recovery objectives for the Platte River. However, they do not specify quantifiable and measurable recovery objectives for the central reach of the Platte River (least tern, piping plover, whooping crane) or lower reaches of the Platte River (pallid sturgeon) in terms of numbers of animals or some other measurable biological response. For example, the recovery objective in the current recovery plan for the interior least tern on the Platte River is 750 breeding pairs, but that objective is not limited to only habitats occurring in the central Platte River or to some other type of measurable biological response for the species.

B. Purpose of Report

The FWS believes it is important to know more specifically the number of individuals or other measurable biological responses that could be supported by the central Platte River and contribute to the recovery of the least tern, piping plover and whooping crane and that could be supported by the lower Platte River and contribute to the recovery of the pallid sturgeon. Establishing species recovery objectives for the target species is not being done as part of the Cooperative Agreement process. The information and recommendations in this report can be used by the FWS and others in focusing recovery activities for these species along the Platte River, including monitoring and research

activities and other long-term planning efforts. There is a need to know “how much is enough” to recover these species on the central and lower Platte River (i.e., when is the Platte River no longer considered by the FWS to be a limiting factor in the recovery of these species).

Establishing species recovery objectives for the target species is also not being done under the official FWS recovery planning process. This report is not intended to duplicate information and recovery actions in the recovery plans. However, the Recovery Teams may choose to use the information from this report they deem appropriate in revising any of the Recovery Plans or for other recovery purposes. The Recovery Plans for the whooping crane and pallid sturgeon are currently being updated.

Therefore, the purpose of this report is to identify recovery objectives for the least tern, piping plover, and whooping crane in the central Platte River and for the pallid sturgeon in the lower Platte River by which progress toward recovery of these species can be measured. Achieving recovery objectives alone, however, does not determine species recovery. “Recovery” only occurs when the reasons for listing the species (e.g., threats) have been removed. This report should not be viewed as a “final” product. It should be subject to change as new scientific information becomes available under “adaptive management” principles.

This report follows the Scope of Work and Consulting Agreement dated June 23, 2000. The subcontractor completed a draft report on October 22, 2001. The draft report was distributed to workshop participants and the 8 species experts that were unable to attend a workshop for their technical review and comment. The draft report was also distributed to the Cooperative Agreement’s Governance Committee for its review and comment. All comments received were considered in preparing this report.

II. METHODOLOGY

Since the FWS needs to know more specifically the recovery objectives for the target species in the central and lower Platte River, the subcontractor worked closely with the FWS and species experts in preparing this report. The FWS identified individuals who possess broad knowledge and expertise about the four target species, and the subcontractor conducted workshops to gather expert opinions and data regarding species objectives. The subcontractor used this information in collaboration with the FWS in preparing this report. Not all the recommendations made in this report were necessarily agreed to by all of the workshop participants. Most minority opinions that were expressed were disputed by the species experts identified by the FWS. Therefore, the information and recommendations in this report tend to rely on the opinions and data presented by those species experts.

A. Species Experts

The FWS originally identified 28 species experts for the four target species that the subcontractor should contact for their participation in developing species objectives. Five additional species experts were later added and participated in the process. The purpose was to select a manageable number of experts (approximately 8 to 10 per species) that were very knowledgeable of the biology and needs of the species within their entire ranges and/or on the Platte River. A list of species experts identified by the FWS is in Appendix A.

B. Technical Workshops

B.1. September 26-27, 2000 Workshop

B.1.1. Procedures

A major contribution to this report was a workshop of species experts for all four target species that was conducted on September 26-27, 2000 at the Platte River Whooping Crane Habitat Maintenance Trust facility near Wood River, Nebraska. Sessions were held with all participants together, however the participants spent most of their time in three separate species groups (whooping crane, pallid sturgeon, and least tern/piping plover). Each species group selected a group leader and a recorder and established ground rules on how the group would operate. All three groups operated by consensus, with minority and majority opinions recorded. The groups used the best available scientific data, knowledge and judgements in their deliberations. Members of each species group presented pertinent information regarding the species recovery efforts, work on recovery plans, updates on species status, research, etc. It was stressed that, to the extent possible, objectives needed to be quantifiable and measurable. The species groups were urged to consider establishing criteria (such as targets for minimum population levels, number of populations, population mortality rates, population reproductive rates, establishment of new colonies, number of nesting pairs, fledge rates, etc.) in developing objectives. Therefore, the recommendations and information in this report are based on the discussions and conclusions among the participants at the workshop, the technical scientific information that was presented, and collaboration with the FWS.

B.1.2. Attendees and Minutes of Workshop

There were 34 individuals that participated in all or part of the workshop (Appendix B). The complete minutes of the workshop and data presented and/or handed out at the workshop are on file with the FWS.¹ There were eight species experts that were unable to attend the workshop. In addition, there were attendees that were biologists familiar with the Platte River and the

¹ *December 15, 2000, Minutes of Workshop to Develop Species Recovery Objectives for Four Target Species in the Central and Lower Platte River (Whooping Crane, Least Tern, Piping Plover, Pallid Sturgeon), September 26-27, 2000.*

target species that participated in the workshop but were not identified by the FWS as species “experts.”

B.2. February 15, 2001 Workshop

B.2.1. Procedures

Another major contribution to the whooping crane section of this report was a whooping crane workshop that was conducted on February 15, 2001 at the Platte River Whooping Crane Habitat Maintenance Trust facility near Wood River, Nebraska. This workshop was a follow-up workshop to the workshop held in September 2000. There were numerous questions and issues discussed at the September workshop regarding whooping cranes that were not addressed or resolved. The February 15, 2001 workshop was intended to address these issues and to develop quantifiable recovery objectives for whooping cranes along the Platte River, if possible. Therefore, the recommendations and information in the whooping crane section of this report are based on the discussions and conclusions among the participants at the February 15 workshop, as well as the September 2000 workshop, the technical scientific information that was presented, and collaboration with the FWS.

B.2.2. Attendees and Minutes of Workshop

There were 11 individuals that attended all or part of the workshop and two individuals that participated by conference call for part of the workshop (Appendix C). The complete minutes of the workshop and data presented and/or handed out at the workshop are on file with the FWS.² The composition of the February 15 workshop was considerably different than the whooping crane group at the September workshop. Three whooping crane experts were unable to attend or otherwise participate in the workshop. In addition, two experts that attended the September workshop were only able to participate for a limited time via conference call at the February 15 workshop. There were several biologists familiar with the Platte River and whooping cranes that participated in the workshop but were not identified by the FWS as species “experts.”

C. River Reach Definitions

The Cooperative Agreement defines the central Platte River as from Lexington to Chapman, Nebraska, and it defines the lower Platte River as between its confluence with the Elkhorn River and its confluence with the Missouri River. For the purpose of this report for least terns and piping plovers, the central Platte River is defined as from Lexington to Columbus, Nebraska. Columbus is where major tributaries (principally, the Loup River) enter the Platte River and where the character of the river changes significantly. For whooping cranes, the definition of the central Platte River in this report is the same as in the Cooperative Agreement. The definition of the lower Platte River for this report is the mouth of the Loup River to the confluence with the Missouri

² *April 19, 2001 Minutes of Follow-up Whooping Crane Workshop, February 15, 2001.*

River. The upper Platte River, as defined in this report, is from Lexington upstream to North Platte, Nebraska.

III. SPECIES RECOVERY OBJECTIVES AND RECOMMENDATIONS

A. INTERIOR LEAST TERN AND PIPING PLOVER

A.1. Existing Recovery Plan Goals and Objectives

The Recovery Plan for the Northern Great Plains population of piping plovers³ states a goal of 465 piping plover pairs for all of Nebraska and 140 pairs (280 adults) maintained for 15 years for the Platte River. The Recovery Plan for the interior least tern⁴ states a goal of 1520 adults for all of Nebraska and 750 adult breeding birds maintained for 10 years for the Platte River. It is recommended that the FWS continue to recognize these as valid population recovery goals unless they are changed through the FWS recovery planning process.

Both recovery plans were written without much knowledge or consideration of least tern and piping plover activity on the North Platte River (including Lake McConaughy) and the South Platte River in Nebraska.⁵ At the time the recovery plans were written, the Recovery Teams did not consider the South Platte or North Platte Rivers as central to recovery of the species.⁶ Therefore, the goals for the Platte River in the existing recovery plans exclude North and South Platte River birds. However, birds on the North Platte River (including Lake McConaughy) and the South Platte River should not be ignored for their potential contribution to the overall species recovery goals.

A.2. Relationship of Existing Recovery Plans to Recommended Objectives in this Report

The purpose of this report is to identify species recovery objectives for the “central” Platte River because it is this area where intensive management and monitoring will be directed under the Platte River Cooperative Agreement and eventual Recovery Program. Identifying objectives for the central Platte River is not intended to ignore the importance of the Lower Platte River, North Platte River or South Platte River for their contribution to least tern and piping plover recovery. It is recognized that terns and plovers in the Platte River system interact with each other, and birds on the central Platte River should not be considered a separate population. If recovery plan

³ *Department of the Interior, U.S. Fish and Wildlife Service, Great Lakes and Northern Great Plains Piping Plover Recovery Plan, May 12, 1988.*

⁴ *Department of the Interior, U.S. Fish and Wildlife Service, Interior Population of the Least Tern Recovery Plan, September 19, 1990.*

⁵ *John Sidle, U.S. Forest Service, Chadron, Nebraska. Personal Communication: April 17, 2001.*

⁶ *Ross Lock, Nebraska Game and Parks Commission, Lincoln, Nebraska. Personal Communication: April 18, 2001.*

objectives for the entire Platte River are met in the future (i.e., 280 adult piping plovers and 750 adult breeding least terns), then the objectives for the central Platte River may need to be revisited. In addition, if recovery objectives are achieved in the future on the central Platte River, they should be revisited and the new information should be viewed in conjunction with production and habitat data from other segments of the Platte River.

