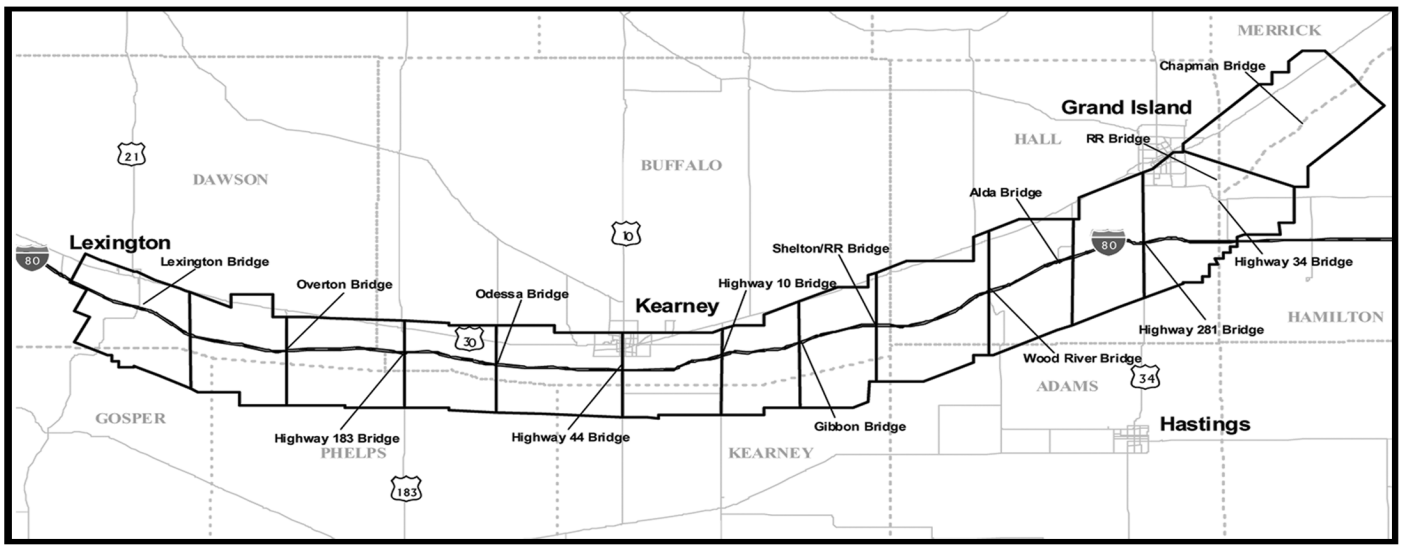
Final Report

Platte River Endangered Species Partnership

Platte River Endangered Species Partnership

Implementation of the Whooping Crane Migrational Survey Protocol Fall - 2002



March 2003

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CHAPTER 1 INTRODUCTION

Greystone Environmental Consultants, Inc. (Greystone) was contracted by the Platte River Endangered Species Partnership (PRESP) to monitor use of the central Platte River by whooping cranes during the fall 2002 migration period. PRESP is an organization created under a cooperative agreement among the States of Colorado, Nebraska, and Wyoming, and the U.S. Department of Interior (DOI).

PRESP has created a protocol for monitoring whooping crane use of the central Platte River during the spring and fall migration. The PRESP Technical Committee developed the first version of the whooping crane monitoring protocol for the spring 2001 monitoring period. The protocol has since been revised several times based on the results of field surveys. The most recent version of the protocol was issued on August 1, 2002 (PRESP 2002). This version of the protocol was used to implement the fall 2002 survey.

The protocol includes procedures for conducting aerial and ground surveys to document use of the central Platte River by whooping cranes. The primary objectives of the surveys include the following:

- Detect whooping crane stopovers in the study area;
- Identify the locations of use and group movements by cranes in the study area;
- Document group activities at crane use sites;
- Document the physical and biological characteristics of use sites; and
- Collect landscape-level data for whooping crane use sites.

This report summarizes the results of the fall 2002 whooping crane survey. Information presented in this report includes the following:

Section 2.0 **Methods** – this section describes field methods and explains quality assurance procedures used for the project.

Section 3.0 **Results** – this section includes a summary of results, including documentation of habitat use and a calculation of the annual index of crane use.

Section 4.0 **Recommendations for Future Protocol Implementation** – this section includes recommendations for modifying the current protocol to facilitate future whooping crane surveys.

Section 5.0 **Conclusions** – this section includes the conclusions of the report.

CHAPTER 2 METHODS

The "Draft Whooping Crane Migrational Habitat Use in the Central Platte River Valley - Whooping Crane Monitoring Protocol" (PRESP 2002) was followed for the fall 2002 survey. The protocol includes methodologies for training, aerial surveys, ground surveys, ground monitoring, and collection of physical and biological data for whooping crane use sites. Under the protocol, both systematic and opportunistic sightings are documented. Systematic sightings include sightings where the whooping crane group was observed during the aerial survey. Systematic sightings also include any monitoring by ground crews who continue to monitor whooping cranes that were observed during the aerial survey. Opportunistic sightings include cases where crane groups were located by means other than the systematic aerial search effort (reports from the public or "accidental" locates by the field crew).

The monitoring protocol establishes the study area and survey period for both the spring and fall surveys. The study area covers a 94.5-mile (river miles) section of the central Platte River between Lexington and Chapman, Nebraska (**Figure 1**). The survey period for the fall 2002 effort started on October 9 and ended on November 10, 2002. These dates represent the 5th and 95th percentile of the dates for all recorded sightings of whooping crane groups in Nebraska from 1975 to 1999 (PRESP 2002).

This section describes the methods for implementation of the fall 2002 survey. In some cases, additional efforts that were not required under the protocol were undertaken to assist in re-locating and monitoring whooping cranes. These additional efforts are also described in this section.

2.1 TRAINING

The monitoring protocol requires that all surveyors attend training on implementation of the protocol. Greystone staff and hired field technicians were therefore required to attend a 2-day training session at Rowe Sanctuary on October 7 and 8, 2002. Six Greystone biologists attended the training and participated in the fall survey. Greystone also hired a staff of 12 local Nebraskans to assist in implementing the protocol. Six of the field technicians had participated in at least one previous whooping crane survey following PRESP guidelines. The members of the fall 2002 survey team are summarized in **Table 2-1**.

TABLE 2-1: MEMBERS OF FALL 2002 WHOOPING CRANE SURVEY TEAM

Greystone Biologists	
Chris Rutledge (Project Manager)	John MacDonald
Sara Davis	Tom Ryon
Pat Golden	Laura Wheatley
Field Technicians	
Tad Casper	Vickie Orr
Sara Fowler	Jerry Pekas
Gene Groff	Jenny Sundberg
Blake Hatfield	Barb Tebbel
Jerry Ingram	Ken Tweedy
Sharon Ingram	Eric Volden

The classroom training included a review of the survey protocol and instruction on use of survey equipment. The training also included a presentation by Wally Jobman, wildlife biologist for the U.S. Fish and Wildlife Service (USFWS), on disturbance avoidance guidelines for whooping cranes. Field technicians and Greystone biologists were also required to attend training on aerial surveys on October 8, 2002. This training was designed to simulate an aerial river survey. As part of the training, each trainee attempted to identify a whooping crane decoy on the river from the air during a short flight.

2.2 AERIAL SURVEYS

Daily aerial surveys were completed concurrently for two sections of the central Platte River between October 9 and November 10, 2002. The eastern, or Grand Island, section included the area between Minden Bridge and Chapman Bridge. The western, or Kearney, section included the area between the Lexington Bridge and Minden Bridge (**Figure 1**). Air Midway was contracted to fly the Kearney section, and Grand Island Aviation was contracted to fly the Grand Island section of the study area.

Aerial surveys were conducted daily from the Kearney and Grand Island Airports, depending on weather conditions. Two aerial surveyors were assigned to each plane and section of the river. Each aerial flight included a river transect on the first leg of the flight and either a river or upland transect on the return leg (PRESP 2002). The river transects were flown at an altitude of 750 feet, and the return transects were flown at an altitude of 1,000 feet. The flight directions were fixed for each day so that both planes started the transects at either the easternmost or westernmost points and subsequently flew in the same direction during the river transect. This pattern was designed to reduce the potential for the two planes to be in the same location at the same time. Return transects were fixed according to each flight day. In the event that a flight was cancelled, all scheduled return transects were pushed back one day.

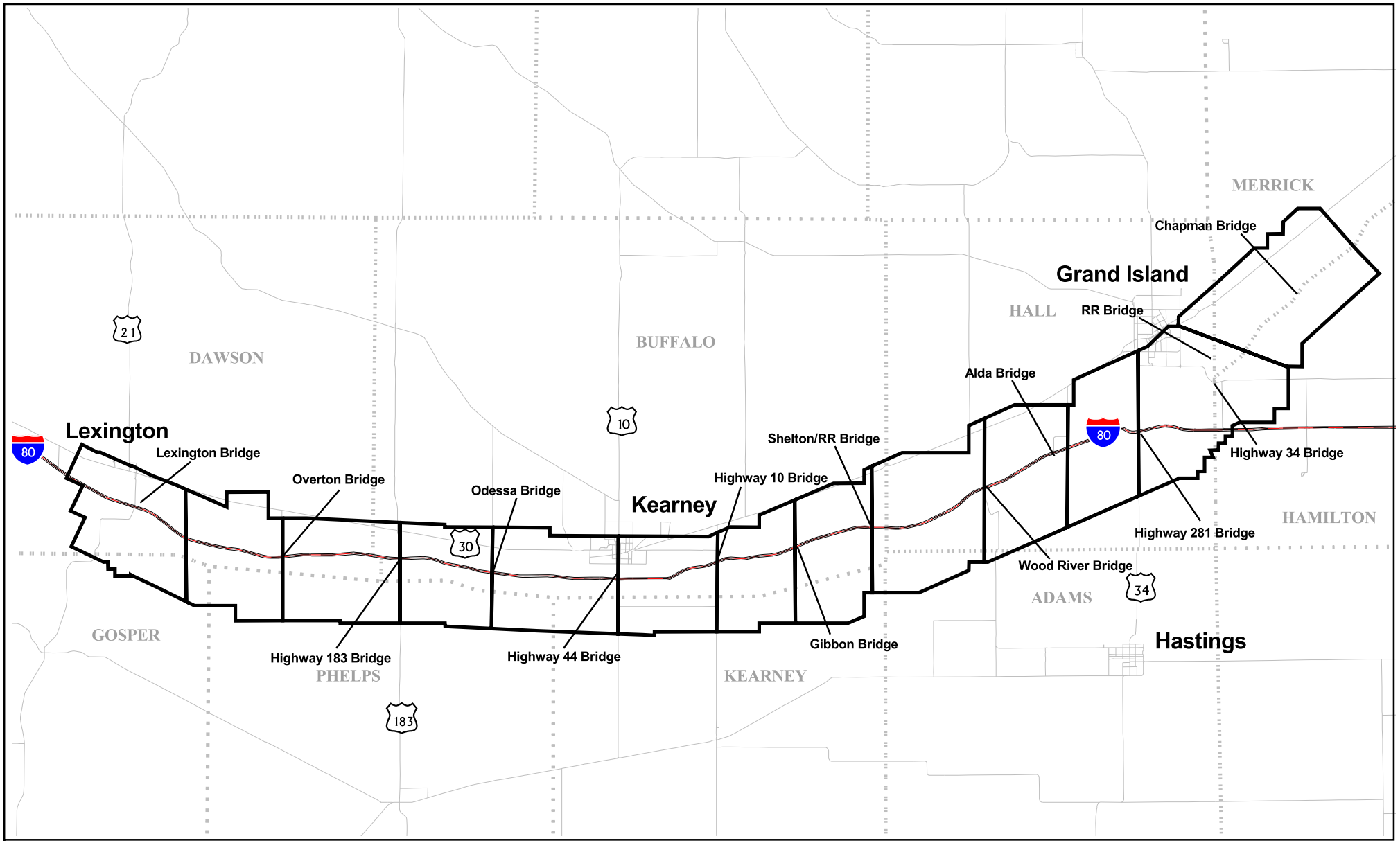
Additional aerial surveys that were not required under the current protocol were flown on three occasions. Two flights were added during the survey to re-locate whooping cranes that had been reported but could not be located by ground crews. These flights were conducted on October 14 and November 1, 2002. A third aerial survey was conducted after the survey period had ended to confirm that all whooping cranes had left the study area. This additional survey occurred on November 12, 2002.

2.3 PLACEMENT OF DECOYS AND VERIFICATION OF SIGHTINGS

The efficiency of the search was evaluated by placing whooping crane decoys within the survey area over the course of the survey period. The locations for decoys were provided to Greystone before the survey began. Pre-determined decoy locations were provided for 15 decoy locations:

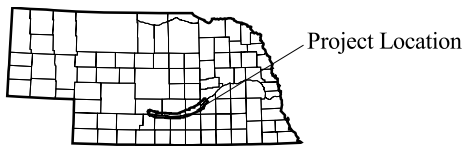
- One agriculture/corn location
- One lowland grass location
- Three wooded river with floodplain locations
- Ten wetted channel locations

Decoys were placed at the pre-determined locations throughout the survey period. Members of the field crew who were not involved with whooping crane monitoring that day were responsible



LEGEND

Project Boundary



0 10 20 30 Miles

Scale: 1:600,000
Transverse Mercator Projection
1983 North American Datum
Zone 14

FALL - 2002
WHOOPING CRANE SURVEYS

FIGURE 1
PROJECT LOCATION MAP

ANALYSIS AREA: PLATTE RIVER, NEBRASKA	
Date: 03/25/03	File: C:\PROJECTS\1421\DATA\FLIGHT_LINES.APR
Drawn By: MS	Layout: overall_proj_map

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for placing the decoys. The aerial survey crew did not know the schedule for placement or the locations of the decoys. Ground crews were notified of the locations as the decoys were placed in the field. Ground crews verified observations when they received a report of a potential whooping crane from the aerial survey crews. In the case that aerial crews did not locate a decoy, ground crews notified the aerial crews of the location. Aerial crews then circled back to locate the decoys before they returned to the airport. Decoys were initially labeled with program identification numbers. However, each decoy was also labeled with a Greystone identification number to keep track of the order and number of decoys that had been placed in the field. Greystone numbers were assigned sequentially as each decoy was placed in the field.

Ground crews were used to verify systematic and opportunistic sightings of whooping cranes. Two ground crew members were assigned to two different locations within each section of the study area during the aerial surveys. For the Kearney section, members of the ground crew were assigned to Odessa Bridge and Overton Bridge. For the Grand Island section, members of the ground crew were assigned to the Sheldon/Railroad Bridge and the Alda Bridge. Assignments for members of the ground crews were selected based on their place of residence.

The members of the aerial crew immediately contacted the ground crew when they believed that a whooping crane was observed. Air crews maintained communication with ground crews using two-way 5-watt handheld radios (Vertex Standard VX-800). Locations of potential sightings of whooping cranes were relayed to the ground crew. The nearest member of the ground crew would then go to the location to search for the whooping cranes. In accordance with the protocol, the ground crew searched for the whooping cranes for a minimum of 2 hours. The aerial survey crew also assisted the ground crew in locating the cranes after both transects were completed.

When the ground crew was able to locate and confirm a whooping crane sighting, the crew then photographed the crane group and began the observation period. Ground crews continued to observe the crane groups until they left the area or until dark. Data collected while the crew observed the crane group included locations of cranes and their activities at use sites, movements, behavioral observations, and physical and biological characteristics of each use site. While they were collecting ground observation data, ground crews adhered to the USFWS avoidance guidelines to limit the potential for disturbance to whooping cranes.

Ground crews were also responsible for verifying opportunistic sightings of whooping cranes. A new hotline number (1-877-208-8557) was established for reporting opportunistic sightings. The number is directly administered by PRESP and can be forwarded to any number in the future. Brochures with information on the hotline number, how to identify whooping cranes, and how to report sightings were distributed to local organizations and agencies. Calls received on the hotline number were forwarded to Whooper Watch. Whooper Watch is a volunteer organization that assists in monitoring whooping cranes during the fall and spring migrations. After potential sightings had been screened, Whooper Watch contacted Greystone biologists, who then went to the site to confirm these sightings.

All whooping crane groups observed during the fall 2002 survey were each assigned a unique identification number. Identification numbers were assigned chronologically. For example, the first and second crane groups observed were assigned identification numbers of 2002FA01 and 2002FA02. A letter "I" was added to the identification number to signify that the crane group was documented only by an opportunistic sighting and was not observed during implementation of the systematic protocol. For example, the first crane group that was opportunistically observed was assigned the identification number of 2002FAI01.

Physical and biological data for use sites associated with a specific crane group were recorded as soon as practical after the group had left the area. Data on stream profile and use site were collected for whooping cranes use sites and decoy locations. Data that were collected include characteristics of the landscape (unobstructed view, distance to disturbances, and habitat type) and river (percent sediment, flow, and channel profile data, including channel width and water depths). In a few cases, data on the use site could not be collected because of problems with access to land.

During the survey, ground crews observed that some whooping crane groups routinely used the same general area. A single stream profile was completed for several use sites in cases where they were located close to each other. The decision whether to group several adjacent use sites to a single stream profile was made based on best professional judgment. Each use site location and stream transect location was assigned a unique identification number. Each identification number includes the crane group number, type of point (R - river use site, F - non-river use site, or S - stream transect), and a number. For example, identification number FA02-R2 is the location of a river use site for crane group FA02.

Data on the use site were collected as soon as possible after the whooping cranes left the study area. However, a number of factors caused a delay in collecting use site data, including:

- Adherence to USFWS whooping crane disturbance avoidance standards
- The large number of sightings during the fall 2002 survey period
- The start of the rifle deer season
- Land access issues
- Other factors including weather (high winds, cold temperatures, and frozen river)

In some cases, collection of use site data was delayed for several days or even weeks because of these factors.

2.4 QUALITY ASSURANCE AND QUALITY CONTROL

A key component of the fall whooping crane survey was the quality control/quality assurance (QA/QC) program. Greystone developed a project-specific QA/QC program in accordance with the protocol. Each crew member was individually responsible for maintaining the highest level of QA/QC for all components of the project, including completing data forms, maintaining accuracy of the aerial and ground surveys, promoting consistency among reporting methods, and entering data into the Microsoft Access database. The Greystone biologist reviewed completed data forms daily. Any changes to the original data forms were documented and initialed by the person who made the change. Specific deviations from the established protocol were also documented on data forms. Detailed explanations for these deviations were included as part of the documentation.

A QA/QC program was also implemented for database entry. In accordance with the established protocol, database files were compared with the raw data forms to identify any discrepancies. Any discrepancies identified were corrected and documented in the database or on the raw data forms, as required.