A.3. Habitat Limitations on the Central Platte River

Numerous studies have documented the changes to the central Platte River channel area. The central Platte River near Grand Island during the period of 1813-57 varied in width from .5 to 3 miles across. Additional documentary evidence provides measurements in the same area that list the width as greater than 1,100 yards prior to 1899, but showing a drastic decrease to about 550 yards in 1899, 330 yards in 1913, and 305 yards in 1919.⁷ Further west, the North Platte River in the fall of 1845 was merely a succession of sandbars among which the channel was divided into rivulets a few inches deep.⁸ Reservoir storage of flows responsible for scouring sandbars has resulted in the encroachment of vegetation along many rivers such as the Platte River and greatly reduced channel width.⁹ Sandbar habitat along the Platte River between North Platte and Grand Island has largely disappeared due to changes in flow regimes caused by dams and diversions upstream.¹⁰ In addition, river main stem

⁷ Williams, G.P. 1978. *The case of the shrinking channels - the North Platte and the Platte Rivers in Nebraska*. U. S. Geological Circular No. 781.

⁸ Fremont, J.C. 1845. *Report of the exploring expedition to the Rocky Mountains*. Washington, D.C. 693 pp.

⁹ Currier, P. J., G. R. Lingle, and J. G. VanDerwalker. 1985. *Migratory bird habitat on the Platte and North Platte Rivers in Nebraska. The Platte River Whooping Crane Habitat Maintenance Trust, Grand Island, Nebraska*.

O'Brien, J. S., and P. J. Currier. 1987. *Channel morphology, channel maintenance and riparian vegetation changes in the big bend reach of the Platte River in Nebraska*. Unpublished report. 49 pp.

Eschner, T., R. Hadley, and K. Crowley. 1981. *Hydrologic and morphologic changes in the Platte River Basin in Colorado, Wyoming and Nebraska: a historical perspective*. U. S. Geological Survey open file report 81-1125. U. S. Geological Survey, Denver, Colorado.

Lyons, J., and T. Randle. 1988. *Platte River channel characteristics in the big bend reach*. U. S. Bureau of Reclamation, Denver, Colorado. Unpublished report. 69 pp.

Sidle, J. G., E. D. Miller, and P. J. Currier. 1989. *Changing habitats in the Platte River valley of Nebraska*. *Prairie Naturalist* 21:91-104.

Stinnett, D. P., R. W. Smith, and S. W. Conrady. 1987. *Riparian areas of western Oklahoma: a special study of their status, trends and values*. U. S. Fish and Wildlife Service, Tulsa, Oklahoma. Unpublished report. 80 pp.

¹⁰ Williams, G. P. 1978.

Currier et al. 1985.

Ziewitz, J. W., J. G. Sidle, and J. J. Dinan. 1992. *Habitat conservation for nesting Least Terns and Piping Plovers on the Platte River, Nebraska*. *Prairie Naturalist* 20:1-20.

reservoirs now trap much of the sediment load resulting in less aggradation and more degradation of the river bed and subsequently less formation of suitable sandbar nesting habitat. No suitable sandbars with relatively bare sand that terns and plovers can use for nesting occur between North Platte and Lexington, and few occur between Lexington and the Loup River confluence.¹¹ Remaining nesting areas on the central Platte River are typically low in elevation above water level and occur in the few existing wide channels. Nests and chicks are frequently lost on these low sandbars along the central Platte River during small flow increases.¹² Most birds on the central Platte River nest on sand pits. More sand pit than sandbar sites are used because of the poor condition of central Platte River sandbars.¹³ Sand pits provide most of the nesting substrate for least terns and piping plovers between North Platte and Lexington (upper Platte), and most terns and plovers nest on sand pits along the central Platte.¹⁴ In contrast, the lower Platte River (Columbus, Nebraska to the Missouri River confluence) has not undergone as extensive habitat changes as the central Platte River.¹⁵ High bare sandbars and wide channels are common on the lower Platte River.¹⁶ The lower Platte and Loup rivers still experience periodic scouring flows.¹⁷

Early records document least terns and piping plovers in Nebraska and along the Platte River in the 1800's.¹⁸ Among the accounts included Duke Paul Wilhelm's observation of the least tern at the mouth of the Platte River during his journey in 1823. Lewis and Clark recorded piping plovers and least terns along the Missouri River in Nebraska. Their sighting of the piping plover was prior to the 1823 designation of the species. Lewis frequently observed least terns nesting on Missouri River sandbars on August 5, 1804. The Warren Expedition also recorded piping plovers and least terns, mostly by Ferdinand Hayden. The piping plover (which Hayden said occurred only on the Platte River) was seen with the least tern on the Loup Fork near the Platte. Hayden found piping plovers on the Loup Fork of the Platte in 1857 and described them as very abundant on the sandbars in the Platte; seen nowhere else in the West (Hayden 1863a). Hayden described least terns as not

¹¹ Ziewitz et al. 1992.

¹² Kirsch, E. M. and G. R. Lingle. 1993. *Habitat use and nesting success of Least Terns on the Platte River, Nebraska. Proceedings of the Missouri River and its tributaries: Least Tern and Piping Plover Symposium. Brookings, South Dakota: South Dakota State University.*

¹³ Ziewitz et al. 1992.

¹⁴ Sidle, J. G., E. C. Wilson, J. J. Dinan, J. Lackey, G. Wingfield, B. K. Good, G. R. Lingle, and R. G. Plettner. 1991. *The 1991 census of Least Terns and Piping Plovers in Nebraska. Nebraska Bird Review 4:133-149.*
Kirsch and Lingle 1993.

¹⁵ Kirsch and Lingle 1993.

¹⁶ Ziewitz et al. 1992.

¹⁷ Sidle et al. 1992.

¹⁸ Ducey, James E. 2000. *Birds of the Untamed West: The History of Birdlife in Nebraska, 1750 to 1875. Making History. Omaha, Nebraska.*

abundant, though widely distributed along the Western streams; collected from the Platte (Hayden 1863a). Naturalist George Suckley reported on birds species during his travels in the northwest Kansas and Nebraska areas of the Platte River Road in 1859. He noted a least tern on the North Platte River. Least terns were reported in 1823 flying about at the mouth of the Platte River (Wilhelm 1928). Least terns were reported on the Platte River on July 10, 1857 (Warren in Baird et al. 1860). One least tern was reported on July 15, 1859 on the North Platte River east of Ash Hollow (Suckley in Beidleman 1956).

Other historical accounts have identified the least tern as a common migrant, especially in northeastern Nebraska, with identified sites in 1866, 1893, 1897, and 1903.¹⁹ The piping plover was identified as a fairly common migrant along the Platte River and common in Nebraska.²⁰ In the 1920's, least terns were found nesting in a colony on sandbars in the South Platte River near North Platte.²¹ Terns were also present in 1930, but a terrific storm killed some adults and reduced the colony to about half its former size. The next observation was in 1941 when birds were found nesting on sandbars in the river near Columbus.²² Two miles east of Brule, 6 pair of terns were found nesting on a sandbar in the South Platte River in 1948.²³ In 1949, nesting was recorded again on the South Platte River in the North Platte area.²⁴ The longest field study of least terns on the Platte River was carried out by Dr. Ray S. Wycoff, who studied activity south of Lexington for 17 years.²⁵ The nesting area was a low sandbar not over 75 feet wide and about 200 feet long. Many observations were made throughout the years. Some of the higher populations recorded were: 1949 (35); 1950 (20); 1953 (24); and 1954 (25). Vegetative encroachment on the sandbar decreased the suitability of the site, and the birds eventually moved to nearby sandpits to nest. Although observations for the long term study ended in 1959, nesting was observed again in this locality ten years later.²⁶

¹⁹ Bruner, Lawrence, Robert H. Wolcott, and Myron H. Swenk. *About 1903. A Preliminary Review of the Birds of Nebraska with synopses.* Omaha, Klopp and Bartlett. 116 pp.

Bruner, Lawrence. 1896. *Some Notes on Nebraska Birds, a list of the species and subspecies found in the state, with notes on their distribution, food-habits, etc. Corrected to April 22, 1896.* Lincoln, Neb., State Journal Company.

²⁰ Bruner et al. 1903

Bruner, Lawrence. 1896.

²¹ Tout, W. 1947. *Lincoln County Birds.* Privately published. 191 pp.

²² Shoemaker, F. H. 1941. *Notes on nesting least tern and piping plover.* Unpublished field notes. 1p.

²³ Benckeseer, H. R. 1948. *Notes from Brule.* NBR. 16:94-96.

²⁴ Audubon Field Notes 3:244.

²⁵ Wycoff, R. S. 1960. *The least tern.* NBR. 38:39-42.

²⁶ Wycoff, R. S. 1969. *Cornell nest record card.* Cornell Laboratory of Ornithology. Ithaca, New York.

It is evident, therefore, that least terns and piping plovers existed and nested historically on the Platte River. Changes to the hydrology of the river and other factors have significantly reduced natural sandbar habitat on the North Platte, South Platte, and central Platte Rivers desired by least terns and piping plovers for nesting. The current habitat situation is a limiting factor on these rivers for the recovery of least tern and piping plover populations.

A.4. Population Status and Trends on the Platte River

Table 1 shows 1987-1998 long-term averages of individual adult least terns and piping plovers. The vast majority of terns and plovers occur along the Platte River proper (including adjacent sand pits). The majority of birds on the North Platte River occur along the shoreline of Lake McConaughy. Very few birds occur along the South Platte River in Nebraska. Based on the survey data in Table 1, there is a long-term average of 166 piping plovers and 549 least terns on the Platte River (upper, central, and lower Platte River). It is recommended that, for the purpose of this report, the central Platte River for least terns and piping plovers be defined as from Lexington to Columbus, Nebraska. Columbus is where major tributaries (principally, the Loup River) enter the Platte River and where the character of the river changes significantly.

**Table 1. Current Status of Piping Plovers and Least Terns
1987 - 1998 Long-Term Averages**

	<u>Piping Plover (individuals)</u>	<u>Least Tern (individuals)</u>
South Platte	2	2
North Platte (L. McConaughy)		
(1990-1998)	70.6	11.5
Upper Platte	8.6	27.2
Central Platte	58.1	147
Lower Platte	100	375
Platte System	<u>239.3</u>	<u>562.7</u>

Source: Eileen Kirsch's working database based on Nebraska Game & Parks data.

Least terns and piping plovers declined on the central and lower Platte Rivers during the period 1987-1998. The decline for both species is significant on sandpit sites on the central Platte River where most terns and plovers nested. The decline was significant for least terns on sandbar habitat in the lower Platte River. The upper Platte River supports very few terns and plovers and most occur on sandpits because the river channel in that stretch is extremely degraded. The shoreline of Lake McConaughy is not a significant nesting area for least terns but is relatively important for piping plovers. The population trends for terns and plovers on Lake McConaughy are slightly positive for piping plovers and slightly negative for least terns. Statewide in Nebraska, least terns and piping plovers are undergoing a

significant population decline.²⁷

A.5. Recommended Central Platte River Objectives

A.5.1. Piping Plover

A.5.1.a. Numbers

Objectives for the central Platte River (Lexington to Columbus) should be 126 piping plovers as a 10-year running average, which is 45 percent of the Recovery Plan goal for the entire Platte River.

The central Platte River supported about 1/3 of the birds (58 plovers out of 166 or 35 percent) on the Platte River over the recent 10 year period (Table 1). Thirty-five percent of 280 birds (the Recovery Plan goal for the Platte River) is 98 individual birds for the central Platte River. However, 98 plovers does not appear to be enough to support a viable population on the central Platte River. This is because of several factors:

- Birds have been counted only since the early 1980's, after the central Platte River has been degraded, so 35 percent may be realistic for a degraded river, but probably too low for river habitat reaches in the central Platte River that likely will be improved through a variety of management actions. Adequate safe nesting habitat is needed to have a self-sustaining population of birds.
- The lower Platte River (below Columbus, Nebraska) has carried the bulk of piping plover production because it has superior habitat conditions for the species in comparison to the central Platte River. However, the population trend is decreasing on the lower Platte River.
- The central Platte River (as defined from Lexington to Columbus) is about 40 miles longer with more sand pits for potential nesting habitat than the lower Platte River.
- Biologically, it is better to try to spread the birds out to reduce the risk of a local catastrophe rather than being satisfied with trying to produce most of the birds from the lower Platte River. This will require significant habitat improvements on the central Platte River.

The recommended numbers objective for piping plovers on the central Platte River is based on professional judgements in view of existing scientific data. However, no analyses of population viability has been done for the central Platte River. A more thorough analysis of such parameters such as habitat quantity and quality, productivity, movements and survival may be needed in order to better determine the minimum viable population needed and specific population objectives. Therefore, based on current information, it is reasonable to expect that 45 percent of 280 adult piping plovers (the Recovery Plan goal for the Platte River), or 126 birds, should be attained on the central

²⁷ Kirsch, E.M. *Nebraska's Least Terns and Piping Plovers 1987-1999: final report.* January 10, 2001. LaCrosse, WI.

Platte River as a 10-year running average.

A.5.1.b. Distribution

The distribution objective for the central Platte River should be that no fewer than 25 percent and no greater than 75 percent of the birds occur above Kearney, Nebraska over a 10 year average. Nesting habitat can occur at both sand pits and instream sites.

There are 17 bridge segments between Lexington and Columbus. Not all of these bridge segments may be able to support nesting areas for plovers. In addition, it may take many nesting sites to form a nesting area. According to average nesting area sizes (2 plover pairs per nesting area)²⁸, there would need to be 32 plover nesting areas to meet the recommended objectives. Although it is important to have a broad distribution of nesting birds, it would be difficult, if not impossible, to attain an even distribution among bridge segments. Therefore, a specific distribution objective by bridge segment is not being recommended. However, to spread the birds out as much as possible, a significant portion of nesting birds should occur both in the upstream and downstream sections of the central Platte River. Kearney is chosen as the splitting point to prevent too much of a skewed distribution. A greatly skewed distribution (i.e., all birds nesting below, or above, Kearney) would not be acceptable. Kearney is also about in the center of the current distribution of piping plovers on the Platte River.

A.5.1.c. Fledge Rates

The fledge rate objective for the central Platte River should be 1.13 fledglings per pair for a 3-year running average for piping plovers. This recommendation is based primarily on work done by Ryan et. al.,²⁹ that described a fledge rate for piping plovers as between 0.86 and 1.13 birds fledged per pair to maintain population stability. In addition, the fledge rate recommended in the FWS biological opinion³⁰ for the Missouri River is 1.13 chicks fledged per pair for a 3-year running average. Also, the following current recruitment rates on the Platte River for various habitats over the last 10 years were discussed at the September 2000 workshop. These are summarized data only to compare current productivity on the Platte River to recommendations in the literature.

²⁸ Nebraska Game & Parks Commission survey data.

²⁹ Ryan, Mark R., Brian G. Root, and Paul M. Mayer. *Status of Piping Plovers in the Great Plains of North America: A demographic simulation model. Conservation Biology, Volume 7, No. 3, September 1993.*

³⁰ U.S. Fish and Wildlife Service, *Biological Opinion on the Operation of the Missouri River Main Stem Reservoir System, Operation and Maintenance of the Missouri River Bank Stabilization and Navigation Project, and Operation of the Kansas River Reservoir System. Submitted November 30, 2000, U.S. Fish and Wildlife Service, Region 6, Denver, Colorado and Region 3, Ft. Snelling, Minnesota, to U.S. Army Corps of Engineers, Northwest Division, Portland, Oregon. 286 pp. + appendices.*

Sand pits managed by power districts = 1.54 plover chicks fledged/ nest³¹
(0.94 plover chicks fledged/pair)³²

Unmanaged sand pits = 1.07 plover chicks fledged/nest³¹

River dredged islands = 0.62 plover chicks fledged/nest³¹

Lower Platte managed sand pits = 1.50 plover chicks fledged/pair³³

Lower Platte unmanaged sand pits = 1.04 plover chicks fledged/pair³⁴

—Lower Platte River sandbars = 0.65 plover chicks fledged/pair³⁵

In 2000 and 2001, an index of lower Platte River productivity was generated by using the number of pairs observed on the river during the summer airboat census, and the number of fledglings observed on follow-up airboat surveys. The estimated fledge rate for the river was 0.51 plover fledglings per pair in 2000 and 1.90 in 2001. The same methodology estimated 0.47 plover fledglings per pair at sand pits along the lower Platte River in 2000 and 2.90 in 2002.³⁶

A recent paper published in 2000³⁷, suggests previous estimates of fledging success are too low for population stability. Baseline models conducted by Plissner and Haig show that the five piping plover populations in the Great Lakes and Great Plains are unlikely to persist, given current reproductive rates and estimates of survivorship and dispersal. They found that a mean productivity of 2.0 fledglings per pair was required to maintain the current population size. Their analysis suggests that a fledge rate on the Platte River should be 1.7 to have an 88 percent chance of surviving 100 years and 2.0 to have a 99.8 chance of surviving 100 years.

This report acknowledges that the recent paper by Plissner and Haig suggests a higher fledge rate than recommended in this report. However, based on other existing references and the discussion at the September workshop, 1.13 fledglings per pair is recommended as the fledge rate for piping plovers on the central Platte River at this time. This report recommends that managers consider reviewing the fledge rate for piping plovers for the central Platte River in a few years, especially

³¹ *Nebraska Public Power District data.*

³² *Central Nebraska Public Power & Irrigation District data.*

³³ *Nebraska Game & Parks Commission data.*

³⁴ *Nebraska Game & Parks Commission data for years 1984, 1986, 1990, 1993, 1994, 1997, and 1998.*

³⁵ *Nebraska Game & Parks Commission Data for years 1986, 1987, 1988, 1989, 1990, 1991, 1994, and 2001.*

³⁶ Marcus, J. F., C. E. Grell, and S. L. Finkbeiner. 2000. *Tern and Plover Conservation Partnership, Year 2000 Final Report*. Unpublished report submitted to the Nebraska Game & Parks Commission. 21 pp. and data for 2001 surveys provided by Jeff Marcus to Jim Lutey on December 4, 2001.

³⁷ Plissner, Jonathan H. and Susan M. Haig. 2000. Viability of piping plover *Charadrius melodus* metapopulations. *Biological Conservation* 92:163-173.

as new research and studies become available. If a preponderance of evidence suggests that this fledge rate should be significantly different, it should be reviewed and changed as appropriate.

A.5.2. Interior Least Tern

A.5.2.a. Numbers

Objectives for the central Platte River (Lexington to Columbus) should be 300 least terns as a 10-year running average, which is 40 percent of the Recovery Plan goal for the entire Platte River.

The central Platte River supported about 1/3 of the birds (147 terns out of 549 or 27 percent) on the Platte River over the recent 10 year period (Table 1). Twenty-seven percent of 750 birds (the Recovery Plan goal for the Platte River) is 202 individual birds for the central Platte River. However, 202 terns does not appear to be enough to support a viable population on the central Platte River. This is because of the same factors as discussed under the piping plover (A.5.1.a.).

This recommended numbers objective for least terns on the central Platte River is based on professional judgements in view of existing scientific data. However, no analyses of population viability has been done for the central Platte River. A more thorough analysis of such parameters such as habitat quantity and quality, productivity, movements and survival may be needed in order to better determine the minimum viable population needed and specific population objectives. Therefore, based on current information available, it is reasonable to expect that 40 percent of 750 adult least terns (the Recovery Plan goal for the Platte River), or 300 birds, should be attained on the central Platte River as a 10-year running average.

A.5.2.b. Distribution

The distribution objective for the central Platte River should be that no fewer than 25 percent and no greater than 75 percent of the birds occur above Kearney, Nebraska over a 10 year average. Nesting habitat can occur at both sand pits and instream sites.

There are 17 bridge segments between Lexington and Columbus. Not all of these bridge segments may be able to support a colony of least terns. In addition, it may take many nesting sites to form a colony. According to average colony sizes (6 tern pairs per colony)³⁸, there would need to be 25 tern colonies to meet the recommended objectives. To spread the birds out as much as possible, a significant portion of nesting birds should occur both in the upstream and downstream sections of the central Platte River. Kearney is chosen as the splitting point. The rationale for choosing the splitting point at Kearney and for a broad distribution of birds is the same as discussed for the

³⁸ *Nebraska Game & Parks Commission survey data.*

piping plover in section A.5.1.b.