CHAPTER 3 RESULTS

The results of the fall 2002 whooping crane survey are summarized in this section. This section is organized as follows:

Section 3.1 Number and Distribution of Flights Flown
Section 3.2 Searcher Efficiency
Section 3.3 Whooping Crane Observations
Section 3.4 Characteristics of Use Sites

3.1 NUMBER AND DISTRIBUTION OF FLIGHTS FLOWN

A number of flights were cancelled from both the Grand Island and Kearney Airports as a result either of weather or of poor flight conditions. The majority of cancellations were related to several large weather fronts that passed through the study area. A number of flights were also cancelled because of poor visibility that resulted from low cloud cover and fog. Of the 33 total possible flight days, 13 flights (39 percent) were flown out of the Kearney Airport and 22 flights (67 percent) were flown out of the Grand Island Airport. Several factors contributed to the smaller number of flights from the Kearney Airport, including differences in weather and elevation. A summary of the number and distribution of return transects flown during the fall-2002 survey is provided in **Table 3-1**.

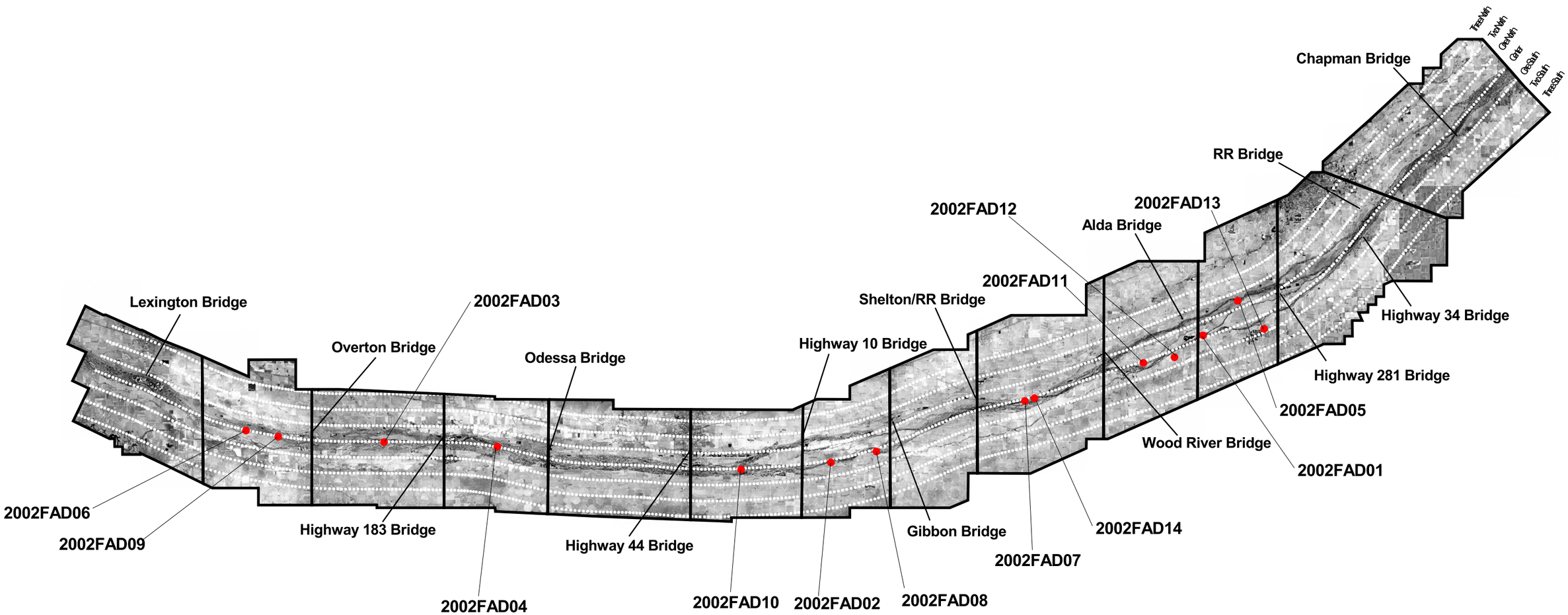
TABLE 3-1: DISTRIBUTION OF RETURN TRANSECTS FLOWN FOR THE FALL 2002 SURVEY

Return Transect	Number of Return Transects Flown			
	Kearney Flight Direction		Grand Island Flight Direction	
	East	West	East	West
0 (River)	1	1	1	2
1N	1	1	1	3
2N	1	1	2	1
3N	1	1	2	1
1S	1	1	2	1
2S	1	1	1	2
3S	1	0	2	1
Total Flight Days	7	6	11	11

In general, frequencies of flight direction were similar for return transects within each section of the study area. The exception is the 1N return transect on the Grand Island section of the river. This return transect was flown in a westbound direction three times but was flown in an eastbound direction only one time. The frequency of westbound flights for the 1N return transect was higher because the flight direction was fixed according to each calendar date.

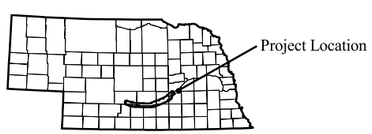
3.2 SEARCHER EFFICIENCY

Whooping crane decoys were placed at pre-determined locations during the fall survey to evaluate the efficiency of the aerial searchers. Fifteen decoy locations were provided to Greystone for the fall 2002 survey. However, Greystone was not able to obtain permission to access the land for decoy location FAD-08. As a result, no decoy was placed at this location. All decoy locations are shown in **Figure 2**.



LEGEND

- Decoy Locations
- Flight Transects



5 0 5 10 Miles

Scale: 1:400,000
Transverse Mercator Projection
1983 North American Datum
Zone 14

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FALL - 2002
WHOOPING CRANE SURVEYS

FIGURE 2
WHOOPING CRANE DECOY LOCATIONS

ANALYSIS AREA: PLATTE RIVER, NEBRASKA	
Date: 03/21/03	File: C:\PROJECTS\1401\DATA\FLIGHT_LINES.APR
Drawn By: MS	Layout: decoys_key_a

Searcher efficiency was calculated using the following equation:

Number of decoys observed/Total decoys * 100

Results for the efficiency of the searchers are summarized in **Table 3-2**. Of the 14 total decoys placed, eight (57 percent) were detected during aerial surveys. Six decoys were not detected during aerial surveys.

TABLE 3-2: FALL 2002 SEARCHER EFFICIENCY

Program Decoy ID	Section	Flight Direction	Flight Transect	Detected (Yes/No)
FAD-01	Grand Island	West	River	No
FAD-02	Kearney	East	River	Yes
FAD-03	Grand Island	West	River	No
FAD-04	Kearney	East	River	Yes
FAD-05	Grand Island	East	1 South	No
FAD-06	Grand Island	East	River	Yes
FAD-07	Kearney	East	River	No
FAD-08	Grand Island	*	*	*
FAD-09	Grand Island	East	River	No
FAD-10	Kearney	West	River	Yes
FAD-11	Grand Island	West	River	Yes
FAD-12	Kearney	East	River	Yes
FAD-13	Grand Island	West	1 North	Yes
FAD-14	Grand Island	West	River	Yes
FAD-15	Kearney	East	River	No

** Not applicable, decoy was never placed on river as a result of problems with access to land*

Searcher efficiency for eastbound flights was 17 percent lower than for westbound flights. Four of the six decoys were observed (67 percent) on days when a westbound transect was flown. In contrast, four of the eight decoys (50 percent) were observed on days when eastbound transects were flown. One out of two decoys (50 percent) placed at off-channel locations was observed during the survey.

The lower efficiency on eastbound flights may have occurred because morning eastbound flights are flown directly into the sun. Flying into the sun reduces the surveyor's field of view because the sun is low on the horizon. The glare from the river is also increased on morning eastbound flights, and white objects often look black or blend into the river. Other factors that may have contributed to the failure of aerial surveyors to locate decoys include weather conditions at the time of the aerial survey, channel width, and river braidedness.

3.3 SUMMARY OF WHOOPING CRANE SIGHTINGS

The following sections include a summary of whooping crane sightings throughout the U.S. and within the project study area.

3.3.1 Whooping Crane Sightings in the U.S.

During the survey, Greystone contacted Mr. Jobman of USFWS on a regular basis to obtain reports on the status of the fall whooping crane migration. A summary of status reports on whooping crane migration received from USFWS is provided in **Appendix A**. Reports on

whooping crane migration prepared by Tom Stehn of Aransas National Wildlife Refuge in Texas are included in **Appendix B**. A report that summarized all confirmed whooping crane sightings was prepared by the USFWS at the end of the fall migration. This report is included in **Appendix C**.

3.3.2 Whooping Crane Sightings in the Study Area

Eighteen whooping cranes were observed within the study area during the fall 2002 survey. The presence of 17 of the 19 whooping cranes was confirmed by USFWS. USFWS considered the presence of the other two whooping cranes probable. This count represents the largest number of whooping cranes ever observed during the fall monitoring period and is approximately 10 percent of the Wood Buffalo/Aransas population. A summary of whooping cranes observed in the study area and their program and USFWS identification numbers is provided in **Table 3-3**. Program crane group numbers were assigned to each crane group in the field in accordance with the protocol. USFWS Crane Group identification numbers were independently assigned to each crane group by the USFWS.

TABLE 3.3: RELATIONSHIP OF PROGRAM CRANE GROUP NUMBERS TO USFWS CRANE GROUP NUMBERS FOR CONFIRMED SIGHTINGS

Program Crane Group Number	USFWS Crane Group ID	Number Cranes (Adults/ Juvenile)	Period Observed
2002FA01	NE 02B-1	1	10/13/02 to 10/14/02
2002FAI03	NE 02B-2	1	10/13/02
2002FAI01	NE 02B-3	1	10/14/02
2002FAI02 *	NE 028-66	2	10/14/02
2002FA02	NE 02B-40	8	11/01/02 to 11/10/02
2002FA03	NE 02B-41	2	11/01/02 to 11/02/02
FA04	NE 02B-42	2/1	11/01/02 to 11/10/02
FA05	NE 02B-43	1	11/05/02 to 11/10/02

* USFWS considered this sighting probable.

Total Crane Use Days

Total crane use days were calculated for the fall 2002 survey period. Crane use days were calculated by multiplying the number of cranes in each group by the number of days they were present in the study area. Total crane use days for each crane group are summarized in **Table 3-4**. The total crane use days for the fall 2002 survey period for confirmed sightings were 121 days.

TABLE 3-4
TOTAL CRANE USE DAYS

Crane Group	Number of Cranes	Number of Days Observed	Crane Use Days
FA01	1	2	2
FA02	8	10	80
2002FAI01	1	1	1
2002FAI03	1	1	1
FA03	2	2	4
FA04	3	9	27
FA05	1	5	5
		TOTAL	**121**

Summary of Systematic and Opportunistic Sightings

The whooping cranes were sighted during both the systematic survey effort and as opportunistic sightings obtained from a variety of sources. Reports of opportunistic sightings were received from the ground and aerial survey crews, Whooper Watch, and the public. **Figure 3** shows the locations of whooping crane use sites recorded during fall 2002 survey. Detailed views of each whooping crane sighting are shown on **Figures 4** through **8**. Opportunistic observations reported to Greystone are summarized in **Appendix D**. The complete database for the fall 2002 survey is included in **Appendix E**. A summary of whooping crane movements between use sites is included in **Appendix F**. The following section provides a general summary of these data.

The first cranes were sighted in the study area on October 13 and October 14, 2002. On October 13, 2002, Paul Currier of the Platte River Whooping Crane Maintenance Trust (PRMT) received a report of a single whooping crane near the Alda Bridge. A PRMT staff member took a photograph of this whooping crane in flight. Since the crane was observed in flight, no use site locations were recorded. This sighting was not reported to Greystone until the afternoon of October 14, 2002. This single crane was assigned a program identification number 2002FAI03 and USFWS identification number NE 02B-2.

On the morning of October 14, three separate groups of cranes were observed or reported to Greystone. Bill Taddiken, an employee of Rowe Sanctuary, observed a single whooping crane near the sanctuary at 7:30 a.m (**Figure 4**). The crane was spotted from an observation tower and was in view for several minutes. The bird was confirmed as a whooping crane during this time. After several minutes, the crane took flight and was believed to have moved either downstream on the river or to a cornfield south of the river. Ground crews searched both areas for several hours. Although ground crews located a large flock of sandhill cranes, they were not able to re-locate the single whooping crane. Since the Greystone team did not observe this whooping crane during the aerial survey, it was considered an opportunistic sighting and was assigned program identification number 2002FAI-01. The USFWS assigned this single crane an identification number of NE 02B-3.

Chapman Bridge

RR Bridge

Alda Bridge

Shelton/RR Bridge

Highway 10 Bridge

Odessa Bridge

Highway 34 Bridge

Highway 281 Bridge

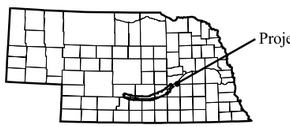
Wood River Bridge

Gibbon Bridge

Highway 44 Bridge

LEGEND

- Crane Sighting Systematic (2002 FA02)
- Crane Sighting Systematic (2002 FA04)
- Crane Sighting Systematic (2002 FA05)
- Crane Sighting Opportunistic (2002 FA01)
- Crane Sighting Opportunistic (2002 FA02)
- Crane Sighting Opportunistic (2002 FA03)
- Crane Sighting Opportunistic (2002 FA04)
- Crane Sighting Opportunistic (2002 FA05)
- Crane Sighting Opportunistic (2002 FAI01)



5 0 5 10 Miles

Scale: 1:275,000
Transverse Mercator Projection
1983 North American Datum
Zone 14

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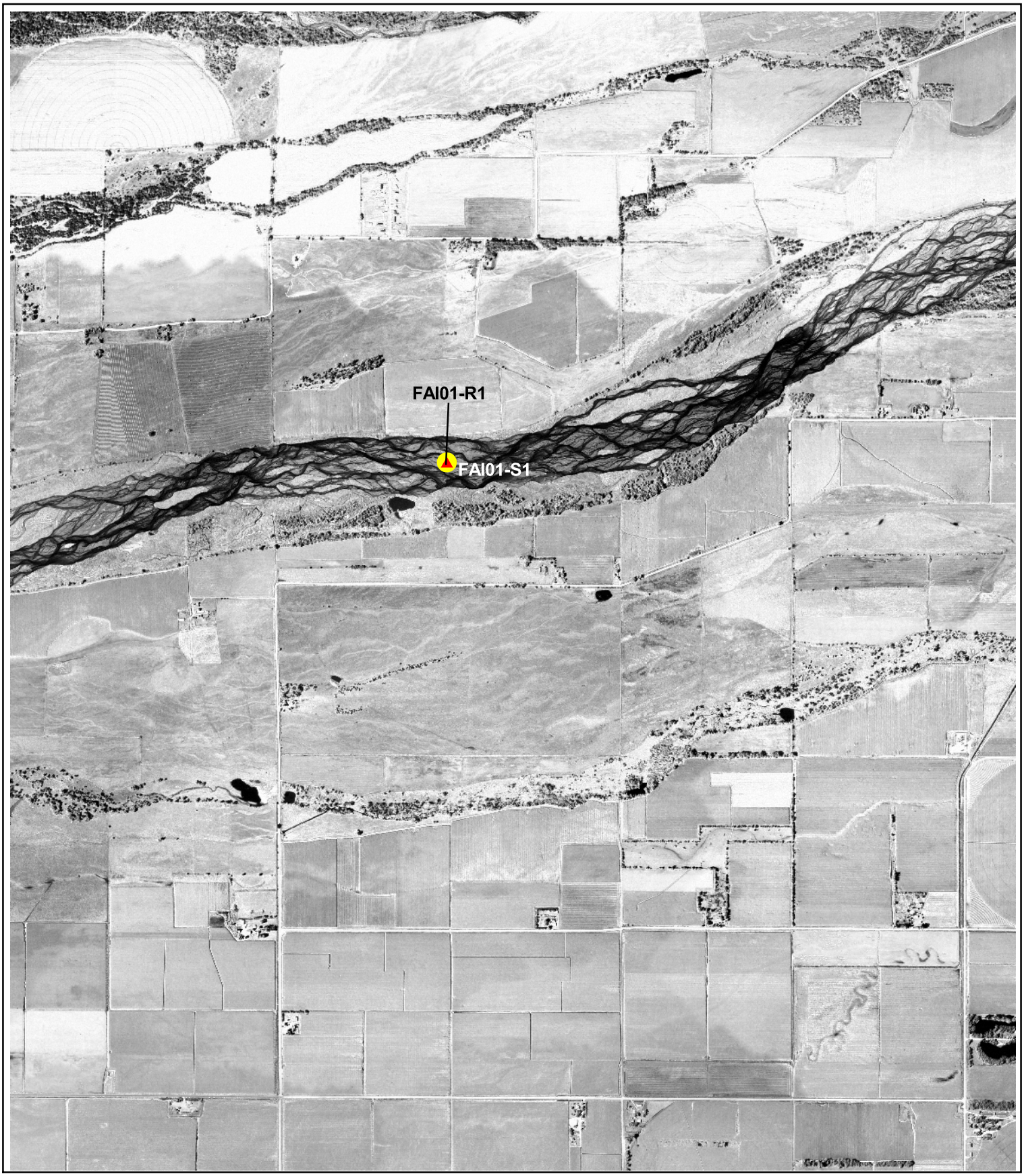
FALL - 2002
WHOOPING CRANE SURVEYS

FIGURE 3
WHOOPING CRANE SIGHTING LOCATIONS

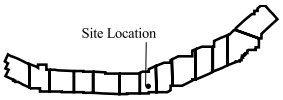
ANALYSIS AREA: PLATTE RIVER, NEBRASKA	
Date: 03/26/03	File: C:\PROJECTS\1421\DATA\FLIGHT_LINES.APR
Drawn By: MS	Layout: crane_pts_key_a



LEGEND

▲ Crane Sighting Opportunistic (2002 FAI01)

● Stream Transect (2002 FAI01)



1000 0 1000 2000 Feet

Scale: 1:24,000
Transverse Mercator Projection
1983 North American Datum
Zone 14

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FALL - 2002
WHOOPING CRANE SURVEYS