A.5.2.c. Fledge Rates

The fledge rate objective for the central Platte River should be 0.70 fledglings per pair for a 3-year running average for least terns. This recommendation is based on current recruitment rates on the Platte River for various habitats over the last 10 years, literature referenced, and discussions at the September 2000 workshop. The following fledge rates are summarized data only to compare current productivity on the Platte River to recommendations in the literature.

Sand pits managed by power districts = 0.99 tern chicks fledged/nest³⁹
(0.90 tern chicks/pair)⁴⁰

Unmanaged sand pits = 0.43 tern chicks fledged/nest³⁹

River dredged islands = 1.04 tern chicks fledged/nest³⁹

Lower Platte managed sand pits = 0.88 tern chicks fledged/pair⁴¹

Lower Platte River sandbars = 0.21 - 0.73 fledglings/pair (1987-90)⁴²

Lower Platte River sand pits = 0.28 - 0.64 fledglings/pair (1987-90)⁴²

Lower Platte River unmanaged sand pits = 0.50 tern chicks fledged/pair⁴³

Lower Platte River sandbars = 0.68 tern chicks fledged/pair⁴⁴

In addition, in 2000 and 2001, an index of lower Platte River productivity was generated by using the number of pairs observed on the river during the summer airboat census, and the number of fledglings observed on follow-up airboat surveys. The estimated fledge rate for the river was 0.44 tern fledglings per pair in 2000 and 1.40 in 2001. The same methodology estimated 0.32 tern fledglings per pair at sand pits along the lower Platte River in 2000 and 0.52 in 2001⁴⁵.

The fledge rate recommended in the FWS biological opinion for the Missouri River is 0.70 chicks fledged per pair for a 3-year running average.⁴⁶ Based on

³⁹ *Nebraska Public Power District data.*

⁴⁰ *Central Nebraska Public Power & Irrigation District data.*

⁴¹ *Nebraska Game & Parks Commission data.*

⁴² *Kirsch, E. M. Habitat Selection and Productivity of Least Terns on the Lower Platte River, Nebraska. Wildlife Monographs, No. 132, January 1996.*

⁴³ *Nebraska Game & Parks Commission data for years 1984, 1986, 1990, 1993, 1994, 1997, and 1998.*

⁴⁴ *Nebraska Game & Parks Commission data for years 1986, 1987, 1988, 1989, 1990, 1991, 1994, and 2001.*

⁴⁵ *Marcus, J. F., C. E. Grell, and S. L. Finkbeiner. 2000. Tern and Plover Conservation Partnership, Year 2000 Final Report. Unpublished report submitted to the Nebraska Game & Parks Commission. 21 pp. and data for 2001 surveys provided by Jeff Marcus to Jim Lutey on December 4, 2001.*

⁴⁶ *U.S. Fish and Wildlife Service, Biological Opinion on the Operation of the Missouri River Main Stem Reservoir System, Operation and Maintenance of the Missouri River*

the biological opinion, other references cited, and the discussion at the September workshop, 0.70 fledglings per pair is recommended as the fledgling rate for least terns on the central Platte River.

At the September 26-27, 2000 workshop, some biologists voiced minority opinions regarding some of these objectives, because they had reservations about trying to attract terns and plovers to the central Platte River. Their view was that the central Platte River is no longer capable of sustaining either species on naturally occurring habitat on the river, unless significant high flows occur several years in a row to create habitat, which is unlikely. Terns and plovers may nest on intensively managed habitats, such as cleared islands or dredged islands. The recommendations in this report are based primarily on the majority views and recommendations among the species experts identified by the FWS.

A.6. Other Recommendations

A.6.1. Sand Pits and Riverine Habitats

In recent years, at least since the 1980's, the central Platte River proper has not provided the habitat necessary for successful tern and plover nesting. Natural sandbar habitat available for successful nesting is scarce or non-existent due to changes in flow regimes of the river. It would likely take significant clearing of vegetation along with high flows on a semi-frequent basis for the river to regain desirable habitat for successful nesting. Although, intensively managed habitat, such as cleared existing river islands or established dredged islands, may produce habitat for successful nesting. Natural sandbar habitat is relatively more plentiful in the lower Platte River, and significant tern and plover production occurs along that segment of the river.

Numerous sand pits, created by commercial sand and gravel operations, occur along the central and lower Platte River. Sand pits provide alternative nesting areas (nesting substrates) for least terns and piping plovers.⁴⁷ The existing least tern and piping plover recovery plans refer to sand pits along the Platte River as "artificial" nesting habitats. Both recovery plans recommend the need to determine the relationship of existing artificial breeding sites to river sites.

Sand pits that are managed successfully for tern and plover production can be important for recruiting birds into the population, especially when riverine habitats are not available for nesting. However, terns and plovers do not appear

Bank Stabilization and Navigation Project, and Operation of the Kansas River Reservoir System. Submitted November 30, 2000, U.S. Fish and Wildlife Service, Region 6, Denver, Colorado and Region 3, Ft. Snelling, Minnesota, to U.S. Army Corps of Engineers, Northwest Division, Portland, Oregon. 286 pp. + appendices.

⁴⁷ Sidle, John G. and Eileen M. Kirsch. 1993. *Least Tern and Piping Plover Nesting at Sand Pits in Nebraska. Colonial Waterbirds* 16(2): 139-148.

to simply switch to sandpit habitat to compensate for a loss of riverine habitat.⁴⁸ Management of sand pits for tern and plover production may include such activities as excluding human activity (signs, fencing), public education (literature boxes), removing vegetation mechanically or chemically, predator exclusion or control, and fencing to exclude cattle. It is recommended that both riverine habitats and sand pits be managed for tern and plover production, although sand pits should not be considered as a “substitute” for riverine habitat.

A significant number of terns and plovers nest on the Platte River and adjacent sand pits. Any productivity at all in bad years still results in some recruitment to the population. It is also important to recognize that the Platte River, including adjacent sand pit habitats for terns and plovers, can serve as “carry-over” habitats to help maintain the overall least tern and piping plover populations when the “bread basket” habitats, such as the Mississippi River and Missouri Couteau area of North Dakota, can’t produce birds for some reason.

The Nebraska Public Power District, Central Nebraska Public Power and Irrigation District, and Nebraska Game and Parks Commission monitor least tern and piping plover nesting at various sand pit sites along the Platte River. In addition, several studies have been conducted on tern and plover nesting at sand pit sites along the Platte River. Some investigators have documented certain characteristics of sand pit habitat for nesting terns and plovers.⁴⁹ Terns and plovers require relatively bare sand and gravel for nesting. Sidle and Kirsch, 1993, investigated the influence of sand pit size, area of sand and gravel, and surface area of water on use of sand pits by terns and plovers. They determined that terns and plovers nested at a greater percentage of sand pits on the central Platte River (81%) than on the lower Platte River (60%). Terns and plovers seemed to use more sand pit habitat on the central Platte River than on the lower Platte River because river sandbar habitat in the central Platte River is severely limited and adjacent sand pit habitat provides alternative nesting habitat. River sandbar habitat in the lower Platte River is plentiful in some years and the birds seem to use adjacent sand pit habitat less frequently. Sand pits seem to have influenced the birds’ distribution by providing alternative nesting habitat along the river where riverine sandbar habitat is limited.

Although some investigation has been conducted on the characteristics of sand pit habitat used by nesting terns and plovers (i.e., Kirsch 1996 compares attributes of used and unused sand pits on the Lower Platte River), there does not appear to be a comprehensive description of sand pit habitat, especially foraging habitat. Therefore, this report recommends that such an investigation be conducted and reported. Specifically, data should be gathered on the characteristics of successful tern and plover nesting and fledging on sand pits along the Platte River

⁴⁸ Kirsch, E. M. *Nebraska’s Least Terns and Piping Plovers 1987-1999: final report.* January 10, 2001. LaCrosse, WI.

⁴⁹ Sidle, John G. and Eileen M. Kirsch. 1993.

(e.g., nesting/fledging data, sand pit size, proximity to the river, area of sand and gravel, surface area of water at the pit site, foraging behavior, time budget and energy expenditure data). In addition, the investigations should assess the features of sand pit habitat that would best facilitate their role in assisting to achieve recovery levels for terns and plovers.

It is recommended that all breeding adults and fledged piping plover and least tern chicks, whether they fledge from sand pits or riverine or shoreline habitats, count towards species numbers and fledge rate objectives.

A.6.2. Standardized Reporting

Managers on the Platte River should standardize reporting of fledge rates by reporting tern and plover chicks per pair rather than chicks per nest. In addition, how numbers of pairs are determined and how numbers of young fledged are determined should be standardized among reporting agencies and organizations.

Agencies and organizations are currently reporting census data on the Platte River in different formats (i.e., chicks per nest versus chicks per pair). Most agencies and most of the scientific literature reports chicks per pair. When chicks per nest is used, it assumes no renesting. Since renesting does occur, it is recommended that censuses be done more than once per year and that chicks per pair be reported by all agencies and organizations monitoring terns and plovers on the Platte River as well as on sand pits. How numbers of pairs are determined (pairs counted during census, total number of nests initiated, maximum number of adults observed divided by 2, etc.) and how the number of young fledged are determined should also be standardized.

B. WHOOPING CRANE

B.1. Existing Recovery Plan Goals and Objectives

The goal in the existing Whooping Crane Recovery Plan⁵⁰ for the Aransas/Wood Buffalo Population (AWP) is that the minimum viable population for the AWP is 1000 individuals, including 250 breeding pairs, sustained for a minimum of a decade before being downlisted to threatened status. This population winters at the Aransas National Wildlife Refuge and adjacent areas in Texas and nests in the Northwest Territories and adjacent areas of Alberta, Canada primarily at Wood Buffalo National Park. During spring and fall, whooping cranes in the AWP stop along the Platte River in Nebraska, as well as other locations along their migration pathway. The current Recovery Plan stipulates the Platte River as one location needed for maintaining suitable roosting habitat used by migrating whooping cranes by ensuring adequate flows that provide quality roosting habitat and that are necessary for scouring invading vegetation from the riverbed. The U.S. and Canadian Recovery Plans are being updated and combined to eliminate duplication and to reflect the two nation approach. There are several specific references to the Platte River in the 2001 draft version of the new Whooping Crane Recovery Plan. These refer to protecting habitat and managing vegetation and identify the Platte River as a location where suitable stopover habitat is needed for migrating whooping cranes.