FIGURE 4
WHOOPING CRANE SIGHTINGS AND
STREAM TRANSECT LOCATION FOR FAIO1

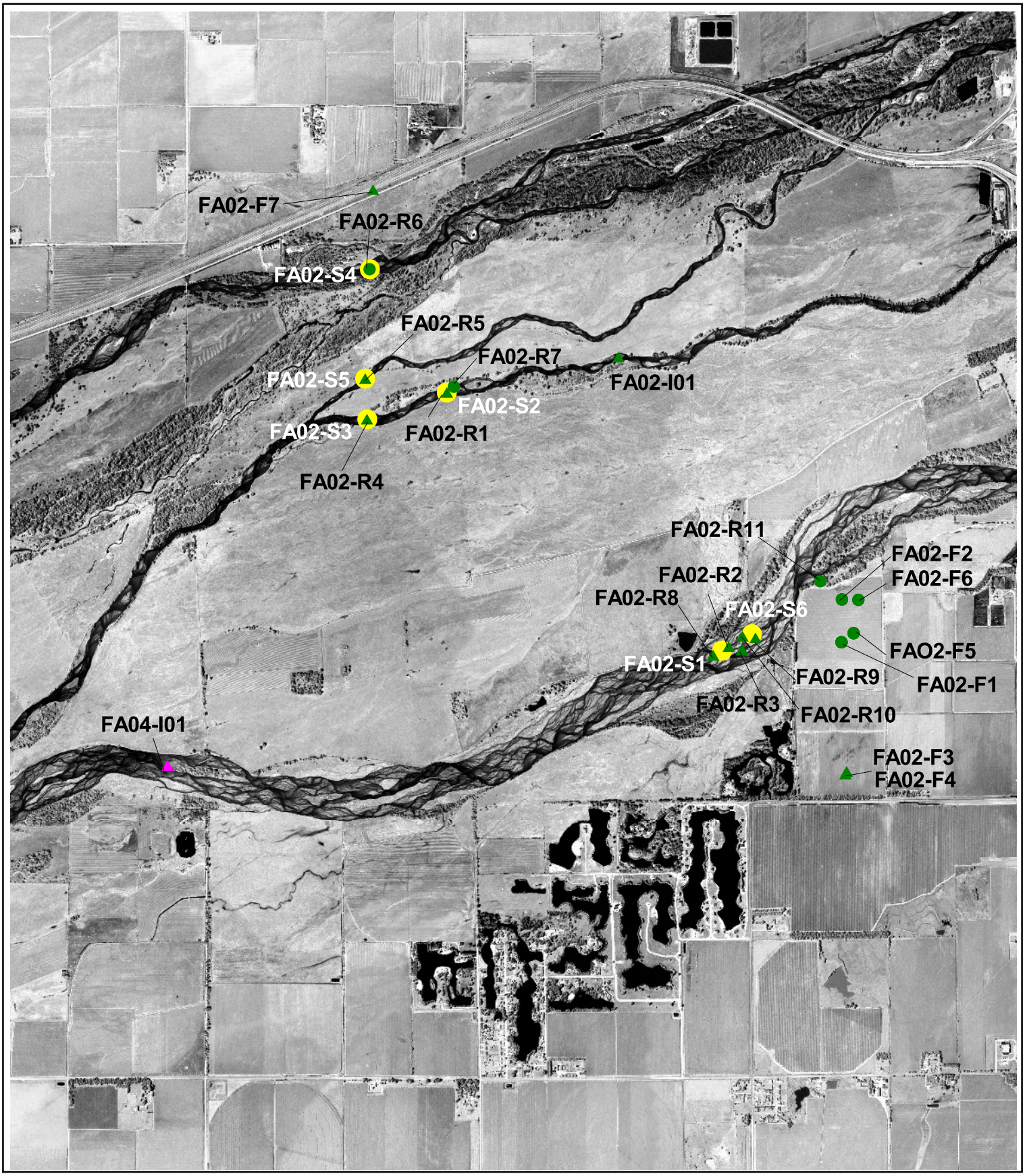
ANALYSIS AREA: PLATTE RIVER, NEBRASKA	
Date: 03/25/03	File: C:\PROJECTS\1421\DATA\FLIGHT_LINES.APR
Drawn By: MS	Layout: crane_transect_pts_A2

Two whooping cranes were also observed in flight on the Grand Island section of the river on the morning of October 14. The Grand Island aerial survey crew first spotted the whooping cranes at 7:40 a.m. while they were commuting along the river to the starting point of the first transect of the day. The plane was flying along the south side of the river en route to the Minden Bridge. Approximately 1/4 to 1/2 mile west of the Alda Bridge, two whooping cranes were observed in flight behind a flock of pelicans. A member of the ground crew who was located at the Alda Bridge also observed the two cranes in flight behind the same group of pelicans. The ground crew member described the birds as being "lighter in color," but could not confirm they were white because of poor lighting. After this observation, the ground crews could not re-locate the cranes for a positive identification. Since these two whooping cranes were not observed during the aerial survey, but rather on the commute, they were considered an opportunistic sighting and were assigned group identification number 2002FAI02. USFWS considered this sighting probable and assigned the group of two whooping cranes identification number NE 028-66.

Because a number of whooping cranes were either observed or reported on the morning of October 14, a second aerial survey was conducted at 12:10 p.m. on the afternoon of October 14. The second survey was conducted in an attempt to re-locate any whooping cranes that had been observed or reported within the Grand Island section of the study area. Two Greystone biologists flew from the Kearney airport and re-surveyed the Grand Island section of the study area. A single whooping crane was observed near Shoemaker Island (**Figure 7**) in a large group of 200 to 300 sandhill cranes. The plane circled the whooping crane several times. The crew member used binoculars to confirm the bird as a single whooping crane. The whooping crane was located on a large island that had been disked. Two photographs of this whooping crane were taken during the aerial survey (**Photos 1** and **2** in **Appendix D**). Ground crews went to the location of the whooping crane in an attempt to collect ground observation data. At 1:00 p.m. on October 14, the winds shifted from the west to predominantly out of the north/northwest. At about this time, ground crews began observing sandhill cranes leaving the area in groups of three to five. Ground crews searched this area until approximately 3:00 p.m., but were unable to re-locate the single whooping crane. No whooping cranes and only a few sandhill cranes were observed in the study area during aerial and ground surveys conducted the following day. This whooping crane was assigned program identification number 2002FA01 and USFWS identification number NE 02B-1.

The second series of observations occurred in early November, when 13 whooping cranes were observed using the central Platte River between November 1 and November 3, 2002. These observations represent the largest number of whooping cranes ever observed using the central Platte River at any given time during the fall period. On November 1, three separate groups of whooping cranes were reported and later confirmed by the Greystone ground crews. These groups included eight whooping cranes near Doniphan, a pair near the Odessa and Kearney Bridges, and a family group (two adults and one juvenile) near the Alda Bridge. The following paragraphs outline observations of these groups.

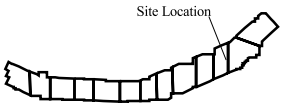
On the morning of November 1, Diane Beachley of Whooper Watch informed Greystone that her volunteers had observed a group of eight whooping cranes north of the town of Doniphan. The volunteers observed the whooping cranes near the Doniphan Cemetery and Cedarview Road. These birds were not observed during the aerial survey. However, snow cover may have limited the ability to observe them. Later that morning, Greystone received a call from the ground crew. The ground crew had observed a group of eight whooping cranes in a cornfield west of Highway 281 and north of Cedarview Road near Amick Acres. The whooping cranes later flew to the river, where they stayed briefly before they took flight. The whooping cranes then circled this general area for more than 2 hours. The group was assigned program identification number 2002FA02 and USFWS identification number NE 02B-40.



LEGEND

- Crane Sighting Systematic (2002 FA02)
- Crane Sighting Opportunistic (2002 FA02)
- Crane Sighting Opportunistic (2002 FA04)
- Stream Transect (2002 FA02)

Site Location



1000 0 1000 2000 Feet

Scale: 1:30,000
Transverse Mercator Projection
1983 North American Datum
Zone 14

GREYSTONE

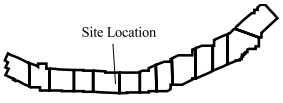
FALL - 2002
WHOOPING CRANE SURVEYS

FIGURE 5
WHOOPING CRANE SIGHTINGS AND STREAM TRANSECT LOCATIONS FOR FA02 AND FA04

ANALYSIS AREA: PLATTE RIVER, NEBRASKA	
Date: 03/26/03	File: C:\PROJECTS\1421\DATA\FLIGHT_LINES.APR
Drawn By: MS	Layout: crane_transect_pts_A4

LEGEND

- Crane Sighting Opportunistic (2002 FA03)
- Stream Transect (2002 FA03)



1000 0 1000 2000 Feet

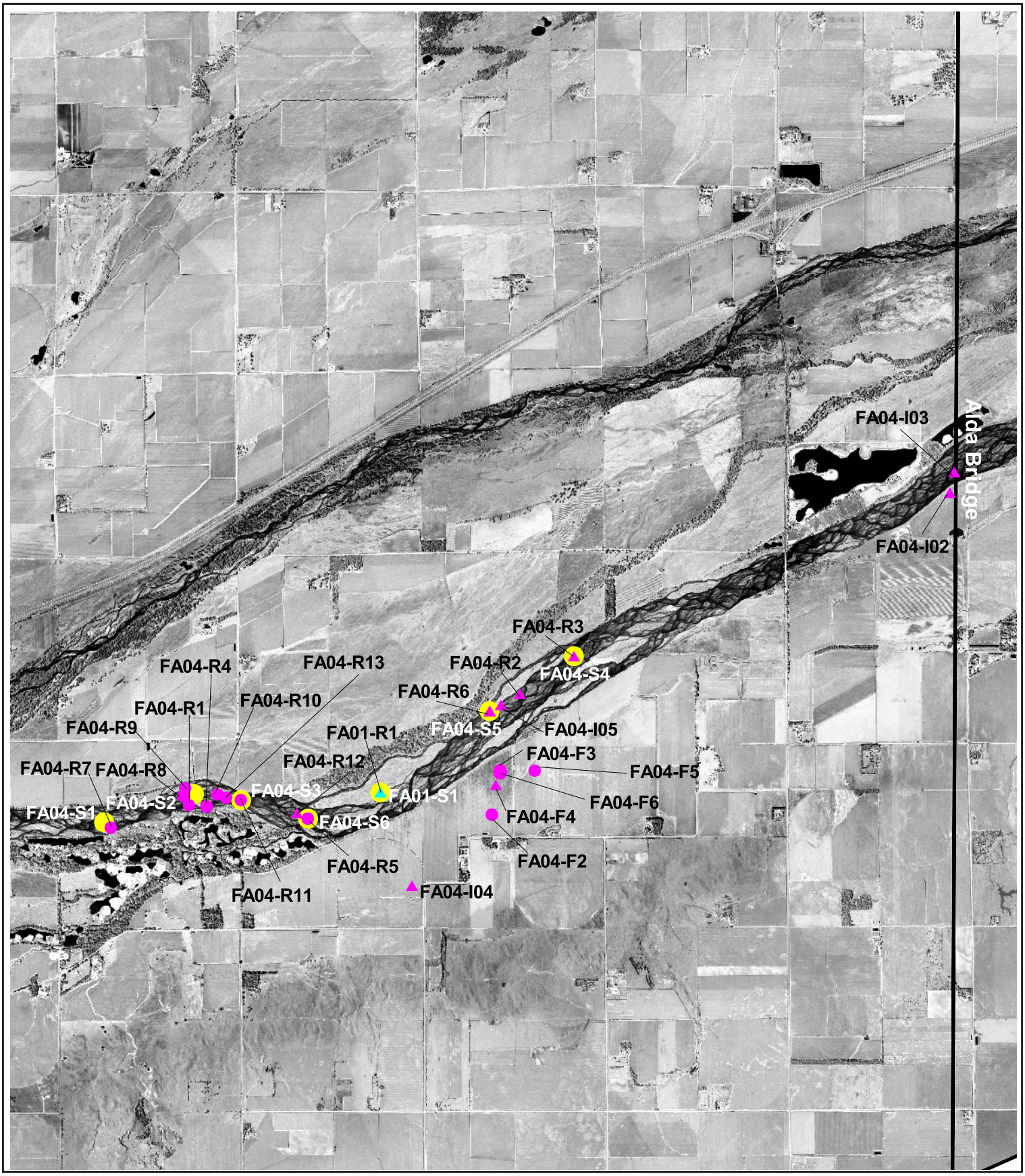
Scale: 1:24,000
Transverse Mercator Projection
1983 North American Datum
Zone 14

GREYSTONE

FALL - 2002
WHOOPING CRANE SURVEYS

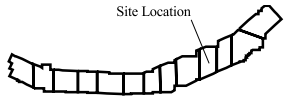
FIGURE 6
WHOOPING CRANE SIGHTINGS AND
STREAM TRANSECT LOCATIONS FOR FA03

ANALYSIS AREA: PLATTE RIVER, NEBRASKA	
Date: 03/26/03	File: C:\PROJECTS\1421\DATA\FLIGHT_LINES.APR
Drawn By: MS	Layout: crane_transect_pts_A1



LEGEND

- Crane Sighting Systematic (2002 FA04)
- Crane Sighting Opportunistic (2002 FA04)
- Crane Sighting Opportunistic (2002 FA01)
- Stream Transect



2000 0 2000 4000 Feet

Scale: 1:45,000
Transverse Mercator Projection
1983 North American Datum
Zone 14

GREYSTONE

FALL - 2002
WHOOPING CRANE SURVEYS

FIGURE 7
WHOOPING CRANE SIGHTINGS AND STREAM TRANSECT LOCATIONS FOR FA01 AND FA04

ANALYSIS AREA: PLATTE RIVER, NEBRASKA	
Date: 03/26/03	File: C:\PROJECTS\1421\DATA\FLIGHT_LINES.APR
Drawn By: MS	Layout: crane_transect_pts_A3

Between November 2 and November 10, the group of eight whooping cranes used several general areas on a regular basis. These areas included several sections of the Platte River and two cornfields near Amick Acres (**Figure 5** and **Appendix F**). Typically, this group of whooping cranes would move from their roost sites on the river to the cornfields just after sunrise. The whooping cranes were typically off their roost sites between 6:55 a.m. and 7:05 a.m. The group was therefore rarely observed on the river during aerial surveys, but was instead observed in adjacent cornfields (**Photo 3**). Locations of the roost sites were obtained from the Greystone field crew, Mr. Jobman and from PRMT biologists. Greystone observed the eight whooping cranes on the river at dusk on November 9, 2002 (**Figure 5**). The whooping cranes were observed leaving this same roost site area during the aerial survey on November 10, 2002 (**Photo 4**). Mr. Jobman observed the whooping cranes on the northern portion of the river and PRMT biologists also documented the locations of several roost sites between November 1 and November 10.

During the day, the group of eight whooping cranes spent the majority of their time in either a cornfield near Amick Acres or on an area of river located just to the west of the cornfield (**Figure 5**). The whooping cranes would alternate between these two areas throughout the day. Typically, this group would leave the roost sites around dawn. The cranes would then move to the cornfield and feed for several hours. During the middle of the day, the cranes would move between the cornfield and the river. Cranes spent most of their time in these areas feeding, walking, preening, or displaying courtship behaviors. In the late afternoon, the cranes would return to the cornfield and feed for an hour to several hours. Around dusk, the cranes returned to the roost sites on the river.

Paul Tebbel of Rowe Sanctuary relayed another sighting of two whooping cranes observed near the Odessa Bridge on November 1. The exact location of these birds was not documented; therefore, the location of this initial sighting could not be mapped. Greystone field technicians later observed these whooping cranes in a cornfield near the Kearney/Highway 44 Bridge (**Figure 6**). The two whooping cranes were observed near a herd of cattle at 4:15 p.m. This group moved to the river at 5:10 p.m. (**Photo 5**). The two whooping cranes were not observed during the aerial survey the next morning. However, Mr. Tebbel located this group on the Platte River about ¼ mile upstream of the Kearney Bridge. He observed the cranes until 8:30 a.m. The ground crew observed these birds until early afternoon when visual contact was lost. Mr. Tebbel informed Greystone that at 2:30 p.m. he observed two whooping cranes flying east over his residence, near Fort Kearny State Recreation Area. USFWS employee Andy Bishop also observed the two whooping cranes in flight at 2:30 p.m. from his hunting blind. The hunting blind is located directly north of the Fort Kearney State Recreation Area. Both reports indicated that the two whooping cranes were moving downstream toward Rowe Sanctuary. These two whooping cranes were never observed again and may have left the study area shortly after these observations. The two whooping cranes were assigned program identification number 2002FA03 and USFWS identification number NE 02B-41.

On November 2, Mr. Jobman reported that a family group of three cranes was observed the previous evening just east of the Alda Bridge. A Crane Meadows employee observed the three cranes from a blind. After the first observation, this family group was always observed west of the Alda Bridge (**Figure 7** and **Appendix F**). The aerial and ground crews often observed the family group using the river near the Lilley Gravel Pits and south of the Luehr farm (**Photo 6**). The family group would frequent fields of corn and soybean stubble south of the river near the Basil Otto residence on Platte River Drive, west of 90th Road. Parents were observed demonstrating courtship behavior to a juvenile, and the juvenile appeared to copy the parent's movements. On November 8, two sandhill cranes were observed feeding with the family group. The sandhill cranes stayed with the whooping cranes until November 10. The parents would

threaten or peck the sandhill cranes and chase them away. This behavior was observed in river and agricultural field habitats when the sandhill cranes would move too close to the juvenile whooping crane. The ground crew last observed the family group on the morning of November 10, when it appeared to have left the study area. The family group of whooping cranes was assigned program identification number 2002FA04 and USFWS identification number NE 02B-42.

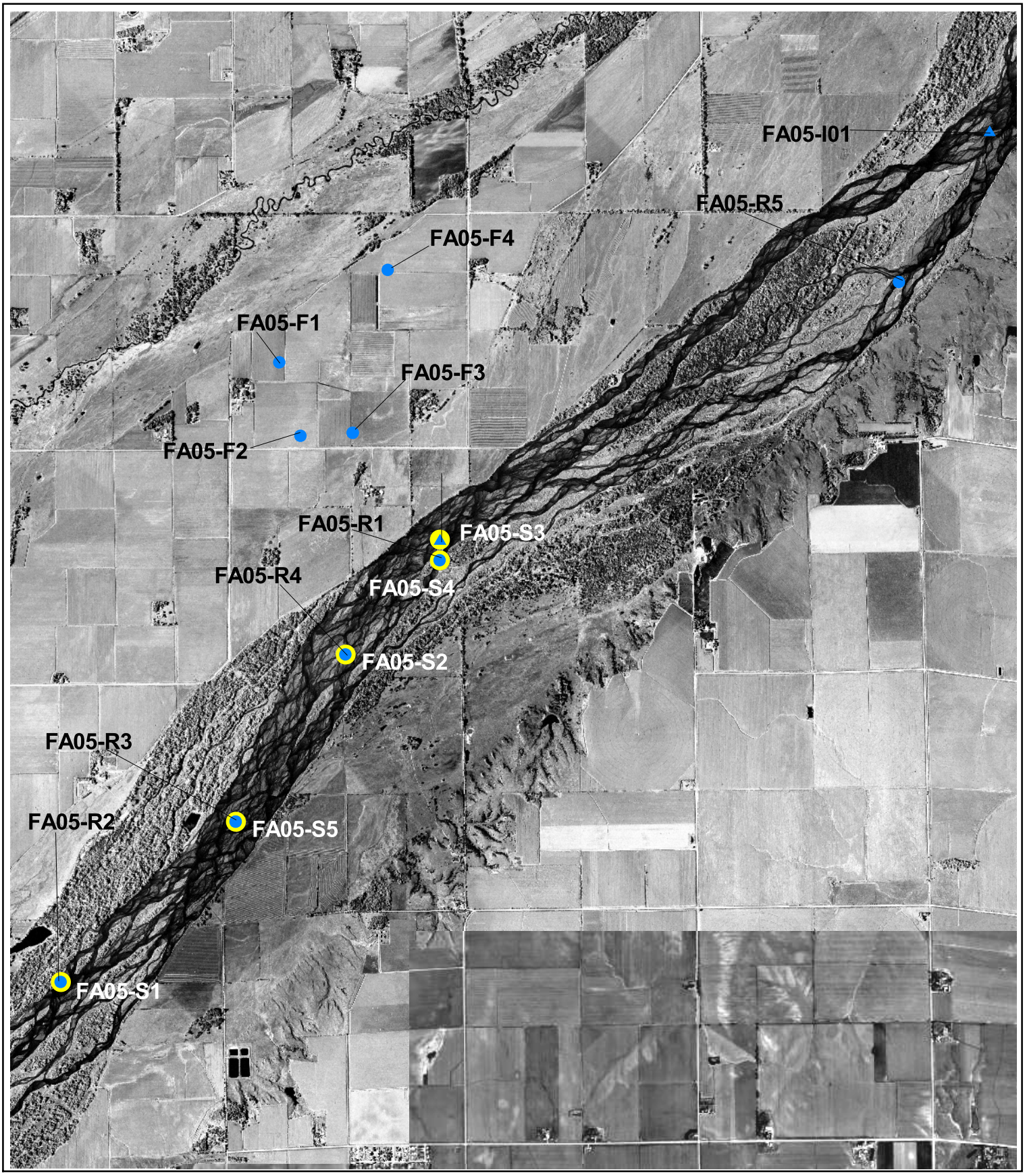
A single whooping crane, assigned program identification number 2002FA05, was observed near the Chapman Bridge downstream of Guendell Island on November 5. Jay Neville, a hunter using a blind owned by John Vipperman, made the initial observation and telephoned the USFWS. This crane was observed later in the evening by Whooper Watch volunteers in a cornfield north of B Road between 5 Road and 4 Road. The next morning, this bird was observed during the aerial survey. When ground crews failed to locate the whooping crane, the aerial crew returned to the area and found the crane in a cornfield north of B Road between 5 Road and 4 Road. The ground crew reported that this individual appeared to have an injured wing, but was still able to fly. Aerial and ground survey crews continued to observe this individual using the Platte River above Guendell Island (**Photos 7**) and cornfields north of the river (**Figure 8**).

The single whooping crane was last observed on November 10, 2002. The whooping crane was observed on the river near the Chapman Bridge at 7:03 a.m during the aerial survey. After the survey was completed, the aerial crew returned to the area to help the ground crew locate the crane on the river but was unable to re-locate the crane. The ground crew later re-located the whooping crane in a cornfield. The ground crew lost visual contact with this crane at 9:05 a.m.

No cranes were observed on November 11, 2002. An aerial flight was not flown on this date since it was outside the survey period. However, ground crews searched all known locations of use sites. The results of these searches indicated that the three whooping crane groups had likely left the study area.

The aerial crew completed a final survey from the Grand Island Airport in the early morning of November 12, 2002. Although it was not required under the protocol, this survey was conducted in an attempt to re-locate the three whooping crane groups. The flight crew surveyed all use areas between the Chapman Bridge and a point 2 miles west of Wood River Bridge. Areas surveyed included cornfields, roost sites, and river use sites where cranes had been observed during the previous week. No crane groups were observed from the air during the survey. Field technicians also conducted additional ground searches at all the areas where cranes were last seen throughout the entire day. No cranes were observed on the ground.

A review of aerial and ground monitoring reports indicates that all three whooping cranes may have left the study area on the morning of November 10, 2002. The group of eight whooping cranes (2002FA-02), the family group (2002FA-04), and the single whooping crane (2002FA-05) were last observed between 9:45 a.m. and 10:30 a.m. on November 10, 2002. During this time, there were strong, cold winds from the north/northwest.



LEGEND

- Crane Sighting Systematic (2002 FA05)
- Crane Sighting Opportunistic (2002 FA05)
- Stream Transect (2002 FA05)

Site Location

2000 0 2000 4000 Feet

Scale: 1:35,000
Transverse Mercator Projection
1983 North American Datum
Zone 14

GREYSTONE

FALL - 2002
WHOOPING CRANE SURVEYS

FIGURE 8
WHOOPING CRANE SIGHTING LOCATIONS AND STREAM TRANSECT LOCATIONS FOR FA05

ANALYSIS AREA: PLATTE RIVER, NEBRASKA	
Date: 03/26/03	File: C:\PROJECTS\1421\DATA\FLIGHT_LINES.APR
Drawn By: MS	Layout: crane_transect_pts_A5

3.4 CHARACTERISTICS OF USE SITES

This section summarizes the characteristics of river and non-river use sites. Additional data on use site characteristics are summarized in **Appendix G**.

River Use Sites

Use site data were obtained by collecting channel profile data at or near each documented river use site. Channel transect locations were located as close to the original crane use site as possible. In the event that several river use sites were located in the same contiguous habitat, a single channel profile was collected to represent several sites. Each channel transect location, shown on **Figures 4** through **8,** was selected based on best professional judgment. A summary of the relationship between whooping crane river use sites and stream transect locations is provided in **Table 3.5**.

Channel profile data could not be collected for location FA03-S2 because permission to access this land could not be obtained. Profile data were also not collected for several locations identified through opportunistic sightings because the locations were not provided to Greystone until January of 2002. These use site locations included FA02-I01, FA04-I01, FA04-I02, FA04-I03, FA04-I04, FA04-I05, FA04-I06, and FA05-I01. Data that were collected at each channel profile location included characteristics of the landscape (habitat type and management practices) and of the river channel (sediment characteristics, channel profile including channel width, obstructed width, water depths, and flow).

A summary of sediment characteristics, land cover classes, and management practices for each channel profile site is provided in **Table 3-4-1**. Substrates of whooping crane use sites were generally characterized as sandy. All but one channel profile location had at least 90 percent fine and coarse sands. Channel profile location R16 had sediment composed of a mixture of coarse sand and small gravel. With the exception of one use location, the majority of river use sites were located in open wetted channels. Six out of 20 (30 percent) channel profiles were located in areas that had been recently been disked and were mostly devoid of emergent vegetation.

TABLE 3-4-1: RIVER CHANNEL SUBSTRATE, LAND COVER, AND MANAGEMENT CHARACTERISTICS

Stream Transect	Associated River Use Site(s)	Percent Sediment				Land Cover Class	Management Practices
		Fine Sand (%)	Coarse Sand (%)	Small Gravel (%)	Large Gravel (%)		
FA01-S1	FA01-R1	98	2	0	0	Barren beach/sandbar	Disked
FAI01-S1	FAI01-R1	40	30	27	3	Wetted channel	None
FA02-S1	FA02-R2 FA02-R8 FA02-R3	90	10	0	0	Wetted channel	Disked
FA02-S2	FA02-R1 FA02-R7	98	2	0	0	Wetted channel	None
FA02-S3	FA02-R4	100	0	0	0	Wetted channel	None
FA02-S4	FA02-R6	98	2	10	0	Wetted channel	None
FA02-S5	FA02-R5	100	0	0	0	Wetted channel	None
FA02-S6	FA02-R9, FA02-R10	98	2	0	0	Wetted channel	Disked
FA03-S1	FA03-S3	40	60	0	0	Wetted channel	None

TABLE 3-4-1: RIVER CHANNEL SUBSTRATE, LAND COVER, AND MANAGEMENT CHARACTERISTICS

Stream Transect	Associated River Use Site(s)	Percent Sediment				Land Cover Class	Management Practices
		Fine Sand (%)	Coarse Sand (%)	Small Gravel (%)	Large Gravel (%)		
FA04-S1	FA04-R7	90	10	0	0	Wetted channel	None
FA04-S2	FA04-R1 FA04-R4 FA04-R8 FA04-R9 FA04-R10	98	2	0	0	Wetted channel	None
FA04-S3	FA04-R11 FA04-R13	95	5	0	0	Wetted channel	None
FA04-S4	FA04-R3	90	10	0	0	Wetted channel	Disked
FA04-S5	FA04-R2 FA04-R6	90	0	10	0	Wetted channel	Disked
FA04-S6	FA04-R5 FA04-R12	80	10	10	0	Wetted channel	None
FA05-S1	FA05-R2	98	2	0	0	Wetted channel	None
FA05-S2	FA05-R4	85	15	0	0	Wetted channel	None
FA05-S3	FA05-R2	40	0	60	0	Wetted channel	None
FA05-S4	FA05-R1	100	0	0	0	Wetted channel	None
FA05-S5	FA05-R3	100	0	0	0	Wetted channel	Disked

Table 3-4-2 includes a summary of the characteristics of the river channel in whooping crane use sites. Data in this table include obstructed view width and bank-to-bank width for the middle transects. Some variability was observed in average bank-to-bank widths of whooping crane use sites. Bank-to-bank widths ranged from 13.11 meters (FA02-S5) to 364.23 meters (FA05-S5). **Appendix H** includes channel profiles for the middle, upstream, and downstream transects for each channel profile location.

TABLE 3-4-2: OBSTRUCTED VIEW AND CHANNEL WIDTH (METERS)

Channel Profile ID	Date Data on Channel Profile Were Collected	Obstructed View (Middle Channel)	Bank to Bank Width (Middle Channel)	Most Commonly Observed Activity
FA01-S1	11/13/02	235.30	200.56	Feeding
FAI01-S1	10/26/02	247.80	247.19	Feeding and resting
FA02-S1	11/19/02	291.08	213.97	Resting but alert
FA02-S2	11/08/02	66.45	64.62	Resting
FA02-S3	11/21/02	69.80	63.40	Walking
FA02-S4	12/02/02	88.39	74.98	Resting
FA02-S5	11/22/02	53.34	13.11	Resting
FA02-S6	11/18/02	196.29	196.29	Walking and resting
FA03-S1	11/12/02	265.18	199.95	Feeding
FA04-S1	11/20/02	229.2	227.99	Walking
FA04-S2	11/20/02	167.03	167.03	Feeding
FA04-S3	11/20/02	136.55	115.52	Walking and feeding
FA04-S4	11/22/02	477.62	326.13	Walking
FA04-S5	11/22/02	246.58	240.79	Feeding and walking

TABLE 3-4-2: OBSTRUCTED VIEW AND CHANNEL WIDTH (METERS)

Channel Profile ID	Date Data on Channel Profile Were Collected	Obstructed View (Middle Channel)	Bank to Bank Width (Middle Channel)	Most Commonly Observed Activity
FA04-S6	12/03/02	337.11	199.34	Walking
FA05-S1	11/14/02	167.64	106.07	Feeding and walking
FA05-S2	11/14/02	63.09	39.62	Resting
FA05-S3	12/20/03 [1]	289.56	240.79	Resting and walking
FA05-S4	12/19/03 [1]	274.62	245.37	Walking, alert
FA05-S5	12/19/03	385.87	364.23	Feeding

[1] Collection of channel profile data was delayed because the river was frozen.

A summary of mean gage heights (in feet) and mean streamflow (in cubic feet per second [cfs]) is included in **Table 3-4-3**. Data are included for the U.S. Geological Survey (USGS) monitoring stations at Overton, Kearney, and Grand Island for days that whooping cranes were observed using river channel use sites. Graphs of gage heights and the mean discharge during the study for the Overton, Kearney, and Grand Island stations is included in **Appendix H**.

TABLE 3.4-3: MEAN DISCHARGE AND STAGE FROM HOURLY PROVISIONAL DATA AT THE OVERTON, KEARNEY, AND GRAND ISLAND STATIONS FOR DAYS WHOOPING CRANES OBSERVED

Date	Gage	Mean Gage Height (feet)	Mean Streamflow (cfs)
10/14/02	Overton	1.71	1,050
	Kearney	3.16	1,250
	Grand Island	3.8	1,060
11/01/02	Overton	1.05	275
	Kearney	2.46	523
	Grand Island	3.27	244
11/02/02	Overton	1.06	280
	Kearney	2.43	489
	Grand Island	3.27	243
11/03/03	Overton	1.06	280
	Kearney	2.44	500
	Grand Island	3.24	218
11/04/02	Overton	1.06	281
	Kearney	2.46	525
	Grand Island	3.22	208
11/05/02	Overton	1.06	279
	Kearney	2.49	560
	Grand Island	3.23	211
11/06/02	Overton	1.06	277
	Kearney	2.5	565
	Grand Island	3.22	202
11/07/02	Overton	1.05	274
	Kearney	2.51	587
	Grand Island	3.21	201
11/08/02	Overton	1.05	273

TABLE 3.4-3: MEAN DISCHARGE AND STAGE FROM HOURLY PROVISIONAL DATA AT THE OVERTON, KEARNEY, AND GRAND ISLAND STATIONS FOR DAYS WHOOPING CRANES OBSERVED

Date	Gage	Mean Gage Height (feet)	Mean Streamflow (cfs)
	Kearney	2.51	581
	Grand Island	3.21	195
11/09/02	Overton	1.06	280
	Kearney	2.53	603
	Grand Island	3.2	189
11/10/02	Overton	1.05	274
	Kearney	2.53	607
	Grand Island	3.18	177
Note: (cfs) = cubic feet per second			

Off-channel use sites

A summary of land cover classes and most commonly observed activities for off-channel use sites is provided in **Table 3-4-4**.

TABLE 3-4-4: CHARACTERISTICS OF OFF-CHANNEL USE SITE

Off Channel Use Site	Land Class Cover	Most Commonly Observed Activity at Use Site
FA02-F1	Ag-Corn	Feeding
FA02-F2	Ag-Corn	Feeding
FA02-F3	Ag-Corn	Feeding
FA02-F4	Ag-Corn	Feeding
FA02-F5	Ag-Corn	Alert, feeding
FA02-F6	Ag-Corn	Feeding
FA03-F1	Ag-Corn	Walking and feeding
FA03-F2	Ag-Corn	Feeding
FA04-F1	Ag-Soybean	Feeding
FA04-F2	Ag-Corn	Feeding
FA04-F3	Ag-Soybean	Resting and feeding
FA04-F4	Ag-Soybean	Walking, took flight
FA04-F5	Ag-Soybean	Resting and feeding
FA04-F6	Ag-Corn	Walking and feeding
FA05-F1	Ag-Corn	Walking, took flight
FA05-F2	Ag-Corn	Feeding
FA05-F3	Ag-Corn	Feeding
FA04-F4	Ag-Corn	Feeding

COST FOR FALL 2002 MONITORING

The cost of field implementation and report writing was $76,500.

CHAPTER 4 RECOMMENDATIONS FOR FUTURE IMPLEMENTATION OF PROTOCOL

The following recommendations are based on experience gained during implementation of the fall 2002 survey. Recommended revisions to the field monitoring protocol and database structure are provided below.

Field Monitoring Protocol

- Publish contact information in local newspapers for reporting whooping crane sightings before the survey period begins to increase the number of opportunistic sightings reported.

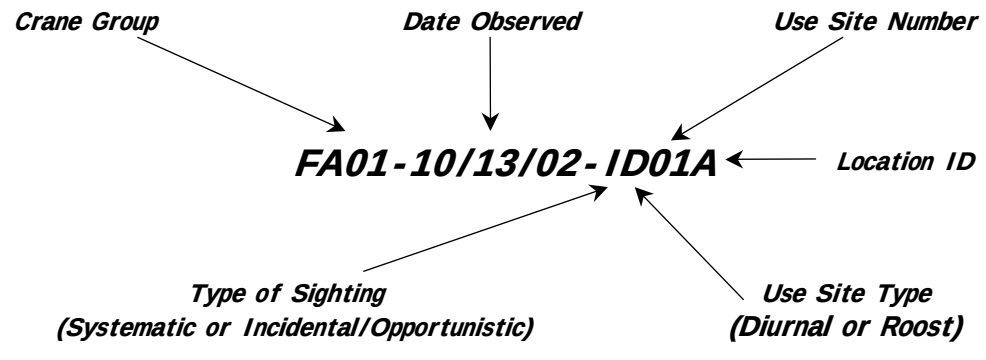
- Monitor and document areas that receive treatments such as disking to remove vegetation on sandbars. Data collected should include date, type of treatment, and location, and a map to show the area that received the treatment. Documentation of treatment areas throughout the study area will allow for a more thorough analysis of the correlation between use site locations and treatment areas.

- Observe locations of obstructions and cranes relative to potential disturbances (for example, cranes observed near tall vegetation, which hid the cranes from a busy highway). Based on observations during the fall survey, it appeared that some obstructions may be an important component of habitat for hiding.

- Conduct additional aerial surveys in cases where cranes have been observed in an area but cannot be re-located by ground crews.

- Develop a detailed standardized unique site identifier for each use site location. This identifier could include information on the crane group, date observed, type of sighting, use site type (diurnal or roost), use site number, and location identification. A sample of a unique identifier is provided below:

Sample of a Unique Site Identifier



- Review all existing data on locations of whooping crane use sites to calculate the maximum distances that whooping cranes have been observed from the central Platte River. If whooping cranes have not been observed 2 to 3 miles from the river, consider eliminating the 2N/2S and 3N/3S transects and concentrate on the river and 1N/1S transects to increase the probability that whooping cranes would be sighted.

- Consider conducting daily flights that include both an eastbound and a westbound river transect. Data for searcher efficiency suggest that searcher efficiency may be lower on days that morning transects are flown into the sun (eastbound). This potential bias could be overcome by flying both an eastbound and westbound transect each morning. Another alternative would be to fly a westbound transect each morning at dawn and an eastbound transect at dusk of each day.

- Collect additional data on food at each use site
  - Identify types of food at each use site
  - Evaluate the availability of food at each use site

- Consider conducting landscape-scale analyses, such as:
  - Identification of landscape-scale features of river and upland habitat
  - Evaluation of movement patterns between use sites and calculation of total use areas
  - Evaluation of the position of obstructions relative to human disturbances
  - Evaluation of human accessibility to diurnal and roost sites

- Consider using other, more efficient, survey methods (such as total station methods) during periods of high crane use.

- At the end of the survey, send thank-you cards to all landowners who participated in the survey by either reporting an opportunistic sighting or by providing access to the property.

Database Structure

- Add a new table to the database to record all opportunistic sightings (see **Appendix D**).

- Add a table to the database to document all landowner contacts made during the survey period. This table should include fields for date of contact, landowner name, telephone number, address, and detailed notes of the conversation (see **Appendix D**).

- Add a new table to the database to record all migration reports on whooping cranes received from USFWS (see **Appendix C**).

- Add fields to the database to record the most frequent activity and total percentage of time spent at that activity for each use site.

- Add additional fields to the WC Instantaneous Use form in the database and the Instantaneous and Continuous Use datasheet to better document weather conditions. Based on the fall survey, whooping crane migration into and out of the survey area appear to be closely related to factors such as weather fronts, changes in pressure and temperature, and wind patterns.

- Add new fields to the Use Characteristics form for discharge measurements for multiple days. The current database is set up to record discharge measurements for only a single day. However, whooping cranes were observed using the same locations of the river for a number of days.

- Add additional fields to the database to differentiate between:
  - Systematic and opportunistic sightings
  - Diurnal and roost sites

CHAPTER 5 LITERATURE CITED

Platte River Endangered Species Partnership (PRESP). 2002. Draft Monitoring Whooping Crane Migrational Habitat Use in the Central Platte River Valley –- Whooping Crane Monitoring Protocol. August 1.