B.2. Habitat Limitations on the Central Platte River

Based on a preponderance of sightings along the Platte River in Nebraska during 1820 to 1948, whooping cranes made the Platte River a major stopover.⁵¹ During the spring, recorded stopovers along the Platte River are higher than any other stopover site within the species' range. Confirmed whooping crane sightings along the Platte River during the spring migration have occurred between February 15 and May 23.⁵² In the AWP flyway, roosting sites on riverine areas by whooping cranes were common only in Nebraska, primarily on the Platte, Niobrara, Middle Loup, and North Loup Rivers.⁵³ The higher use of riverine roosts in Nebraska may be related to the relatively unique geomorphic characteristics of rivers there, which include shallow, relatively slow-moving channel flows and sand bars with little vegetative cover.

Numerous studies and articles have documented the physical changes to the Platte River since the late 1800's and resulting habitat loss for whooping cranes as well as some other species. Several of these references are provided under "A.3. Habitat

⁵⁰ *Department of the Interior, U.S. Fish and Wildlife Service, Whooping Crane Recovery Plan, February 11, 1994.*

⁵¹ *Allen, R. P. 1952. The whooping crane. National Audubon Society Resource Report 3, 246 pp.*

⁵² *U. S. Fish and Wildlife Service. Unpublished data.*

⁵³ *Austin, Jane E. and Amy L. Richert. May 2001. A Comprehensive Review of Observational and Site Evaluation Data of Migrant Whooping Cranes in the United States, 1943-99.*

Limitations on the Central Platte River” in the piping plover and least tern section of this report. In addition, woody vegetation expansion and continuing declines in open channel habitat (preferred by whooping cranes) on the Platte River is documented.⁵⁴ As a result of reduced channel width, loss of adjacent wet meadows, and encroachment of the channel by woody vegetation, 128 km of river channel whooping crane habitat have been lost.⁵⁵ In the remaining 120 km of the Platte River channel that crosses the breadth of the migration path, there has been a 58 to 87% reduction in channel area due to encroachment of woody vegetation and a 70% loss in the average annual flow since 1930. Woody vegetation is still expanding and channel width declining on the Platte River.⁵⁶ As much as 97% of suitable crane roosting habitat has been lost in some river segments. Over 73% of native grasslands and wetlands adjacent to the river channel have been lost due to declines in river flows, construction of drainage systems, and conversion to cropland.⁵⁷

To help ensure conservation of the whooping crane, on May 15, 1978, the FWS designated a portion of the central Platte River as “critical habitat”⁵⁸ for whooping cranes. The area designated was a strip of river bottom with a north-south width of 3 miles, a south boundary paralleling Interstate 80, beginning at the junction of U.S. Highway 283 and Interstate 80 near Lexington, and extending eastward along Interstate 80 to the interchange for Shelton and Denman, Nebraska near the Buffalo-Hall County line. On the same date, 8 other sites in 5 states were also designated as critical habitat for the whooping crane. The Platte River site is the only one of the 9 sites designated that remains largely under private ownership. All of the others are under state or federal protection.

Habitat improvements to the central Platte River for whooping cranes would help ensure the AWP well being by providing adequate migrational habitat for an increasing number of whooping cranes as the recovery plan goal for the AWP is met.

B.3. Status of Aransas/Wood Buffalo Population

The AWP (the species’ only self-sustaining wild migratory flock) is experiencing a gradual positive population trend overall, although some years exhibit stationary or negative results. In January 2000, there were 187 individuals in the AWP. Fifty pairs nested in May and another eight pairs did not attempt to nest in 2000.

⁵⁴ Currier, P. J. 1997. *Woody vegetation expansion and continuing declines in open channel habitat on the Platte River in Nebraska. Proc. North Am. Crane Workshop 7:141-152.*

⁵⁵ U. S. Fish and Wildlife Service. 1981. *The Platte River ecology study. Special Research Report. Northern Prairie Research Center, Jamestown, North Dakota. 187 pp.*

⁵⁶ Currier 1997.

⁵⁷ Currier, P. J., G. R. Lingle, and J. G. VanDerwalker. 1985. *Migratory bird habitat on the Platte and North Platte Rivers in Nebraska. The Platte River Whooping Crane Habitat Maintenance Trust, Grand Island, Nebraska. 177 pp.*

⁵⁸ U. S. Fish and Wildlife Service, Department of the Interior. May 15, 1978. *Federal Register, Vol. 43, No. 94.*

Therefore, at that time, there were 58 potential nesting pairs. Only 9 chicks hatched in Canada made it to Aransas. There were 22 known mortalities from the spring of 2000 to the spring of 2001. Therefore, it was essentially a declining population in 2000 to 174 individuals in spring 2001. This is exactly the same number as of February 2002. Although 161 adults and 15 chicks arrived at Aransas in fall 2001, for a peak population of 176, one adult and one chick subsequently died on the wintering grounds.

The migration pathway of whooping cranes through Nebraska is approximately 150 miles wide, with a north-south orientation, approximately 15 degrees west of “true” north. The 150-mile corridor along the Platte River extends from roughly North Platte to Grand Island, although the “central” Platte River covers only 80 miles at the eastern end of the 150-mile corridor. About 83 percent of the sightings in Nebraska occurred within the 150-mile corridor, with the remaining (17 percent) occurring west of that corridor. In the 80-mile migration corridor from Lexington to Grand Island, 74 percent of the confirmed statewide sightings from 1942-2001 occurred. Observer effort is greater along the Platte River between Lexington and Grand Island than in any other area of Nebraska. Observer effort in the corridor lying north and south of the Platte River is similar to efforts in the areas east and west of the 80-mile corridor.⁵⁹

Other important stopover sites in Nebraska are the western Rainwater Basins, North and Middle Loup Rivers, wetlands in Central Custer County, Sandhills wetlands, and the Niobrara River.

According to FWS records, at the end of the year 2000, there had been 340 confirmed whooping crane sightings reported in Nebraska since 1940. Fifty-six of these sightings were on the central Platte River. All of these Platte River sightings were between the towns of Overton and Chapman. There have been no confirmed whooping crane sightings using the Platte River upstream of Overton since 1942. Of the 340 confirmed sightings, 201 occurred in the spring. Twelve of the 56 Platte River sightings occurred in the fall, and 44 occurred in the spring. Most sightings are reported during April and October.

B.4. Whooping Crane Habitat and Population Management on the Platte River

Various organizations and agencies have improved and are improving and managing habitat along the central Platte River to benefit whooping cranes. In addition, habitat along the central Platte River would be improved under the proposed Recovery Program resulting from the Platte River Cooperative Agreement. Long-term habitat protection scenarios being evaluated under the Cooperative Agreement incorporate the concept of protecting approximately 29,000 acres of suitable habitat in ten habitat complexes along the central Platte River from Lexington to Chapman.

Increased whooping crane use of the central Platte River valley is anticipated as a

⁵⁹ FWS records, *Grand Island, Nebraska*.

consequence of habitat improvement and management.⁶⁰ It will likely be decades before habitat improvement goals of the Cooperative Agreement are fully realized. As habitat is improved along the central Platte River, whooping crane use will likely increase as a traditional stopover area. However, even after the first decade of implementing habitat improvements, the increases in whooping crane use may not be fully evident for another decade.

Given that the recovery goal for the AWP is 1000 whooping cranes, this report recommends that habitat on the central Platte River be managed for 100 percent of the recovered AWP (1000 birds). Whooping cranes are long-lived, and some live up to 25 years in the wild. In addition, whooping cranes learn to use “traditional stopover areas”.⁶¹ One prime example is Quivira National Wildlife Refuge in central Kansas. As habitat is improved further along the central Platte River, it will likely increase whooping crane use as a traditional stopover area. Therefore, it is anticipated that all of the whooping cranes in a recovered AWP (1000 birds) would be expected to stop over along the central Platte River at some time during their lifetime. All 1000 birds, however, certainly would not be expected to stop along the Platte River at the same time.

The location of suitable whooping crane habitat may be more important than the amount of habitat. Whooping cranes in flight at Aransas National Wildlife Refuge are able to detect controlled burn sites five miles distant and are attracted to such sites because they are a ready source of insects, toasted seeds, acorns, and small vertebrates. Based on this sight distance in any direction, a crane migrating across the Platte River valley could probably see habitats within each 10-mile bridge segment. In addition, it is important for whooping cranes to be spread out in suitable habitat distributed along the Platte River to reduce the potential for disease and for energy conservation. Therefore, from a spacial distribution standpoint, suitable habitat (i.e., open channel roost sites) in each of the 10 bridge segments seems sufficient if it were available.

Although this report is not being done under the Platte River Cooperative Agreement, whooping crane experts considered proposed habitat protection scenarios in relation to Platte River habitat needs for migratory whooping cranes in the AWP. The approximately 2900-acre habitat complex per each of 10 bridge segments (such as that described in the Platte River Management Joint Study and referenced in the Cooperative Agreement) is preferred over smaller units. However, smaller units may still be beneficial to whooping cranes if they contain suitable

⁶⁰ Strom, K. J. 1987. *Lillian Annette Rowe Sanctuary - Managing migratory crane habitat on the Platte River, Nebraska*. Pages 326-330 in J. C. Lewis and J. W. Ziewitz, eds. *Proceedings 1985 Crane Workshop. Platte River Whooping Crane Habitat Maintenance Trust and U. S. Fish and Wildlife Service, Grand Island, Nebraska*.

⁶¹ Kuyt, E. 1992. *Aerial radio-tracking of whooping cranes migrating between Wood Buffalo National Park and Aransas National Wildlife Refuge, 1981-1984*. Occas. Pap. 74, Canadian Wildlife Service, 53pp.

whooping crane habitat and are sufficient in number and spacing to be detectable to cranes flying over the Platte River. Therefore, some flexibility in layout and size of the complexes could be accommodated, but these areas should be protected from disturbance and contain certain key habitat parameters (e.g., wide, wet river channels, wet meadows, lowland grasslands). There is a need for more research on what habitat best provides benefits for whooping cranes along the Platte River.