APPENDIX A: USFWS Whooping Crane Migration Status Reports, Fall 2002

USFWS Whooping Crane Migration Status Reports Fall – 2002		
Date Contacted	**Contact**	**Notes**
10/9/02	Wally Jobman	Some birds staging in N. Dakota, most are still staging in Saskatchewan
10/10/02	Wally Jobman	No birds reported in area. Only reported whooping cranes in N. Dakota. Front moving through on weekend, may push birds into area.
10/11/02	Wally Jobman	Same as 10/9/02. Six probable sightings in central N. Dakota near Bismark.
10/15/02	Wally Jobman	Karl Grover, State Wildlife Manager at CheyenneBottoms in Kansas, reported 8 probable whooping cranes
10/17/02	Wally Jobman	New sighting in southwestern N. Dakota of 6 adults and 1 juvenile. No new reports in Nebraska.
10/18/02	Wally Jobman	Four birds were observed in Northern Kansas at Cocker City. Seven birds at 2 locations in central N. Dakota. Reports of sandhills really moving into that area. No reports of whooping cranes at Aransas based on aerial survey done last week.
10/24/02	Wally Jobman	Left message requiring latest status report of whooping crane migration.
10/25/02	Wally Jobman	Wally reported that 2 Whooping Cranes had been sighted by Tom Stehn in the Aransas Wildlife Refuge. There were also a couple of incidental sighting reports from Oklahoma. The USFWS and North Dakota Fish and Game Association have recently (within the past week) received many sighting reports of Whooping Cranes in North Dakota. No new sighting reports in Nebraska. Will contact Wally early next week for further updates.
10/29/02	Wally Jobman	Six birds were confirmed 2 miles northwest of Long Pine, NE in Brown County on 10/28 and 2 adults and a juvenile were confirmed southwest of Taylor, NE in Custer County near the Middle Loup River this morning. Survey being conducted at Aransas today, weather permiting. Still getting sightings from North Dakota and numerous sightings from Salt Plains NWR in OK.
11/01/02	Wally Jobman	Observed group of 8 whooping cranes at 11AM with Wally and Diane Beachly at Morman Island near Doniphan.

11/01/02	Wally Jobman	Called Wally at 6PM to tell him that two cranes were confirmed west of the Kearney (Hwy 44) Bridge and that group of 8 were still near Morman Island.
11/02/02	Wally Jobman	Wally reported that a family group of 3 cranes were observed last evening east of the Alda Bridge. Cranes were observed from a Crane Meadows blind by a crane meadows employees (volunteer?). Group of 8 cranes were observed in corn field south of river. Wally noted that these cranes were off the roost site early (0705 hrs).
11/03/02	Wally Jobman	Wally reported that a family group of whooping cranes was observed on 11/3 on the Middle Loup River near Sargent, Custer County, NE. This is approximately 60 miles north of Kearney NE. Adults both have leg bands on left legs, one white and one blue with white stripe. See related entry on 10/29/02
11/05/02	Wally Jobman	Wally received a call from John Vipperman. A hunter (Jay Neville) using his blind observed a whooping crane west of the Chapman Bridge and east of Guendel Island.
11/06/02	Wally Jobman	Wally observed family group of whooping cranes in bean stubble about ¼ mile west from Alda Bridge and SW of 90th Road (T9N R11W Sec 14 NE1/4. Also observed group of 8 whooping cranes leaving corn field NE of Amick Acres and fly to North Channel of Platte River.
11/07/02	Wally Jobman	Wally recived a call from Bill Lemburg of Carroll, NE. Single whooping crane observed near 7th Road and on the river near Phillips, NE.

APPENDIX B: Monitoring Reports from Aerial Surveys at Aransas National Wildlife Refuge, Fall 2002

Monitoring Reports from Aerial Surveys at Aransas National Wildlife Refuge Fall – 2002

November 26, 2002

An aerial census on November 26, 2002 of the Aransas National Wildlife Refuge and surrounding areas estimated the number of whooping cranes present at 160 adults + 16 young = 176 total.

Recap of cranes observed:

Change from last week:

Refuge	52 + 6	+ 1
Lamar	4 + 0	0
San Jose	36 + 2	+ 4
Matagorda	52 + 7	+ 8
Welder Flats	16 + 1	- 7
Total	160 + 16 = 176	+ 6

Remarks:

Overcast skies, occasional light drizzle, and strong north winds made for very difficult census conditions, especially over Welder Flats and San Jose Island. All of the crane area was covered except for Indianola with 7.5 hours of flight time. No cranes had been reported this past week at Indianola where a pair wintered in 2001-02, so it is doubtful that a search of that area would have added to the total crane count.

An estimated six cranes completed the migration since the previous flight on November 20th. New arrivals included a 16th family group that could be the Shell Reef New pair. Present are 65 adult pairs that brought 16 chicks, along with 30 subadults. The estimated 65 pairs at Aransas is higher than the known number of breeding pairs in Canada in 2002 (50 pairs that nested plus 5 that failed to nest). Thus, the number of pairs at Aransas is probably an overestimate.

One bird with a drooping left wing was observed in a trio near the airstrip on Matagorda Island.

Status of migration:

Most of the flock has arrived at Aransas. The only bird believed to still be in migration is a single that was near the northern border of Kansas. This could be the injured single that was seen on the Platte River about 100 miles to the north on November 10th. I do not have an updated report to know if that bird is still present in Kansas, although it was there last week.

(EDITOR'S NOTE: Anyone in the field with any information on this bird, please contact Tom immediately!)

Peak counts at Aransas are normally obtained in December or even January as a few stragglers always seem to arrive later than most of the flock. The current population of 176 at Aransas matches the peak population count during the 2001-02 winter. Thus, the population has at least remained the same size in the past year, with an increase over the 173 present in spring, 2002.

It is hoped that pairs still in migration are the banded Jay Bird Point pair, and a pair that last winter stayed at Mustang Lake. A pair has been seen off and on at Mustang Lake this winter, so perhaps the pair is present but is moving back and forth to Matagorda Island. The unbanded Lobstick pair has not arrived at Aransas, nor was it seen this fall at its traditional stopover in Saskatchewan. It is probable that at least one member of this pair died since the summer. The Lobstick male was 24 years old.

Habitat:

Tides had increased noticeably (+ 1.04 feet) from last week, measured at 2.78 mlt on November 26. Only the marshes on San Jose still showed extensive mudflats. The cranes are feeding on wolfberry and crabs, with many sandhill cranes in the salt marsh also taking advantage of the abundant number of wolfberry fruits. Four cranes were located in open bay habitat on today's flight.

Unusual Locations:

The Big Tree pair had flown west across Highway 35 to the marshes south of Holiday Beach where they had been seen several times
previously this winter.

Families:

The most unexpected location on the census flight was the presence of a 16th family group near Shell Reef Bayou on Matagorda Island. We flew directly between all 6 family groups on the south end of Matagorda Island to ensure there was no duplication. The 15th family group was still present east of Cottonwood Bayou. No cranes were seen this week near Pringle Lake on Matagorda Island. Sixteen chicks have arrived at Aransas out of the 18 that were known to be present in mid-August. The 16 families present include:

Known Pairs in Wood Buffalo:
Pat's Bay (05/02, A-2)
Middle Pond (06/02, A-6)a
North Pipeline Flats (16/02)
North Cottonwood (20/02)
South M. I. (25/02,S-13)
Central Matagorda (34/02)

a This family was not found in Wood Buffalo in August, and thus was the 18th chick in mid-August

Unknown Pairs in Wood Buffalo:
Mustang Slough South
Behind Lakeside
Lakeside
Grass Island
Spalding Point (or East Spalding Cove)
Inlet
Shell Reef New
East Cottonwood
S. Pringle
South Shoalwater

Pairs Present Without Their Chicks Seen in August:
Boat Ramp New (nest 31/02, banded crane YbY-y/g)
Spalding Lake (44/02, banded crane R-YbY)
N. Sundown Bay pair (nest 45/02, unbanded)
Middle Sundown Bay (29/02, unbanded)
Power Lake (10/02, unbanded)

November 20, 2002

An aerial census of the Aransas National Wildlife Refuge and surrounding areas made November 20, 2002 estimated the number of whooping cranes present at 155 adults + 15 young = 170 total.

Recap of cranes observed:

Refuge	51 + 6
Lamar	4 + 0
San Jose	32 + 2
Matagorda	45 + 6
Welder Flats	23 + 1
Total	155 + 15 = 170

Remarks:

Clear skies and light north winds provided perfect census conditions. All of the crane area was covered with 8.0 hours of flight time.

The cranes were aided by good migration conditions on the coast November 15, 16 and 19. Nine cranes completed the migration since the previous flight on November 13th. New arrivals included the Allyn's Bight pair (nil-hs, nesting area K-11), and an unknown family group found east of Cottonwood Bayou that was being chased by an adjacent territorial pair. If this family group remains east of Cottonwood Bayou, I believe it was a brand new nesting pair in 2002 since no duo was present last year in that location. A duo was present on the Jay Bird Point territory on San Jose, but no band was present on the

foot of the male. Perhaps this was the territorial pair with the band having fallen off since last winter.

Not yet identified is an unbanded duo that stayed near Indianola, Texas last winter. A duo was heard but not sighted at Indianola on November 18th by expert birders. No cranes were present at Indianola despite a ground search on the 19th and an aerial search on the 20th. Perhaps this duo flew on to the normal wintering grounds.

Status of migration:

Most of the flock has arrived at Aransas. There could be as many as an estimated 10 cranes still in migration, depending on mortality. The only bird known to still be in migration is a single near the northern border of Kansas. This could be the injured single that was seen on the Platte River about 100 miles to the north on November 10th.

It is hoped that pairs still in migration are the banded Jay Bird Point, the unbanded Lobstick pair, and a pair that last winter stayed at Mustang Lake. Peak counts at Aransas are normally obtained in December or even January as a few stragglers always seem to arrive later than most of the flock. Thus, I hope the population will show a small increase from the 173 present in spring, 2002.

Habitat:

Tides had dropped noticeably from the extreme highs two weeks ago, recorded at 1.74 mean low tide on Nov. 18, an average medium-low tide for winter. On today?s flight, some mudflats were exposed on San Jose Island in the Vinson Slough drainage that was about 65 % dry. The cranes are feeding on wolfberry and crabs, with many sandhill cranes in the salt marsh also taking advantage of the abundant number of wolfberry fruits.

Unusual Locations:

The only unexpected location on the census flight was the presence of a 15th family group east of Cottonwood Bayou. No cranes were seen this week near Pringle Lake on Matagorda Island. Two cranes were sighted by Pilot Tom Taylor on November 16th just south of Mud Island in Redfish Bay, a few miles south of the regular crane area. This sighting was considered "probable" since he did not drop below 800 feet and get low enough to be 100% positive.

Families:

Fifteen chicks so far have arrived at Aransas out of the 18 that were known to be present in mid-August. The 15 families present include;

Known pairs in Wood Buffalo:
Pat's Bay (05/02, A-2)
Middle Pond (06/02, A-6)a
North Pipeline Flats (16/02)
North Cottonwood (20/02)

South M. I. (25/02,S-13)
Central Matagorda (34/02)

a This family was not found in Wood Buffalo in August, and thus was the 18th chick in mid-August

Unknown pairs in Wood Buffalo:
Mustang Slough South
Behind Lakeside
Lakeside
Grass Island
Spalding Point (or East Spalding Cove)
Inlet
East Cottonwood
S. Pringle
South Shoalwater

Pairs present without their chicks seen in August:
Boat Ramp New (nest 31/02, banded crane YbY-y/g)
Spalding Lake (44/02, banded crane R-YbY)
N. Sundown Bay pair (nest 45/02, unbanded)
Middle Sundown Bay (29/02, unbanded)
Power Lake (10/02, unbanded)

November 13, 2002

An aerial census of the Aransas National Wildlife Refuge and surrounding areas made November 13, 2002 estimated the number of whooping cranes present at 147 adults + 14 young = 161 total.

Recap of cranes observed:

Refuge	49 + 6
Lamar	4 + 0
San Jose	26 + 2
Matagorda	47 + 5
Welder Flats	21 + 1
Total	147 + 14 = 161

Remarks:

Clear skies and light winds provided perfect census conditions. All of the crane areas were covered except Indianola with 8.0 hours of flight time.

Eighty-three cranes completed the migration since the previous flight on November 06th. The cranes were aided by good migration conditions on the coast on November 6-7, with excellent conditions November 12th when many cranes are believed to have arrived. In

the 2-week period October 31 and November 13, a total of 141 cranes have arrived at Aransas. Even though arrivals initially were approximately one week later than average, the progress of the migration caught up in a hurry.

Status of migration:

Most of the flock has arrived at Aransas. There could be as many as an estimated 20 cranes still in migration, depending on mortality. Pairs believed to still be in migration are the Allyn's Bight and Jay Bird Point pairs with adults with metal bands, and the unbanded Lobstick pair.

Habitat:

Tides had dropped noticeably from the extreme highs last week and were at mid-levels. On today's flight, some mudflats were exposed on San Jose Island in the Vinson Slough drainage that was about 50% dry.

Unusual Locations:

One crane was visible at the refuge's Mustang Lake observation tower. Hopefully, this was a subadult and not one member of the unbanded pair that was present last winter. The Big Tree pair had flown west across Highway 35 to marsh south of Holiday Beach. Two cranes were back south of the headquarters on the south end of Matagorda, a place frequented last year. A pair has returned to Dewberry Island near Port O'Connor. A family group and a pair were seen on Long Island adjacent to the middle of Pringle Lake on Matagorda Island. Cranes have occasionally been seen here in the past, but it is unusual. At the end of the census, two cranes were first seen in flight and followed for 6 miles until they landed at Power Lake on Matagorda Island. It is not known if these cranes were seen earlier, or whether they were migrants just arriving. After the two cranes landed, we returned to see if they could have come from Long Island. The family and pair were no longer there and were not located again, so it is possible the two in flight had been on Long Island.

Families:

Fourteen chicks so far have arrived at Aransas out of the 18 that were known to be present in mid-August. The 14 families present include:

Known pairs in Wood Buffalo:
Pat's Bay (05/02,A-2)
Middle Pond (06/02, A-6)a
North Pipeline Flats (16/02)
North Cottonwood (20/02)
South M. I. (25/02,S-13)
Central Matagorda (34/02)

a This family was not found in Wood Buffalo in August, and thus was the 18th chick in mid-August.

Unknown pairs in Wood Buffalo:
Mustang Slough South (unknown, could also be Mustang Slough)
Behind Lakeside (unknown)
Lakeside
Grass Island
Spalding Point
Inlet
S. Pringle
South Shoalwater

The Boat Ramp New (nest 31/02) and Spalding Lake (44/02) pairs have arrived without their chick that were seen in mid-August. I also believe the unbanded N. Sundown Bay pair (nest 45/02) is at Aransas without their expected chick. Unbanded pairs that I'm unsure about whether or not they have arrived without their chicks are Middle Sundown Bay (29/02) and Power Lake (10/02). Let's hope for a few more families.

November 6, 2002

An aerial census of the Aransas National Wildlife Refuge and surrounding areas made November 06, 2002 estimated the number of whooping cranes present at 78 adults + 8 young = 86 total.

Recap of cranes observed:

Refuge 33 + 4
Lamar 2 + 0
San Jose 8 + 2
Matagorda 25 + 2
Welder Flats 10 + 0

Total 78 + 8 = 86

Remarks:

Clear skies and light north winds provided perfect census conditions. All of the primary crane areas were covered with 6.3 hours of flight time.

Sixty-six cranes that completed the migration since the previous flight on October 31st were aided by a cold front that brought 8.33 inches of rain to the refuge on November 3-4. Clear skies and north winds following the front on November 5-6 produced ideal migration conditions for the cranes to reach the coast. Three whooping crane sightings totaling 7 birds made November 4 and 5 in the northern half of Texas reported on the Texas birding site on the internet were the first sightings reported in Texas this fall, indicative of a migration of whooping cranes across Texas on those days. The Big Tree pair is believed to have arrived November 6. Numbers of cormorants and waterfowl were also notably higher during today's census flight compared with the previous week.

Status of migration:

Approximately half of the whooping cranes have arrived at Aransas. Other cranes have been reported recently in Nebraska and Oklahoma, including a total of 13 on the Platte River.

Territories:

Known territorial pairs (identified by bands or presence on territory) that have arrived since last week included the Boat Ramp New, Pipeline, South Dunham Point, Big Tree, Long Reef, Cottonwood Bayou A, Central Matagorda, and Panther Point pairs. Numerous additional pairs are presumably present but could not be differentiated from subadult duos. The Lakeside family and Long Reef pair were off their territories becasue of neighbors that have not yet arrived.

Habitat:

Tides were still extremely high. Bay and whooping crane census - Nov. 6.ems marsh salinities measured on November 4th were at 0 parts per thousand from the flooding rains received the previous day. Water covered numerous portion of the refuge's East Shore Road adjacent to the crane area. The new State Highway 35 Bypass between Rockport and Aransas Pass was closed due to water on the roadway. The recent rains were added to over 15 inches of rain the refuge received in October. The lower grassland areas in the uplands are holding significant amounts of water. This is much-need rain for refuge habitat that has ended the drought. On today's flight, most cranes were in habitat supporting blue crabs or wolfberry, two predominate foods of the whooping cranes in the fall.

Families:

The 8 families present include:

Known pairs in Wood Buffalo:
Middle Sundown Bay (06/02, A-6)a
Pat's Bay (05/02, A-2)
South M. I. (25/02,S-13)b

a This family was not found in Wood Buffalo in August, and thus was the 18th chick in mid-August.
b Bands not seen on pair to clearly identify family. Possible that red color band on male has fallen off since June.

Unknown pairs in Wood Buffalo:
Mustang Slough South (unknown, could also be Mustang Slough or Rattlesnake)
South Sundown Bay or Behind Lakeside (unknown)
Lakeside
Spalding Point

N. Power Lake (family present second year in a row)

The Boat Ramp New pair (nest 31/02) has arrived without their chick that was seen in mid-August.

October 31, 2002

An aerial census of the Aransas NWR and surrounding areas made October 31st, 2002 estimated the number of whooping cranes present at 19 adults + 1 chick = 20.

Recap of cranes observed: (20)

Refuge 4+1
Lamar 0
San Jose 2
Matagorda 9
Welder Flats 4
Indianola 0
Total 20

Remarks:

Census conditions were fair all morning, with strong northeast winds and mostly cloudy skies. Total flight time equaled 3.8 hours, with all of the primary crane areas covered. Eighteen cranes have arrived since the last flight on October 24th when two cranes were first confirmed present. Present on today's flight were one family group, one known nesting pair (with banded crane r-r), and 15 unknown.

Status of Migration:

Arrivals at Aransas are about one week slower than average. Whooping cranes started migrating through the central U.S. about October 12th. The last sighting in Saskatchewan in Canada was made October 23rd. At present, the cranes have left Canada, but are scattered throughout the Central Flyway, with sightings reported October 25th ranging from North Dakota to Oklahoma. Numerous cranes are expected to arrive at Aransas in the next two weeks.

Habitat:

Tides have been extremely high, with water high up on the emergent vegetation in the salt marsh. Summer and fall rains have produced excellent conditions for the returning cranes. Floods on the Guadalupe River have produced high freshwater inflows, creating excellent conditions for blue crabs. Numerous large blue crabs are in the marshes, along with fruiting wolfberry plants. Recent rains have helped replenish refuge dugouts and freshwater wetlands, particularly noticeable on Matagaorda Island uplands. Marsh salinities in mid-October were 10 parts per thousand, with the surrounding bays between 6 and 8 ppt.

Additional note: On Nov. 1st, eight whoopers were confirmed by the Platte River in Nebraska. This is about as large as groups get in migration, with a few rare exceptions.

October 25, 2002

Census flight October 24th found the first 2 arrivals on the shoreline of San Jose Island. Census total of whooping cranes was two. The remainder of the flock is spread out from Oklahoma to North Dakota, (and perhaps even Saskatchewan?).

APPENDIX C: Cooperative Whooping Crane Tracking Project Report (July 2002 – January 2003)

COOPERATIVE WHOOPING CRANE TRACKING PROJECT
(July 2002 - January 2003)

Whooping crane spring and fall migrations are monitored each year. Sighting reports are forwarded to the Ecological Services Field Office of the U.S. Fish and Wildlife Service, Grand Island, Nebraska, by private individuals, the National Audubon Society, other private organizations, State and Federal conservation agencies, and the Canadian Wildlife Service. Cooperation throughout the whooping crane flyway continues to be excellent. Special thanks go out to each participant.

Between 1977 and 1988, 132 juvenile whooping cranes were color-marked on the breeding grounds; of these 26 were accounted for during the winter of 2002-03. Four color-marked cranes were observed during the fall migration. All sightings of color-marked whooping cranes during migration are maintained at the Grand Island office. **We cannot over-emphasize the importance of observers looking closely for the colored leg bands.**

Whooping crane arrivals at Aransas National Wildlife Refuge (Aransas) (Fig. 1), a sighting report summary (Table 1), and a map of degree-block sighting locations (Fig. 2) are included with this narrative summary. Repeat sightings of the same birds at the same location during a stopover period are not included when known to be repeats. Only sightings classified as confirmed, based on whooping crane recovery plan criteria, are shown in the report. Probable and unconfirmed sightings are not shown. All whooping crane reports received from the United States are on record in the Grand Island Ecological Services Field Office and are available upon request.

An estimated 173 whooping cranes began the 2002 spring migration. A record 50 nests were located on the breeding grounds. Thirty-three chicks were located during June suveys, and surveys during August determined that at least 16 chicks were surviving. Under optimum conditions about 189 birds were expected to arrive at Aransas last fall. The first birds arrived at Aransas on October 24. About 91 percent (i.e., 168 birds) of the arrivals at Aransas occurred between October 24 and November 20. One hundred eighty-five cranes are believed to have arrived at Aransas, including 16 young birds. The peak whooping crane population is assumed to be 185 (169 adult/subadults and 16 chicks) birds. As of January 8, 2003, four adult/subadult cranes had not arrived at Aransas and were unaccounted for.

The first dates recorded for confirmed observations of migrating whooping cranes were July 1 in Canada and October 13 in the United States (Table 1). The last sighting date was November 17. Sightings were reported from Saskatchewan, Canada (43); Alberta, Canada (3); North Dakota (16); South Dakota (2); Nebraska (9); Kansas (12); Oklahoma (12); and Texas (5).

Weather during September 2002, was unseasonally mild and dry, while October was cooler than normal with above normal precipitation. The first storm system of the fall moved through the northern and central Great Plains on October 12-14, prompting a sandhill crane migration and the first whooping crane sightings in the United States. Following the passage of this storm system milder weather returned and the next major storm did not occur until October 29-31. This storm system initiated a major migration of waterfowl and cranes and produced snow and unseasonably

cold weather in North Dakota, South Dakota, and Nebraska. November temperatures were above normal and precipitation was below normal in the northern and central Great Plains.

Thanks again to the many cooperators. Your continued assistance is essential to the tracking project. Please contact Mr. Wally Jobman, U.S. Fish and Wildlife Service, in Grand Island, Nebraska, if observation details are desired (203 West Second Street, Federal Building, Second Floor, Grand Island, Nebraska 68801; commercial telephone: (308)382-6468, ext. 16, FAX (308)384-8835, or email: wally_jobman@fws.gov).

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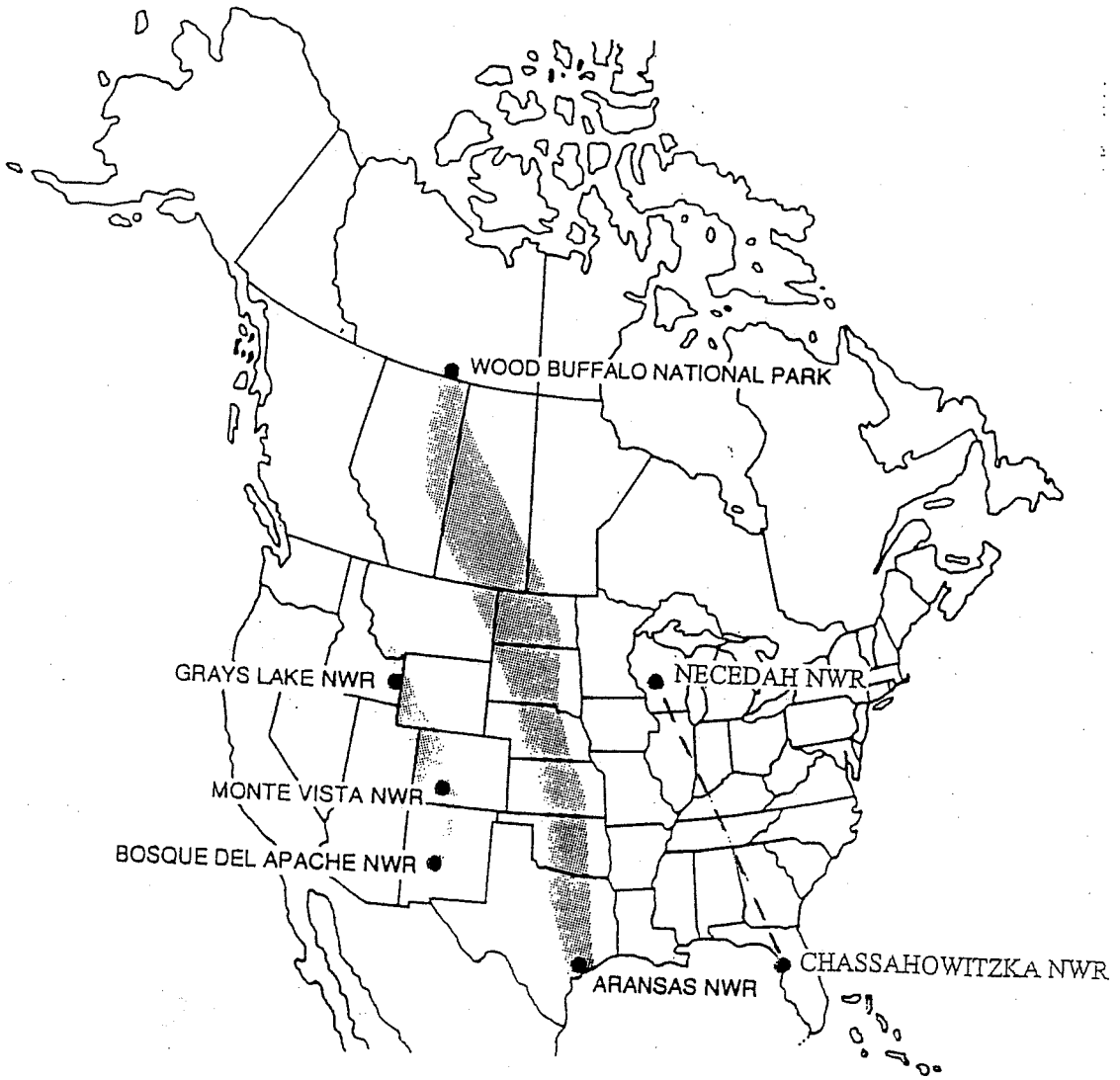


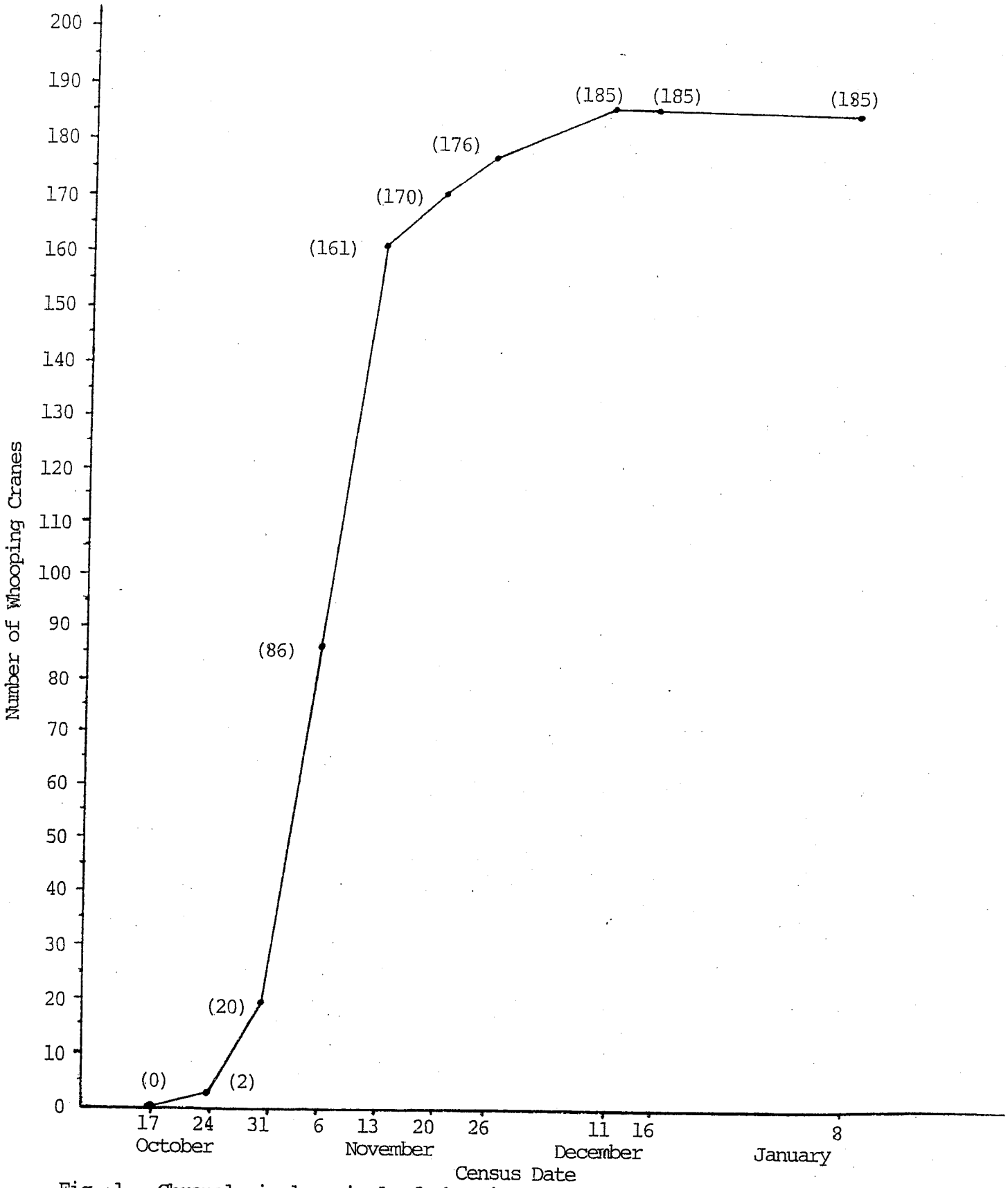


Fig. 1. Chronological arrival of whooping cranes at Aransas NWR, Texas; fall 2002.

Table 1. Date, State or Province of occurrence, and number of birds observed in confirmed whooping crane sightings reported during the Fall 2002 migration.[1]

Date[2]	TX	OK	KS	NE	SD	ND	Sask.
07-01							2-0
07-07							2-0
08-08							2-0
08-30							2-0
09-05							2-0
09-15							4-0
09-19							2-0;4-0
09-21							4-0
09-23							2-1
09-24							2-1;1-0
							2-0
09-25							8-0;2-1
09-27							1-0
09-29							4-0;2-0
							1-0
10-02							2-1;2-0
10-04							2-0
10-05							2-1;2-0
10-06							2-0
10-07							2-0;2-0
10-08							2-1
10-09							2-0;2-0
10-10							1-0;6-0
10-12							2-0;2-1
10-13				1-0;1-0			
10-14				1-0			1-0
10-15			2-0;3-0				
10-16						3-0;6-1	2-1;5-0
						6-0	
10-17						4-0	
10-18			4-0				
10-19						3-0;2-0	4-0
10-20		2-0					
10-21		1-0					2-0;2-1
10-22			3-0				8-0;4-0
10-23						2-0;2-0	2-1;4-1
						2-0	
10-24		1-0					
10-25		2-0				4-0;5-0	2-0
						2-0;2-0	
						2-0	
10-26						2-1	
10-27		4-0				2-1	6-1
10-28		5-0		5-1	2-0		
10-29		1-0			8-0		
10-31		4-0	5-0	2-1			

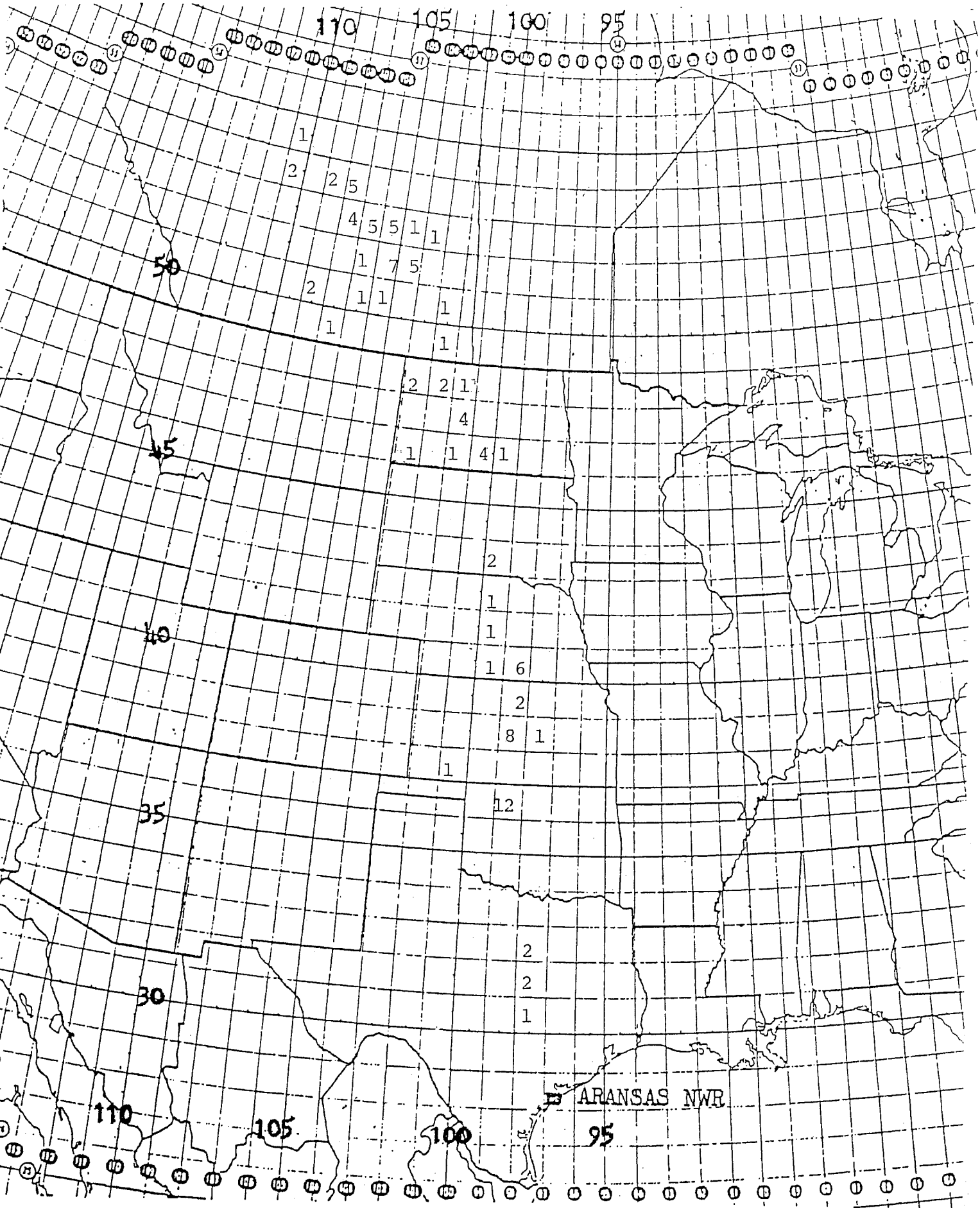
Table 1. Continued.

Date	TX	OK	KS	NE	SD	ND	Sask.
11-01			1-0;2-1	2-0;8-0			
			2-0	2-1			
11-03		10-0	2-0				
11-04	2-1	2-0	2-1				
11-05	2-0;2-0			1-0			
11-06	2-1						
11-07			6-0				
11-10		1-0					
11-14			1-0				
11-16		2-1					
11-17	1-0						
TOTAL SIGHTINGS REPORTED:							
	5	12	12	9	2	16	46

[1]Each report represented by number of whooping cranes reported; adult-young. Sightings in which color-banded birds were present are underlined. The 08-08, 08-30, and 09-05 sightings were in Alberta.

[2]Month-day; first date of sighting used when bird(s) at location several days.

(c)tableF02



ig. 2. Number of confirmed whooping crane sightings reported in each degree-block during he fall 2002 migration.

CONFIRMED

Fall 2002 Whooping Crane Sightings in The U.S.A.

State/Obs.	Date	No.	Location
NE 02B-1	10/13-14/02	1	Hall Co., 3 mi. west of Doniphan and Platte River 2.5 mi. west of Alda bridge. T9N,R11W,S15,N2.
NE 02B-2	10/13/02	1	Hall Co., 2.5 mi. upstream (west) from Wood River bridge over Platte River (Denman/ 150th). Flying.
NE 02B-3	10/14/02	1	Buffalo Co., Platte River, 1 mi. west of Rowe Sanctuary office, 5 mi. south and 3 west of Gibbon.
KS 02B-4	10/15/02	3	Barton Co., Cheyenne Bottoms SWA.
ND 02B-5	10/16-17/02	6+1	Grant Co., 8 mi. south of New Leipzig, Pretty Rock NWR.
ND 02B-6	10/16/02	3	McLean Co., 2 mi. north of Washburn.
ND 02B-7	10/17/02	4	McLean Co., 9 mi. south and 1 east of Ryder. T150N,R86W,S25,SW4.
KS 02B-8	10/18-19/02	4	Mitchell Co., 3 mi. southwest of Cawker City. T7S,R10W,S6. Y-nil.
ND 02B-9	10/16/02	6	McLean Co., 4.5 mi. northeast of Washburn. Flying.
ND 02B-10	10/19/02	2	Mountrail Co., 3 mi. west and 2 north of Tagus. 156N,R88W,S3.
OK 02B-11	10/20-22/02	2	Alfalfa Co., Salt Plains NWR.
KS 02B-12	10/15-27/02	2	Stafford Co., Quivira NWR. T21S,R11W,S28.