These habitat complexes should not be a substitute for maintaining the ecological integrity of the Platte River system. Existing suitable habitat should remain along the central Platte River exclusive of future restored and managed habitat. There are other species, including sandhill cranes, that require substantially more roosting habitat than would exist only in these habitat complexes. Ultimately, whooping cranes may also be adversely impacted if sandhill cranes become overcrowded by lack of habitat and reduced food base.

Present information suggests significant migration movement of whooping cranes west of the central Platte River.⁶² However, there is little suitable stopover habitat in that western reach (North Platte to Lexington). Benefits to whooping crane distribution would incur by protecting and managing habitat along the Platte River west of Lexington, similar to habitat complexes proposed for the central Platte River. However, the same intensity of management as in the central Platte River may not be feasible or possible west of Lexington, primarily because of the lower flow conditions upstream of the J-2 Return near Lexington.

B.5. Detection of Whooping Crane Use and Population Trends on the Platte River

The whooping crane group at the September 2000 workshop was unable to develop specific numbers objectives for whooping cranes on the Platte River primarily because (1) survey techniques currently do not detect all use by whooping cranes, and (2) the erratic and low annual crane use may make statistical analysis difficult.

B.5.1. Survey Techniques

In the mid to late -1980's, surveys were intensive, with daily flights of the river in April and October. Surveys since that time were mostly limited to responding to reported sightings. Migration for all individual whooping cranes is highly variable, but can occur from mid-February to mid-May in the spring and from mid-September to early January in the fall and winter. Thus, the survey period is extensive and daily surveys would be necessary if a count of the entire population is desirable. Aerial surveys are the only practical way to survey a large area. The surveys begin at daybreak by flying over the river from east to west or vice versa. The flights are expensive. Despite the large, white coloration of the adult birds, past surveys have overlooked some birds that were confirmed by ground observations. Whooping cranes begin leaving the river roost at daybreak to fly to feeding areas. As the aerial survey

⁶² FWS records, Grand Island, Nebraska.

progresses, and time passes, an increasing number of cranes have already moved outside the survey area. Consequently, daily aerial surveys provide incomplete counts of whooping crane use or presence. If managers cannot adequately measure use, then failure to meet some numbers objective could be improperly interpreted. For example, if managers are not able to demonstrate achievement of stated objectives, even though habitat management has occurred, then some may argue that habitat management should stop. In reality, the habitat management might have been ideal, but survey techniques may have been unable to confirm that because of the low numbers of birds and erratic use.

The draft protocols (December 11, 2000) being developed for monitoring whooping crane use on the Platte River are conceptually sound given the limitations of surveys. For example, there are sometimes problems with weather patterns that can prevent survey flights for extended periods of time. Additional improvements should be made to existing survey techniques and methods.

B.5.2. Statistical Analyses

There is a question about the statistical significance that could be placed on any increased whooping crane use of the central Platte River. As habitat improvements are made along the central Platte River, it is expected that whooping crane use would gradually increase. Because the AWP is small, the numbers counted will be low, and year to year river use has been highly variable in the past. Weather conditions in any given year can strongly influence whether whooping cranes stop on the Platte River.⁶³ For example, in some years, strong winds have pushed cranes east or west of their principal migration pathway so they did not fly over the central Platte River.⁶⁴ Weather conditions in some years may result in most whooping cranes overflying the Platte River before the time of day they need to go to roost. The low numbers involved and the variability of river use makes it difficult to statistically evaluate the significance of any increase or decrease in river use. If statistical significance could, indeed, be measured, then it may be practical to develop numerical objectives for whooping crane stopovers on the central Platte River.

After the September 2000 workshop, Dr. Jim Lewis provided Dr. Doug Johnson, statistician at the USGS, Northern Prairie Wildlife Research Center, Jamestown, North Dakota, with information regarding this issue and requested his analysis of existing whooping crane data. Dr. Johnson concluded that the existing data suggests that the recent (since 1985) increase in whooping crane

⁶³ Kuyt, E. 1992. *Aerial radio-tracking of whooping cranes migrating between Wood Buffalo National Park and Aransas National Wildlife Refuge, 1981-1984. Occas. Pap.74, Canadian Wildlife Service, 53pp.*

⁶⁴ Wally Jobman, U.S. Fish and Wildlife Service, Grand Island, Nebraska. *Personal Communication: September 2000.*

sightings on the Platte River is only partly due to a larger population and that some of the increase may be due to either greater detectability of birds using the Platte River or increased use of the area.⁶⁵ His analysis suggested that managers should be able to detect a doubling of the number of sightings on the Platte River. In addition to Dr. Johnson's analysis, several scientists at the USGS's Midcontinent Ecological Science Center (MESC) in Ft. Collins, Colorado, reviewed Dr. Johnson's analysis and agreed with his conclusions. The MESC has been involved with Platte River whooping crane roosting modeling techniques and other Platte River studies for many years.

Based on Dr. Johnson's analysis, it was concluded that managers should be able to detect increased whooping crane use of the Platte River due to factors other than just an overall increase in the AWP (e.g., response to habitat improvements). Therefore, the question regarding the ability to statistically detect a doubling of whooping crane use on the Platte River should be discounted as an obstacle in developing whooping crane use objectives and monitoring protocols.

Dr. Johnson's analysis was completed based on information provided by Dr. Lewis. The data was split at 1985, the time when habitat management for whooping cranes first began along the Platte River.^{66 67} In addition, the analysis was done based on the number of cranes seen, not the number of sightings. Each sighting sometimes includes more than one crane. The analysis of numbers of birds was chosen because of the noted trend for greater numbers of birds seen per sighting as the AWP has increased. This report, however, recommends that a more detailed statistical analysis be completed of the data available, including the number of crane sightings as well as the number of cranes.

B.6. Platte River Objectives

Although it is recommended that 100 percent of the recovered AWP should be managed for in the central Platte River area, it is recognized that birds pass over the upper Platte River now, and some provisions for their habitat stopover needs should not be excluded. Suitable riverine stopover habitat in the upper Platte River, as well as the central Platte River, may be particularly important during drought cycles where such areas may be the only ones available in that part of Nebraska. One or

⁶⁵ Douglas H. Johnson, U.S. Geological Survey, Jamestown, North Dakota. E-mail correspondence to Jim Lewis, Statistical Analysis. December 1, 2000.

⁶⁶ Strom, K. 1987. Lillian Annette Rowe Sanctuary -- Managing Migratory Crane Habitat on the Platte River, Nebraska. Pages 326-330 in *Proceedings 1985 Crane Workshop, Platte River Whooping Crane Habitat Maintenance Trust and U.S. Fish and Wildlife Service*. 415 pp.

⁶⁷ Lingle, G.R. 1982. Mormon Island Crane Meadows -- Protecting Habitat for Cranes along the Platte River, Nebraska. Pages 17-21 in *Proceedings 1981 Crane Workshop, National Audubon Society, Tavernier, Florida*. 296 pp.

more habitat developments could be provided for whooping cranes west of the central Platte River although the feasibility of such habitat work may be questionable. In areas where river channel roost habitat is not restorable, it may be beneficial to manage roosting habitat in restored wetlands off the river. Such concepts should be studied and analyzed thoroughly prior to making decisions. Nevertheless, the priority for whooping crane habitat restoration and management on the Platte River should focus on the central Platte River. This is because the majority of whooping crane stopovers occur on the central Platte River and that is where habitat management can be most beneficial (river channel, wet meadow, and flow management).

If it is determined at a future time that some habitat development and management is feasible in the upper Platte River area, a 90:10 split in terms of the proportion of whooping crane use or stopovers could be selected as a revised objective at that time. That is, management could occur for 90 percent of whooping crane stopovers on the central Platte River and for 10 percent of stopovers west of the central Platte River. The rationale for the 90:10 split is that if 10 habitat complexes are developed along bridge segments from Lexington to Chapman, as currently proposed, and if at least one habitat development occurred west of the central Platte River, then roughly 90 percent of new recovered suitable habitat would be available in the central Platte River and 10 percent would be available west of the central Platte River. Again, this report stresses that existing suitable habitat should remain on the central Platte River exclusive of future restored and managed habitat.

B.7. Managing for the Population Objective

B.7.1. Population Ratios

Population ratios are difficult to establish and monitor because the detection of bird stopovers varies with effort and the efficiency of detecting stopovers is really not known. Recognizing this problem, this report recommends that population ratios provided by Dr. Doug Johnson be used as indices of whooping crane use of the Platte River and to estimate the potential changes in use. Separate ratios could be selected for fall and spring populations. For the fall, the peak winter population at Aransas NWR (typically in December) should be used. For the spring, the number of birds departing Aransas should be used. The ratios should be calculated using “confirmed” and “probable” sightings on the Platte River separately and possibly combine them, if beneficial. Combining “confirmed” and “probable” sightings may make allowances for differences in effort to confirm “probable” sightings in the past. However, the greatest emphasis should be on “confirmed” sightings. Sightings may be one bird or a number of birds. As the AWP has increased since 1940, there has been an increase in the number of birds per sighting. That pattern will likely continue, therefore, there is a need to consider both the number of birds and number of sightings in interpreting trends and evaluating management activities. The following formulas should be used to determine the annual ratios:

ratio for fall use = fall sightings and (separately) no. of cranes in the fall

winter total at Aransas NWR

ratio for spring use = $\frac{\text{spring sightings and (separately) no. of cranes in the spring}}{\text{number departing Aransas NWR in spring}}$

These population ratios should be successfully tested and endorsed before they are used as standardized means of crane detection.

B.7.2. Index of Bird Use Days

Whooping crane distribution along the Platte River, in relation to managed areas, is another means of evaluating benefits of habitat management. There is a need to have a whooping crane use index of bird days on the river as an additional measure of habitat attractiveness. This information is available in post-1984 whooping crane use data. A bird day is defined as one whooping crane sighted in the Platte River Valley on one day. Each additional day that the same bird is present is counted as another use day.

Therefore, two indices could be measured: (1) the proportion of the population stopping on the Platte River in the spring and fall, and (2) the number of bird days of use in the spring and fall. The comparisons should begin immediately. There is a need to recognize that there may be a lag time between management actions and bird responses.