ND	02B-13	10/23/02	2	Divide Co., 2.5 mi. south of Crosby. T162N,R97W,S9,NW4.
ND	02B-14	10/23-25/02	2	Bowman Co., 1 mi. northwest of Gascoyne, Gascoyne Lake.
OK	02B-15	10/21-22/02	1	Alfalfa Co., Salt Plains NWR.
KS	02B-16	10/22/02	3	Russell Co., flying over Wilson Reservoir.
ND	02B-17	10/19/02	3	McLean Co., 5.5 mi. north of Audubon NWR.
ND	02B-18	10/25/02	4	Kidder Co., 9 mi. south and 1 west of Steele. T138N,R73W,S31,E2.
OK	02B-19	10/24-25/02	1	Alfalfa Co., Salt Plains NWR.
OK	02B-20	10/25-26/02	2	Alfalfa Co., Salt Plains NWR.
ND	02B-21	10/25/02	5	Burleigh Co., flying over Bismarck near Sertoma Park.
ND	02B-22	10/23-24/02	2	Williams Co., 2 mi. north and 3 west of Tioga. T157N,R95W,S7,SE4.
ND	02B-23	10/25/02	2	Emmons Co., 5 mi. south and 12 west of Moffit. T136N,R79W,S12. Flying.
ND	02B-24	10/27/02	2+1	Burke Co., 10 mi. southwest of Bowbells. Flying.
OK	02B-25	10/27/02	4	Alfalfa Co., Salt Plains NWR.
NE	02B-26	10/28/02	5+1	Brown Co., 1 mi. east and 2.5 north of Long Pine. T30N,R20W,S8.
OK	02B-27	10/28/02	5	Alfalfa Co., Salt Plains NWR.
ND	02B-28	10/26-31/02	2+1	Emmons Co., 16 mi. west and 4 south of Linton, Missouri River. T131N,R79W,S18.
OK	02B-29	10/29-11/04/02	1	Alfalfa Co., Salt Plains NWR.

OK	02B-30	10/31/02	4	Alfalfa Co., Salt Plains NWR.
NE	02B-31	10/31-11/02/02	2+1	Custer Co., 1 mi. south and 3 west of Sargent, Middle Loup River. T19N,R18W,S7. W-nil, BwB-nil.
SD	02B-32	10/28/02	2	Tripp Co., 3 mi. south of Hamill. T101N,R74W,S16,NE4.
SD	02B-33	10/29/02	8	Tripp Co., 13 mi. northeast of Winner. T100N,R75W,S16.
ND	02B-34	10/25/02	2	Burleigh Co., flying over Bismarck airport.
KS	02B-35	11/01-04/02	2+1	Mcpherson Co., 6.5 mi. northwest of McPherson. T18S,R4W,S35.
KS	02B-36	11/03/02	2	Seward Co., 1.5 mi. south of Kismet. T33S,R31W,S16.
OK	02B-37	11/03-04/02	10	Alfalfa Co., Salt Plains NWR.
KS	02B-38	10/31-11/03/02	5	Stafford Co., Quivira NWR. T21S,R11W,S27,28.
OK	02B-39	11/04/02	2	Alfalfa Co., Salt Plains NWR.
NE	02B-40	11/01-10/02	8	Hall Co., 1.5 mi. south and 0.75 west of Doniphan. Platte River. T10N,R10W,S36,SW4.
NE	02B-41	11/01-03/02	2	Buffalo/Phelps Cos., 0.75 mi. south of Odessa I-80 exchange and Platte River upstream of Kearney bridge.
NE	02B-42	11/01-10/02	2+1	Hall Co., Platte River vicinity of Alda bridge.
NE	02B-43	11/05-10/02	1	Merrick Co., Platte River, 5 mi. south and 3 west of Chapman. T11N,R8W,S10,SE4.
KS	02B-44	11/07-10/02	6	Stafford Co., 3 mi. east and 1.75 south of Stafford. T24S,R11W,S20,28.

OK	02B-45	11/10/02	1	Alfalfa Co., Salt Plains NWR.
ND	02B-46	10/25/02	2	Mountrail Co., 10 mi. north of Palermo.
TX	02B-47	11/05/02	2	Tarrant Co., 5 mi. south of Benbrook. Flying.
TX	02B-48	11/06/02	2+1	Tarrant Co., 1.5 mi. south of Lakeside. Flying.
TX	02B-49	11/05/02	2	McLennan Co., 5 mi. north of Waco. Flying.
TX	02B-50	11/04/02	2+1	McLennan Co., 3 mi. north of Waco.
KS	02B-51	11/14-30/02	1	Jewell Co., 1.5 mi.east and 1.5 south of Webber.
OK	02B-52	11/16/02	2+1	Alfalfa Co., Salt Plains NWR.
TX	02B-53	11/17-23/02	1	Williamson Co., 3 mi. southeast of Thrall.
KS	02B-54	11/01/02	1	Stafford Co., Quivira NWR. T21S,R11W,S27.
KS	02B-55	11/01/02	2	Stafford Co., 3 mi. east and 0.5 south of Stafford. T24S,R11W,S21.
KS	02B-56	11/04-07/02	2+1	Rice Co., 3 mi. north of Alden.

PROBABLE

Fall 2002 Whooping Crane Sightings in The U.S.A.

State/Obs.	Date	No.	Location
ND 02B-57	09/23/02	1	Burleigh Co., 4-5 mi. east of Bismarck on I-90.
ND 02B-58	09/25/02	1	Morton Co., 2 mi. south of Sweet Briar.
ND 02B-59	09/25/02	2	Ward Co., southwest corner of county, near Makoti. Flying.
ND 02B-60	09/27/02	1	Morton Co., Missouri River, 2.5 mi. north of Mandan.
ND 02B-61	10/02/02	4	Burleigh Co., near Beaver Bay.
ND 02B-62	10/05/02	4	Burleigh Co., flying near Memorial Bridge over Bismarck.
ND 02B-63	10/08/02	1	Morton Co., 3 mi. south of USDA Ag. Exp. Sta. Flying.
NE 02B-64	10/13/02	1	Dawson Co., 1 mi. east of Overton bridge. Flying.
NE 02B-65	10/13/02	1	Hall Co., flying near Whooping Crane Trust office, 1 mi. east of Alda bridge.
NE 02B-66	10/14/02	2	Hall Co., 0.25-0.50 mi. west of Alda bridge. Flying.
ND 02B-67	10/15/02	2	Kidder Co., 12 mi. east of Moffit. T137N,R74W,S16.
ND 02B-68	10/16/02	9	McLean Co., 12 mi. south of Ryder.
ND 02B-69	10/18/02	4	Oliver Co., near Washburn. T144N,R82W,S23,NW4.

ND	02B-70	10/22/02	3	McLean Co. 3 mi. north of Lake Audubon.
ND	02B-71	10/16-17/02	3	McLean Co. 5 mi. southeast of Max.
ND	02B-72	10/27/02	4	Emmons Co., 7 mi. north and 0.5 west of Pollock, SD.
ND	02B-73	10/25/02	2	Burleigh Co., flying northwest of Bismarck, south of I-94.
ND	02B-74	10/26/02	6	Emmons Co., Missouri River, 14 mi. south of Hazelton boat ramp. Flying.
ND	02B-75	10/25/02	2	Emmons Co., 7 mi. north of Beaver Bay.
NE	02B-76	10/30/02	6	Sherman Co., flying north of Ashton.
SD	02B-77	10/30/02	5	Pennington Co., flying over Rapid City.
SD	02B-78	10/03/02	1	Sully Co., Lake Oahe, east end of Okobojo Bay.
SD	02B-79	10/27/03	6	Lyman Co., 6 mi. north and 2 west of Vivian. T106N,R79W,S5.
SD	02B-80	10/27/02	2	Sully Co., Stone Lake, 20 mi. east of Agar. Flying.
NE	02B-81	10/29/02	2	Garden Co., 2 mi. south and 5 west of Oshkosh, North Platte River.
NE	02B-82	10/31/02	2	Garden Co., 1 mi. west of Lewellen. Flying.
NE	02B-83	11/02/02	2	Hall Co., flying along Platte River east of Shelton bridge.
NE	02B-84	11/02/02	2+1	Custer Co., South Loup River, 8 mi. west of Pleasanton.

NE	02B-85	11/03/02	2+1	Custer Co., 6 mi. north of Oconto on Hwy 21. T21N,R14W,S11.
TX	02B-86	11/05/02	8	Williamson Co., just north of Florence. Flying.
OK	02B-87	11/05/02	3	Grant Co., flying 6 mi. southwest of Manchester.
KS	02B-88	11/09/02	2	Jewell Co., Lovewell Reservoir.

UNCONFIRMED

Fall 2002 Whooping Crane Sightings in The U.S.A.

State/Obs.	Date	No.	Location
ND 02B-89	09/27/02	4	Griggs Co., ND. 38 mi. east of Carrington on Hwy 200.
ND 02B-90	09/26-27/02	5	Grand Forks Co., 3 mi. south of Emeraldo. Flying.
ND 02B-91	09/28/02	6	Sheridan Co., 8 mi. south of Goodrich. Flying.
ND 02B-92	10/02/02	1	Steele Co., ND. 1.5 mi. west and 2 south of Hope. Flying.
NE 02B-93	10/13/02	7	Scotts Bluff Co., along Hwy 92, midway between McGrew and Melbeta. Flying.
TX 02B-94	10/15/02	7	McMullen Co., 1 mi. north and 2 west of Tilden. Flying.
ND 02B-95	10/22/02	6	Burleigh Co., 5 mi. northwest of Wilton. Flying.
ND 02B-96	10/25/02	2	Pierce Co., near Balta Dam. Flying.
ND 02B-97	10/25/02	2	Wells Co., 3 mi. south of Chaseley.
OK 02B-98	11/09/02	12	Oklahoma Co., 8 mi. west of Bethany. Flying.

APPENDIX D: Whooping Crane Sighting Reports and Landowner Contacts, Fall 2002

Whooping Crane Sighting Reports and Landowner Contacts Fall – 2002		
Date Contacted	**Contact/Source**	**Notes**
10/13/02	Wally Jobman	Wally received a report of a whooping crane in flight in Dawson County, 1 mile east of the Overton Bridge. This was considered a probable sighting and was assigned USFWS identification number NE 02B-64.
10/13/02	Wally Jobman	Wally received a report of a whooping crane flying in Hall County near the Whooping Crane Trust Office approximately 1 mile east of the Alda Bridge. This was considered a probable sighting and was assigned USFWS identification number NE 02B-65.
10/14/02	Paul Currier	Paul Currier was contacted by one of Platte River Trust maintenance crew who reported a whooping crane. Crane was sighted at Crane Meadows and on PRT land south of crane meadows flying with a group of sandhills. Photo of this crane is located at Platte River trust offices. Sighting confirmed and assigned USFWS identification number NE 02B-2.
10/14/02	Bill Pattiken	Reported 1 whooping crane at Rowe Sanctuary at 7:30 am on Platte River on October 14, 2002. Crane was observed from observation platform, 30 yards upstream of blind on Hornaday property. Roosted on water in a group of 50 to 100 sandhill cranes. Group flew southwest at approximately 7:40 am. Contact Steve Hornaday in Grand Island, by calling Hornaday to get access to complete a transect. Sighting considered confirmed and assigned USFWS identification number NE 02B-3/
10/23/02	Paul Currier	Paul was informed of the new Greystone crew (Sara and John) that were conducting the whooper monitoring from 10/19 to 10/29. He was told that if he heard of any sightings or his staff located a whooper, to contact us so we could follow up.
10/24/02	Steve Hornady (Landowner)	Steve Hornady owns the land directly west of the Rowe Sanctuary. He was contacted by John MacDonald regarding access his property to do the stream profiles for the Whooping Crane sighted by Bill Taddicken. Steve indicated that it wouldn't be a problem accessing his land whenever we needed to do the stream profiles. He said that there may be hunters on his property that are allowed to use his property during hunting season. If we are to meet with these individuals, just mention who we are and what we are doing. Steve will contact them to let them know we may be out there.
10/30/02	Paul Currier	Asked for help on determining land ownership

Whooping Crane Sighting Reports and Landowner Contacts Fall – 2002		
Date Contacted	**Contact/Source**	**Notes**
10/31/02	Daniel Rainforth (Landowner)	Asked for permission to conduct partial transect on land south of Shoemaker Island, he eventually gave permission.
10/31/02	Gayle Binfield (Landowner)	Asked for permission to conduct partial transect on land south of Shoemaker Island, he gave permission.
11/01/02	USFWS	A local hunter, Jim Castleberry, observed crane group 2002FA04 in the early morning from a hunting blind. (Location 547424.33802, 4515314.46677).
11/01/02	Diane Beachley	9AM. Whooper watch volunteers observed group of 8 whooping cranes north of Doniphan near cemetery and Cedarview Road.
11/01/02	Paul Tebbel	Reported that two whooping cranes were observed by a hunter, Colin Wilke, about 11AM east of the Oddessa Bridge.
11/01/02	USFWS	Beth Goldwitz and Nick Anich (Crane Trust) observed crane group 2002FA04 in a grassland located SE of the West Wildrose observation blind (Platte River Whooping Crane Trust). The observation occurred late evening. (Location 544286.41961, 4514096.85317).
11/01/02	USFWS	Beth Goldwitz and Nick Anich observed crane group 2002FA04 from same observation post identified in previous location. Crane group moved to river at dusk. (Location 544306.927679, 4514255.78379).
11/02/02	Paul Tebbel	Two whooping cranes observed flying over his residence, near Fort Kearney State Recreation Area, moving downstream toward Rowe Sanctuary.
11/02/02	Wally Jobman	Wally received a report of 2 whooping cranes in Hall County flying along the Platte River east of the Sheldon Bridge. This was considered a probable sighting and was assigned USFWS identification number NE 02B-83.
11/03/02	Cathy MacKenzie	Met Cathy and Jim MacKenzie to observe group of 8 whooping cranes in corn field NE of Amick Acres.
11/03/02	USFWS	Wally Jobman (USFWS) observed crane group 2002FA04 in corn stubble field close to road. Group identified at 8:00AM. (Location 539524.65192, 4510608.77936).
11/04/02	Lloyd Luehr	Discussed Whooping Crane survey effort for Platte River Endangered Species Partnership. Mr. Luehr gave permission to monitor family group of whooping cranes on the river south of his property.
11/06/02	USFWS	Kirk Schroeder and Wally Jobman observed group of 8 whooping cranes (2002FA02) at 10:15AM north of the Crane Trust barn. (Location 550048.61575, 4517714.44726).

Whooping Crane Sighting Reports and Landowner Contacts Fall – 2002		
Date Contacted	**Contact/Source**	**Notes**
11/07/02	Ken Mueler	Met to ask permission to access river front property near intersection of 4th Road and A Road. Property called Willow Island.
11/08/02	USFWS	Beth Goldwitz observed crane group 2002FA04 using a field located in Alda Farm (Crane Trust), west of Alda Road. Observation occurred in late afternoon/evening. Group observed with two sandhill cranes. (Location 540315.3544, 4512193.68299).
11/08/02	USFWS	Crane group 2002FA04 observed by Beth Goldwitz. Group had moved to river at dusk. (Location 540262.87414, 4511651.38705).
11/08/02	USFWS	Crane group 2002FA05 was identified by Mr. Lemburg near the end of 7th Road. Bird was observed in the channel in late evening. (Location 570362.08066, 453072.14323).
November, 2002	Jack & Shelly Ramey	Broadfoot Sand & Gravel access through Jack and Shelly to perform stream transect for FA-03.
November, 2002	Libby Merrifield	Betty Connell's daughter. Libby was contacted and stated that she would talk to her mother. Never heard a reply back. Made several return calls with no response.
November, 2002	Lyle & Linda Henderson	Manager of land owned by Betty Connell (Lyle). Stated that we needed Betty Connell's permission to perform work on her land.
November, 2002	Albert Moeller	Performed stream transect for FA-02 on land owned by Albert Moeller.
November, 2002	Platte River Whooping Crane Trust	Accessed land on Kenny Binfield easement owned by the Platte River Crane Trust. Performed stream transect for FA-04.
November, 2002	Loyd Luer	Contacted to perform stream transects for FA-04 on land owned by Loyd Luer.
November, 2002	Jim Willman	Contacted and accessed a stream profile site for FA-05 on land owned by Jim Willman
November, 2002	Dick & Jim Ratje	Two brothers that own land on south side of river from Jim Willman. Contact was attempted with no reply.
November, 2002	Kenney & Joan Patrick	Land owners of three of the stream transect sites for FA-05. Contact and permission was granted for stream transects.
November, 2002	John Honore	Land owner on the south side of the river from Kenney & Joan Patrick. Contacted and permission was granted to conduct stream transects for FA-05.
November, 2002	Brent Lathrop, Nature Conservancy	Decoy site access.
November 2002	Jim Jennings, Central Nebraska Public Power District	Decoy site access.