B.7.3. Habitat Suitability Models

This report recommends using habitat suitability models⁶⁸ as additional tools to evaluate habitat and habitat changes for whooping cranes. The following models are identified:

Model A - estimate $\frac{\text{existing suitable habitat } I}{\text{existing suitable habitat } I+n}$
Model B - estimate $\frac{\text{existing suitable habitat } I}{\text{existing suitable habitat } I+n}$

The denominator in both models would be the existing habitat suitability index plus the index altered over time. Model B would be an improved model developed at a later date after more data are collected. The model components would be changed, perhaps after 5 years, based on monitoring data. Good monitoring data would be essential for the model. The development of habitat suitability index (HSI) models are recommended as additional tools to evaluate habitat and habitat changes for whooping cranes.

B.8. Research and Monitoring Needs

⁶⁸ Dale Strickland, WEST, Inc. and Executive Director, Platte River Cooperative Agreement, Cheyenne, Wyoming. Personal recommendations made at Follow-up Whooping Crane Workshop, February 15, 2001.

As a result of discussion at the September 26-27, 2000 and February 15, 2001 workshops, data presented, and collaboration with the FWS, several research and monitoring needs are recommended.

1. Continue and improve surveys of whooping crane use and associated habitat. As a result of new habitat improvements along the central Platte River, increases in whooping crane use would be gradual and would likely only be evident in the second decade of implementation of a Recovery Program. Therefore, changes in whooping crane use along the river should be monitored over a prolonged period of time.
2. Continue to refine the habitat roost model and techniques for evaluating habitat quality for whooping cranes as a management tool. Additional measurements at or near whooping crane roost sites may be desirable. These include water depth, velocity, characteristics of submerged sandbars, distance to obstructions, and proximity to other landscape features (i.e., wet meadows).
3. Continue to monitor sandhill crane use as one measure of habitat suitability and management progress. Nighttime videography for detecting sandhill cranes is one promising tool that is being investigated by researchers. Sandhill cranes exhibit similar habitat preferences as whooping cranes even though there are differences. Much research has been accomplished on sandhill crane use and habitat needs along the Platte River that helps managers to also understand whooping cranes. Sandhill cranes are closely related genetically to whooping cranes, and their abundance makes it possible to use them as a surrogate research species.
4. Whooping crane behavior, habitat use, and time-budget data should be studied regarding use of the central Platte River to help managers interpret habitat preferences and the well-being of whooping cranes that use the Platte River.

C. PALLID STURGEON

C.1. Existing Recovery Plan Goals and Objectives

The Pallid Sturgeon Recovery Plan⁶⁹ is currently undergoing an update. Additional data collected since the original plan was drafted will be added and some areas of the plan are to be refined.

The Recovery Plan includes both short-term and long-term recovery objectives. The short-term goal is to prevent extinction by removing adults from the wild and establishing captive broodstock populations. The long-term recovery objective is to downlist or delist the species by 2040 through protection and habitat restoration activities, provided that the following criteria are met: 1.) naturally reproducing, self-sustaining populations exist within each recovery area, and that 2.) a minimum of 10 percent of the sturgeon population within each recovery area is comprised of mature females. More quantifiable measures of recovery are desirable, however limited demographic and life history data for the pallid sturgeon precludes proposing more specific criteria at this time.

The Recovery Plan designates six Recovery Priority Management Areas (RPMA) within the historical range of the pallid sturgeon. Recovery Priority Management Areas were based on the most recent records of occurrence and the probability that these areas still provide suitable habitat for restoration and recovery. While these priority areas consisted mainly of mainstem segments within the large rivers, the Recovery Team indicated that implementation of recovery actions should be encouraged near the mouths of several major tributaries. One of the RPMA's encompasses the lower Missouri River. Specifically identified as an area of special concern within this RPMA is the area around the confluence with the Platte River. Confluences with tributaries were emphasized in selecting some Recovery Priority Management Areas because of their known importance as feeding and nursery areas for large river fish. However, the Recovery Plan was not specific about the upstream extent to which recovery actions should be implemented on these tributaries. There is a need to refine the recovery document to integrate the major tributaries, where appropriate, into the overall species recovery planning process. In order to effectively accomplish this goal, it will be necessary to collect additional data to determine the importance of tributaries to the species and the extent to which actions taken on the tributaries will contribute to the recovery of the pallid sturgeon.

C.2. Lower Platte River Objectives

Biologists are continually limited by the paucity of data available to answer two fundamental questions: 1.) What is the importance of the Platte River to pallid sturgeon? and 2.) How will recovery actions on the Platte River contribute to pallid sturgeon recovery? Without sufficient data to address these questions, defensible quantifiable recovery objectives for the pallid sturgeon in the Platte River are

⁶⁹ Department of the Interior, U.S. Fish and Wildlife Service, *Pallid Sturgeon Recovery Plan*, November 7, 1993.

difficult to develop.

This report 1.) summarizes the status of pallid sturgeon in the lower Platte River, 2.) refines the extent of the Platte River considered to be potentially suitable habitat for pallid sturgeon, and therefore open to consideration for recovery actions, and 3.) provides a listing of the critical data that are needed in order to develop specific recovery objectives.

C.3. Status of Pallid Sturgeon in the Lower Platte River

The following information summarizes the current knowledge of the status of the pallid sturgeon in the Lower Platte River. The lower Platte River is defined as the stretch of river from the mouth of the Loup River near Columbus downstream to the confluence with the Missouri River.

1. Historical and recent records document the existence of adult pallid sturgeon in the lower Platte River.⁷⁰ A single record of occurrence for pallid sturgeon was documented on the lower Elkhorn River, however the reliability of this record is questionable. Much of this historical data was the result of sport angler captures and therefore must be interpreted with caution.
2. Adult pallid sturgeon have been captured in the lower Platte River and near the confluence of the Platte River with the Missouri River during the period of time that the species is thought to spawn.
3. Platte River pallid sturgeon populations have been recently augmented by the release of 500 to 600 hatchery-propagated fish over a period of three years beginning in 1997.
4. Habitat-use data collected from hatchery-reared pallid sturgeon implanted with radio transmitters shares some similarities with results reported for wild-caught sturgeon in other portions of their range. Subsequent studies with wild caught pallid sturgeon will yield additional information. Tracking data suggests that some sturgeon released into the Platte River moved out into the Missouri River and subsequently returned to the Platte River. Some sturgeon also over-wintered in the lower Platte River. This indicates the likelihood that habitat in the lower Platte River is suitable for sub-adult pallid sturgeon.⁷¹
5. Larval *Scaphirhynchus* sp. have been collected in the lower Platte River indicating that suitable spawning conditions and habitat for sturgeon exist.⁷²

⁷⁰ *Nebraska Natural Heritage Program and Pallid Sturgeon Recovery Team, Occurrence of pallid sturgeon in the lower Missouri River in Nebraska since 1970, Table 2, undated.*

⁷¹ *Data presented by Vaughn Snook, University of Nebraska-Lincoln, at workshop on September 26, 2000.*

⁷² *Data presented by Cory Reade, University of Nebraska-Lincoln, at workshop on*

6. Examination of one sturgeon (spp.) collected on the lower Platte River revealed possible intermediate meristic characteristics.⁷³
7. On May 3, 2001, a female pallid sturgeon was collected near Louisville, Nebraska (approximate river kilometer 26). It was implanted with a radio transmitter and released.⁷⁴
8. Sturgeon commonly congregate in the lower portions or at the mouths of tributaries; possibly for feeding, over-wintering, reproductive staging or spawning. Tributaries may also provide heterogeneity or diversity of habitat that is no longer present in the mainstem.
9. The lower Platte River retains a fish community or assemblage that is characteristic of the regional large river fauna. This assemblage includes other large river species of concern such as the flathead chub and sturgeon chub.
10. The physical riverine habitat within the lower Platte River is comparably less altered than other major tributaries of the lower Missouri River.
11. The lower Platte River is a free-flowing stretch without barriers that would impede migration or movement of adult, juvenile or larval sturgeon.

The available data indicate that the lower Platte River is used by pallid sturgeon. The extent of use and the relative importance of the Platte River to pallid sturgeon are unknown at this time. Pallid sturgeon in the Platte River are relatively rare and populations within the Platte River are below the recovery criteria stated in the Recovery Plan.

C.4. Extent of Suitable Habitat in the Lower Platte River

The following summarizes data that indicate the extent of suitable habitat for pallid sturgeon in the lower Platte River.

1. Historical and recent records of captures in the Platte River indicate that pallid sturgeon were found as far upstream as the confluence with the Elkhorn

September 26, 2000.

⁷³ *Data presented by Dr. Edward Peters, University of Nebraska-Lincoln, at workshop on September 26, 2000.*

⁷⁴ *Data provided by Dr. Edward Peters, University of Nebraska-Lincoln, to Jim Lutey on December 14, 2001.*

River.⁷⁵

However, most of these data are from angler captures and is biased. Angler captures may not reflect the true extent of pallid sturgeon movement upstream in tributaries.

2. Hatchery-reared pallid sturgeon have been relocated as far upstream on the Platte River as Fremont.⁷⁶
3. Characterization and assessment of physical habitat within the lower Platte River indicate that riverine habitat is very similar along the entire stretch of the river from the mouth upstream to the confluence with the Loup River. Significant differences in sturgeon habitat were found upstream from Columbus, Nebraska (mouth of the Loup River) and downstream from Columbus. There were some differences in habitat among four sites downstream from Columbus, but they were not consistent among these downstream sites.⁷⁷
4. Based upon the historical data and assessment of current habitat conditions, there are no reasons to exclude portions of the lower Platte or Elkhorn Rivers as potential pallid sturgeon habitat.

The current extent of Recovery Priority Management Area 4 for the pallid sturgeon is based upon historical captures and remaining suitable habitat and includes the lower Platte River. Based upon the best available knowledge and the current understanding of the requirements of the pallid sturgeon, the lower Platte River, from the confluence with the Elkhorn River to the mouth of the Platte River at the Missouri River, should be included in the Recovery Priority Management Area unit and should be considered when implementing recovery actions for the pallid sturgeon.

Due to recent telemetry data on hatchery-reared pallid sturgeon, habitat quality and similarity to the conditions of the Platte River below the Elkhorn River, the area of the Platte River below the Loup River could also provide the conditions necessary

⁷⁵ *Nebraska Natural Heritage Program and Pallid Sturgeon Recovery Team, Occurrence of pallid sturgeon in the lower Missouri River in Nebraska since 1970, Draft Table 2, undated.*

⁷⁶ *Data presented by Vaughn Snook, University of Nebraska-Lincoln, at workshop on September 26, 2000.*

⁷⁷ *Yu, Shyi Liand. 1996. Factors Affecting Habitat Use by Fish Species in the Platte River, Nebraska. PhD Dissertation, Department of Forestry, Fisheries and Wildlife, University of Nebraska, Lincoln, Nebraska, USA.*

for pallid sturgeon survival and should not be ruled out for future recovery efforts.⁷⁸ The importance of this area to pallid sturgeon and its life history is currently unknown and may be important to pallid sturgeon. Further information should be obtained to further quantify its importance to the species.

C.5. Recommendations

Additional studies will be required in order to obtain the data necessary to establish specific quantifiable objectives for the pallid sturgeon in the lower Platte River. The following recommendations are based on pallid sturgeon group discussions and data presented at the September 2000 workshop and collaboration with the FWS:

1. Habitat Protection. Preserve, or restore where appropriate, the hydro-geomorphic processes and functions that are responsible for creating or maintaining the physical habitat template characteristic of the lower Platte River: a dynamic, sandy, free-flowing, braided river. Recovery actions should attempt to restore or maintain natural hydrologic regimes, including sediment discharge relationships, and work to capture the extent of the natural variability inherent in these physical processes. Actions which alter these processes or limit system variability should be examined both incrementally and additively to determine the nature and extent of their impact to pallid sturgeon recovery.

2. Document, Characterize and Assess Pallid Sturgeon Habitat. Identify existing data and collect additional information to determine the historic and current chemical and physical habitat conditions and processes in the Platte River. Documentation and characterization of quantifiable parameters should include baseline information on hydrology, sediment transport, temperature, bed form, channel complexity and water quality. Habitat conditions and processes should be related to habitat used by pallid sturgeon. An assessment can then be conducted to determine the quality and quantity of habitat for pallid sturgeon in the Platte River.

3. Determine the Contribution of the Lower Platte River to Recovery of Pallid Sturgeon. Develop baseline information on pallid sturgeon for the Platte River, including the abundance, distribution and population structure of pallid sturgeon in the Platte River. Determine the importance of the Platte River for reproduction and document subsequent larval development and juvenile rearing through recruitment to the adult population. Specific objectives to be addressed in the next 5 years include:

a. Document habitat use, relative habitat preference, and species assemblages associated with adult and juvenile pallid sturgeon in the lower Platte River.

⁷⁸ Data presented by Vaughn Snook, University of Nebraska-Lincoln, at workshop on September 26, 2000.

- b. Document the phenology for pallid sturgeon and the relative abundance of larvae for pallid sturgeon and associated species in the lower Platte River.
- c. Determine if changes in ambient river habitat conditions influence habitat use by pallid sturgeon in the lower Platte River.
- d. Document the catch by anglers in the lower Platte River.

4. Develop Quantifiable Population Recovery Objectives. Criteria addressing minimum viable population size and demography for Recovery Priority Management Area 4 must be determined to guide and monitor recovery actions.

5. Monitoring. Develop effective habitat assessment tools and effective sampling techniques for pallid sturgeon. Design an appropriate long-term monitoring program to collect baseline data and quantify biological responses and habitat changes in response to recovery actions.

6. Information Management and Education. Develop and distribute information and educational materials on the pallid sturgeon and its ecosystem. Encourage and support communication and publication of pallid sturgeon data and research.

Dr. Edward Peters, University of Nebraska-Lincoln, submitted a proposed study entitled “Ecology and management of the pallid sturgeon and sturgeon chub in the lower Platte River.” The study has been funded and permitted and is being implemented. This is intended to be a 5-year study, and when completed in May 2005, should provide data to answer many of the data and study needs identified above.

IV. SUMMARY OF RECOMMENDATIONS

A. INTERIOR LEAST TERN AND PIPING PLOVER

1. The FWS should continue to recognize that the population goals for least terns and piping plovers in Nebraska as stated in the current recovery plans are valid unless changed through the FWS recovery planning process.
2. Although the recovery goals in the existing recovery plans for the Platte River exclude North and South Platte River birds, birds on the North Platte River (including Lake McConaughy) and the South Platte River should not be ignored for their potential contribution to the overall species recovery goals.
3. For the purpose of this report, the central Platte River for least terns and piping plovers should be defined as from Lexington to Columbus, Nebraska because Columbus is where major tributaries enter the Platte River and where the character

of the river changes significantly.

4. The numbers objective for piping plovers on the central Platte River should be 126 piping plovers as a 10-year running average, which is 45 percent of the Recovery Plan goal for the entire Platte River.

5. The numbers objective for least terns on the central Platte River should be 300 least terns as a 10-year running average, which is 40 percent of the Recovery Plan goal for the entire Platte River.

6. The distribution objective for least terns and piping plovers on the central Platte River should be that no fewer than 25 percent and no greater than 75 percent of the birds occur above Kearney, Nebraska over a 10 year average. Nesting habitat can occur at both sand pits and instream sites.

7. A specific distribution objective for least terns and piping plovers by bridge segment is not being recommended, however to spread the birds out as much as possible, a significant portion of nesting birds should occur both in the upstream and downstream sections of the central Platte River. Kearney is chosen as the splitting point to prevent too much of a skewed distribution.

8. The fledge rate objective for piping plovers on the central Platte River should be 1.13 fledglings per pair for a 3-year running average. However, managers should consider reviewing new studies and data that may indicate a need to change this objective.

9. The fledge rate objective for least terns on the central Platte River should be 0.70 fledglings per pair for a 3-year running average

10. Both riverine habitats and sand pits should be managed for least tern and piping plover production. Sand pits should not be considered as a “substitute” for riverine habitat.

11. An investigation should be conducted and reported on the characteristics of sand pit habitat, especially foraging habitats, used by nesting least terns and piping plovers.

12. All breeding adults and fledged piping plover and least tern chicks, whether they fledge from sand pits or riverine or shoreline habitats should count towards species numbers and fledge rate objectives.

13. Managers on the Platte River should standardize reporting of fledge rates by reporting least tern and piping plover chicks per pair rather than chicks per nest. Also, managers should standardize how numbers of pairs and how numbers of young fledged are determined.

B. WHOOPING CRANE

1. Habitat on the central Platte River should be managed for 100 percent of the recovered Aransas/Wood Buffalo Population (AWP) of whooping cranes (1000 birds).
2. From a spacial distribution standpoint, suitable habitat for whooping cranes in each of the 10 bridge segments seems sufficient if it were available.
3. The approximately 2900-acre habitat complex per each of 10 bridge segments (as discussed in the Platte River Management Joint Study and referenced in the Cooperative Agreement) is preferred. However, smaller units may still be beneficial to whooping cranes if they contain suitable whooping crane habitat and are sufficient in number and spacing to be detectable to cranes flying over the Platte River. Therefore, some flexibility in layout and size of the complexes could be accommodated, but these areas should be protected from disturbance and contain certain key habitat parameters.
4. The habitat complexes should not be a substitute for maintaining the ecological integrity of the Platte River system.
5. There should be more research on what habitat best provides benefits for whooping cranes along the Platte River.
6. A more detailed statistical analysis should be completed of the data available, including the number of whooping crane sightings as well as the number of cranes.
7. One or more habitat developments could be provided for whooping cranes west of the central Platte River, although the feasibility of such habitat work may be questionable. If it is determined at a future time that some habitat development and management is feasible in the upper Platte River area, a 90:10 split in terms of the proportion of whooping crane use or stopovers could be selected as a revised objective at that time. That is, management should occur for 90 percent of whooping crane stopovers on the central Platte River and for 10 percent of stopovers west of the central Platte River.
8. Recognizing that population ratios are difficult to establish and monitor, population ratios should be used as indices of whooping crane use of the Platte River and to estimate the potential changes in use. Separate ratios should be used for fall and spring populations. These population ratios should be successfully tested and endorsed before they are used as standardized means of crane detection.
9. A whooping crane use index of bird days on the river as an additional measure of habitat attractiveness should be used.

10. Habitat suitability models should be developed and used as additional tools to evaluate habitat and habitat changes for whooping cranes.
11. Several research and monitoring needs are recommended:
 - a. Continue and improve surveys of whooping crane use and associated habitat.
 - b. Continue to refine the habitat roost model and techniques for evaluating habitat quality for whooping cranes as a management tool.
 - c. Continue to monitor sandhill crane use as one measure of habitat suitability and management progress.
 - d. Whooping crane behavior, habitat use, and time-budget data should be studied regarding use of the central Platte River to help managers interpret habitat preferences and the well-being of whooping cranes that use the Platte River.

C. PALLID STURGEON

1. The lower Platte River, from the confluence with the Elkhorn River to the mouth of the Platte River at the Missouri River, should be included in the Recovery Priority Management Area unit and should be considered when implementing recovery actions for the pallid sturgeon.
2. The area of the Platte River below the Loup River could also provide the conditions necessary for pallid sturgeon survival and should not be ruled out for future recovery efforts.
3. Preserve, or restore where appropriate, the hydro-geomorphic processes and functions that are responsible for creating or maintaining the physical habitat template characteristic of the lower Platte River: a dynamic, sandy, free-flowing, braided river.
4. Identify existing data and collect additional information to determine the historic and current chemical and physical habitat conditions and processes in the Platte River.
5. Develop baseline information on pallid sturgeon for the Platte River, including the abundance, distribution and population structure of pallid sturgeon in the Platte River.
6. Criteria addressing minimum viable population size and demography for Recovery Priority Management Area 4 must be determined to develop quantifiable population recovery objectives and to guide and monitor recovery actions.
7. Effective habitat assessment tools and effective sampling techniques for pallid sturgeon should be developed.

8. Information and educational materials on the pallid sturgeon and its ecosystem should be developed and distributed.

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APPENDIX C

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