APPENDIX E: CD-ROM of Fall 2002 Project Digital Photos and Database

APPENDIX F: Summary of Whooping Crane Use Site Characteristics and Movement Patterns

Summary of Whooping Crane Riverine Use Site Characteristics

Crane Group ID	Use Site ID	Use Date(s)	Habitat	Average Distance to Potential Disturbance [1]	Potential Disturbance Types	Average Distance to Obstruction [1]
2002FA01	FA01-R1	10/14/2002	Barren Beach/Bar			
2002FAI01	FAI01-R1	10/14/2002	Wetted Channel			
2002FA02	FA02-R1	11/9/2002	Barren Beach/Bar	1200	Road	10
2002FA02	FA02-R2	11/8/2002	Barren Beach/Bar	1800	Road	100
2002FA02	FA02-R3	11/9/2002	Barren Beach/Bar	1200	Road	15
2002FA02	FA02-R4	Date not reported	Wetted Channel			
2002FA02	FA02-R5	Date not reported	Wetted Channel			
2002FA02	FA02-R6	11/5/2002, 11/10/2002	Wetted Channel		Road	300
2002FA02	FA02-R7	11/10/2002	Wetted Channel			
2002FA02	FA02-R8	11/1/2002	Wetted Channel	400	Human	10
2002FA02	FA02-R9	11/5/2002	Wetted Channel			
2002FA02	FA02-R10	11/5/2002	Wetted Channel			
2002FA02	FA02-R11	11/3/2002	Barren Beach/Bar	300	Hunting Blind	100
2002FA03	FA03-R1	11/2/2002	Wetted Channel	265	Dirt road	140
2002FA03	FA03-R2	11/2/2002	Wetted Channel	50	Dirt road	5
2002FA04	FA04-R1	11/6/2002, 11/7/2002	Barren Beach/Bar			
2002FA04	FA04-R10	11/7/2002, 11/9/2002	Wetted Channel	250	Blind, Fied Road	25
2002FA04	FA04-R11	11/3/2002	Wetted Channel		Road	
2002FA04	FA04-R12	11/5/2002	Wetted Channel			50
2002FA04	FA04-R13	11/7/2002	Wetted Channel	250	Blind	50
2002FA04	FA04-R2	11/2/2002	Barren Beach/Bar	100	Blind	60
2002FA04	FA04-R3	11/2/2002	Barren Beach/Bar			
2002FA04	FA04-R4	11/4/2002	Wetted Channel, emergents, herbaceous	550	Observer, hunting blind, farming activity, buildings, vehicles	70
2002FA04	FA04-R5	11/4/2002	Wetted channel, emergents	100	Farm activity	45
2002FA04	FA04-R6	11/5/2002	Wetted Channel			
2002FA04	FA04-R6	11/5/2002	Lowland Grasses			
2002FA04	FA04-R7	11/4/2002	Wetted Channel	800	Observer	
2002FA04	FA04-R8	11/3/2002	Wetted Channel	400	Road	
2002FA04	FA09-R9	11/4/2002	Wetted Channel	800	Observer	
2002FA05	FA05-R1	11/6/2002, 11/9/2002	Wetted Channelannel, herbaceous	145	Road	165
2002FA05	FA05-R2	11/6/2002	Wetted Channel			
2002FA05	FA05-R3	11/10/2002	Wetted Channel	500	Road	500
2002FA05	FA05-R4	11/7/2002	Wetted Channel			
2002FA05	FA05-R5	11/9/2002	Wetted Channel			

[1] Average distances to disturbances and obstructions were calculated based on observations made by field crew.

Summary of Whooping Crane Non-channel Use Site Characteristics

Crane Group ID	Use Site ID	Use Date(s)	Habitat	Average Distance to Potential Disturbance	Potential Disturbance Types	Average Distance to Obstruction
2002FA02	FA02-F1	11/2/2002, 11/4/2002	Ag-Corn	285	ATV trail, road	200
2002FA02	FA02-F2	11/3/2002, 11/8/2002	Ag-Corn	865	Road, human	142
2002FA02	FA02-F3	11/1/2002	Ag-Corn	800	Road	400
2002FA02	FA02-F4	11/5/2002	Ag-Corn			
2002FA02	FA02-F5	11/7/2002, 11/8/2002, 11/9/2002	Ag-Corn	150	Truck	75
2002FA02	FA02-F6	11/6/2002	Ag-Corn			
2002FA03	FA03-F1	Date not reported	Ag-Corn			
2002FA03	FA03-F2	11/2/2002	Ag-Corn	175	Dirt road	201
2002FA04	FA04-F1	11/10/2002	Ag-SoyBean	300	Road	115
2002FA04	FA04-F2	11/3/2002, 11/4/2002	Ag-Corn	400	Road, farm activity	250
2002FA04	FA04-F3	11/7/2002, 11/8/2002	Ag-Corn and Ag-Soybean	1200	Farm House	45
2002FA04	FA04-F4	11/6/2002	Ag-SoyBean	800	Road	200
2002FA04	FA04-F5	11/8/2002	Ag-SoyBean			
2002FA04	FA04-F6	11/6/2002	Ag-Corn	510	Hunters, sandhill cranes, road	100
2002FA05	FA05-F1	11/7/2002	Ag-Corn			
2002FA05	FA05-F2	11/7/2002	Ag-Corn			
2002FA05	FA05-F3	11/6/2002	Ag-Corn	400	Road	500
2002FA05	FA05-F4	11/7/2002	Ag-Corn	800	Road	800

[1] Average distances to disturbances and obstructions were calculated based on observations made by field crew.

APPENDIX G: Select Project Photos

Photo 1 Single whooping crane (2002FA01) on Shoemaker Island surrounded by sandhill cranes. (Photo taken at 12:10 p.m. on October 14, 2002)

Photo 2 Single whooping crane (2002FA01) on Shoemaker Island. Photo taken from south side of river. (Photo taken on October 14, 2002 at 12:10 p.m.)

Photo 3 Group of 8 whooping cranes (FA-02) near observation bunker on Mormon Island. (Photo taken at 8:48 a.m. on November 7, 2002).

Photo 4 Group of 8 (FA-02) in north channel of Central Platte River. (Photo taken at 7:07 a.m. on November 10, 2002).

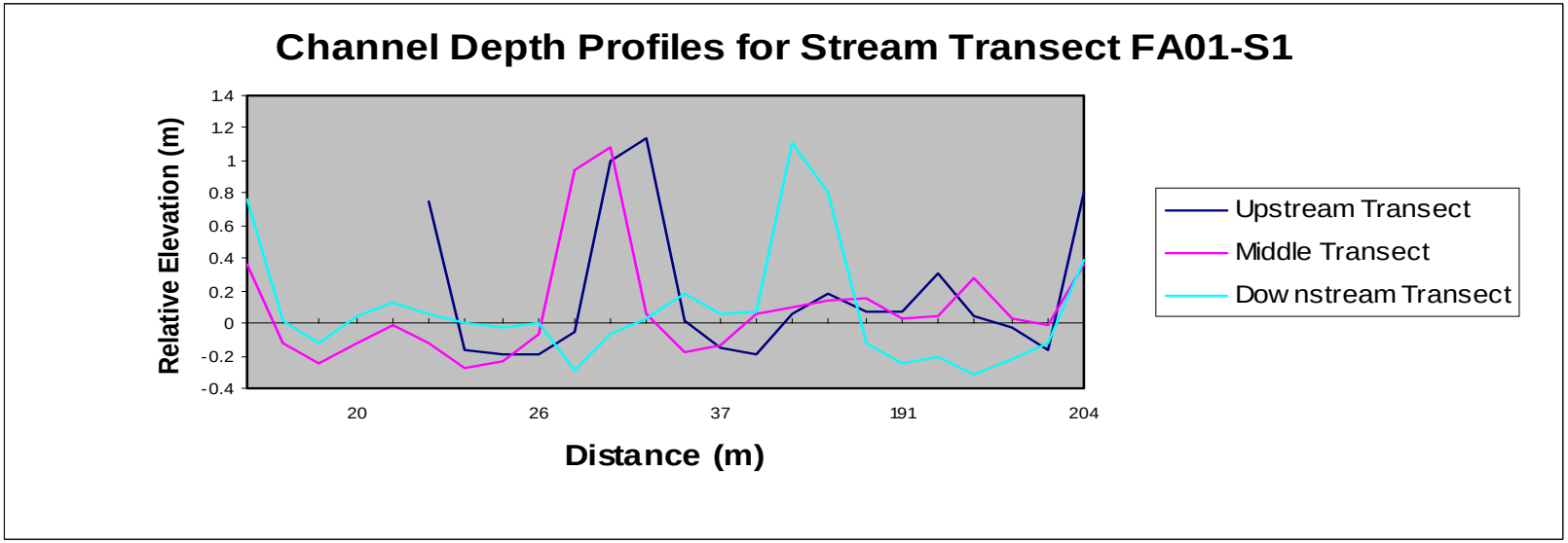
Photo 5 Pair of whooping cranes (FA-03) as observed from Kearney Bridge. (Photo taken at 4:49 p.m. on November 1, 2002)

Photo 6 Family Group of whooping cranes (FA-04) located near the west end of the Binfield Easement on Shoemaker Island. (Photo taken at 7:18 a.m. on November 7, 2002).

Photo 7 Single whooping crane (FA-05) located approximately four miles upstream of the Chapman Bridge. (Photo taken at 9:00 a.m. on November 7, 2002)

Photo 8 Single whooping crane (FA-05) located approximately four miles upstream of the Chapman Bridge. (Photo taken at 7:33 a.m. on November 9, 2002).

APPENDIX H: Stream Channel Profiles and Hydrographs for Fall 2002



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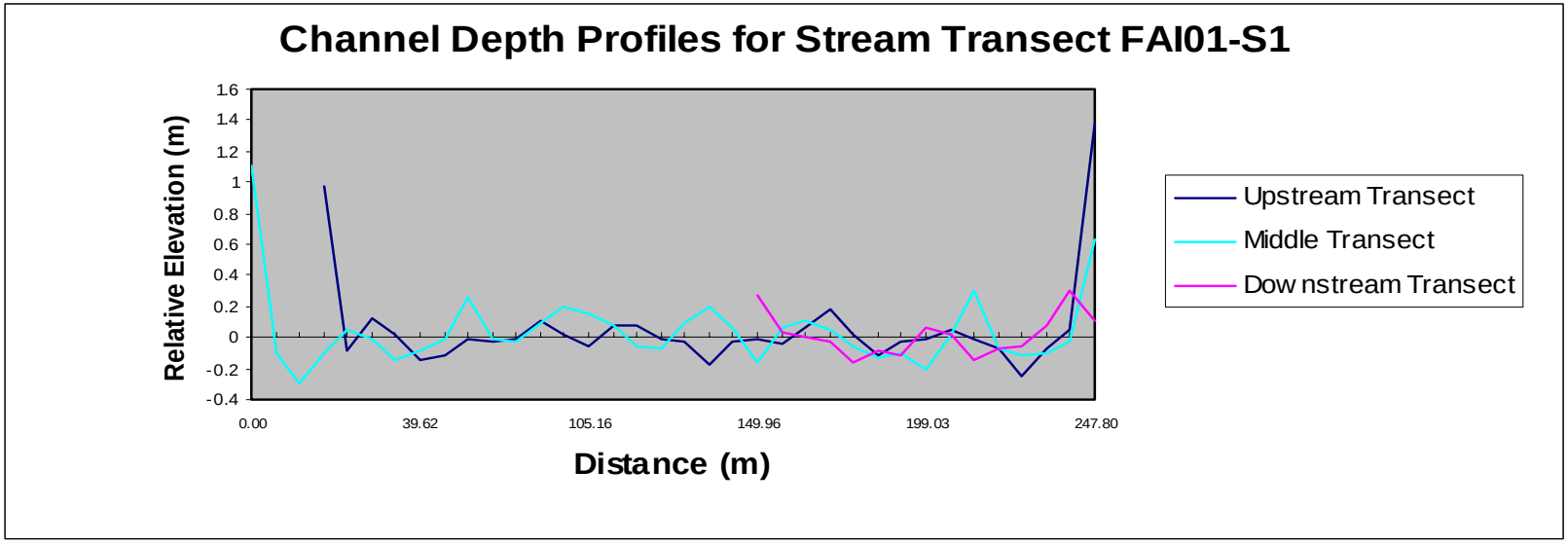
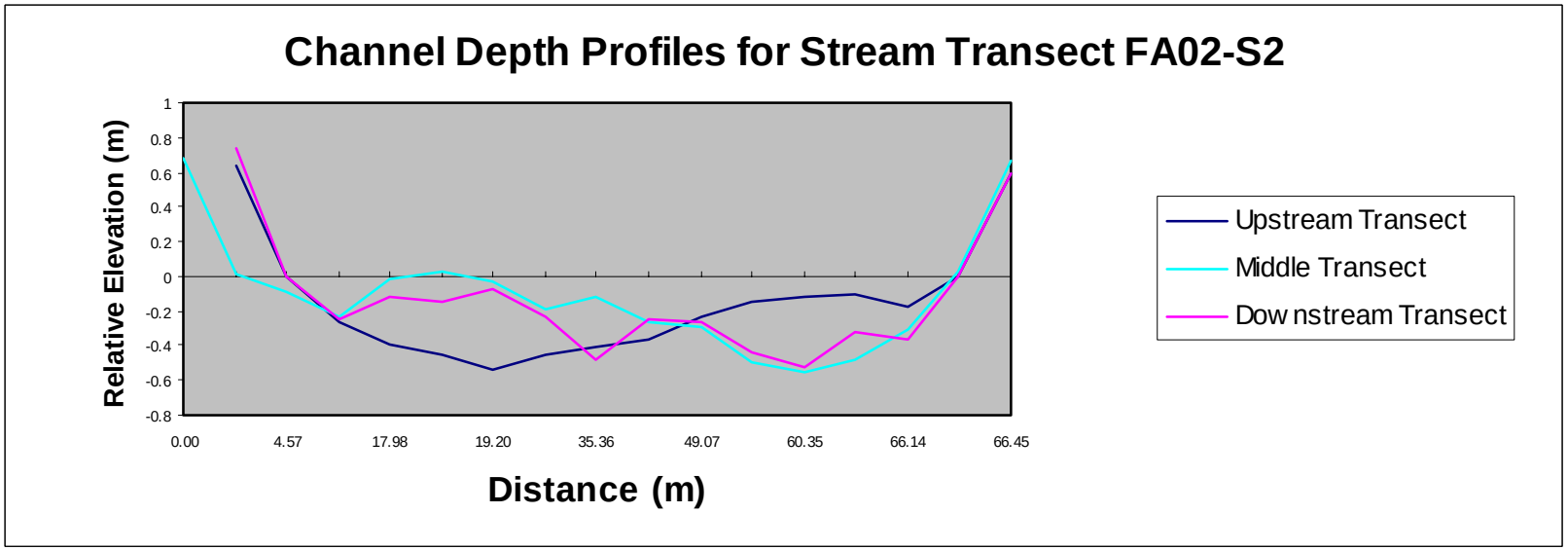
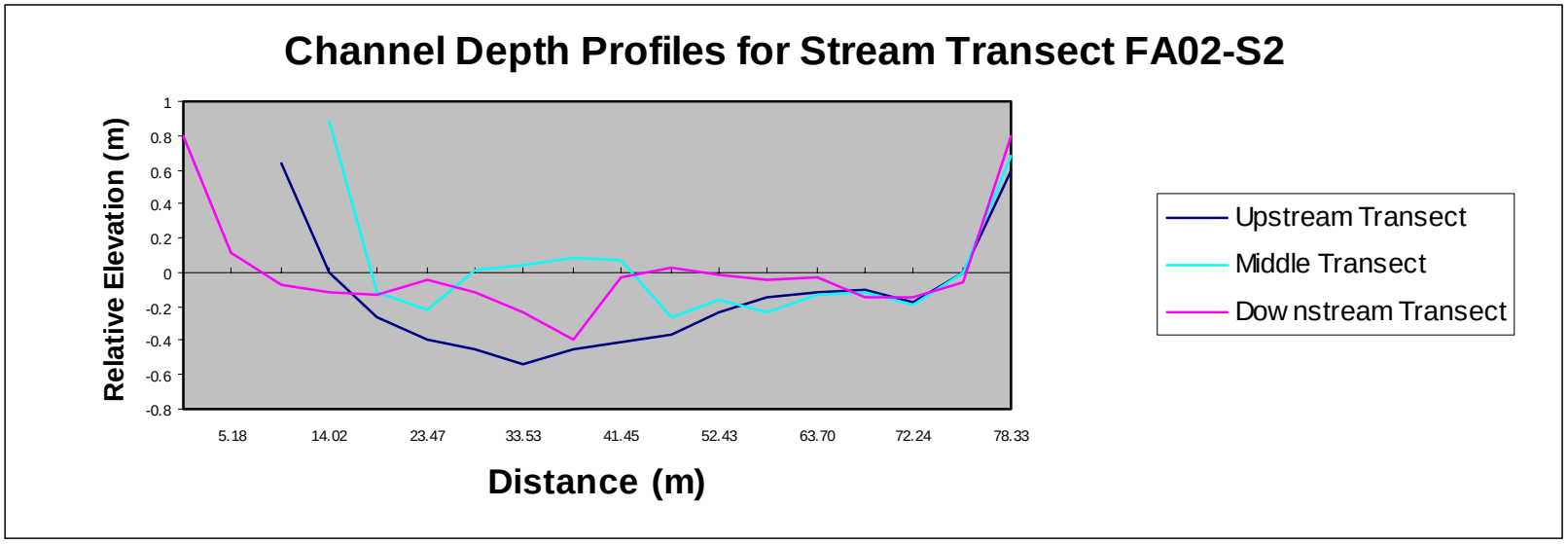


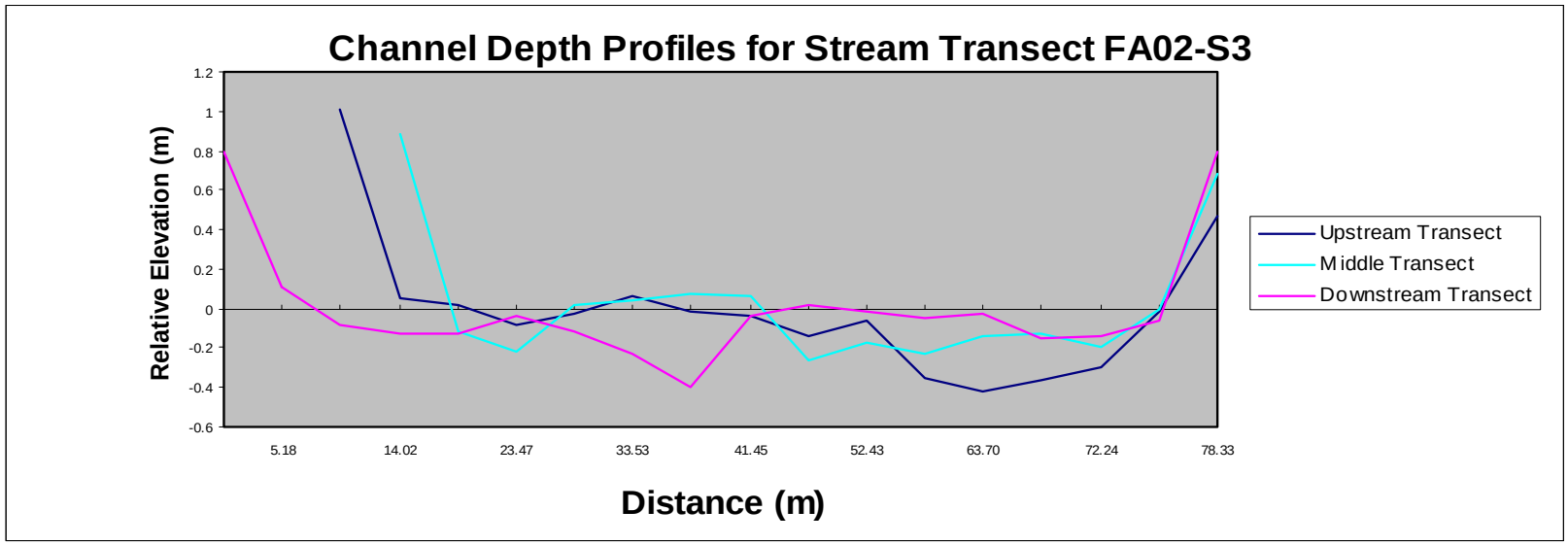
Transect Date/time: 10/26/2002, 13:55



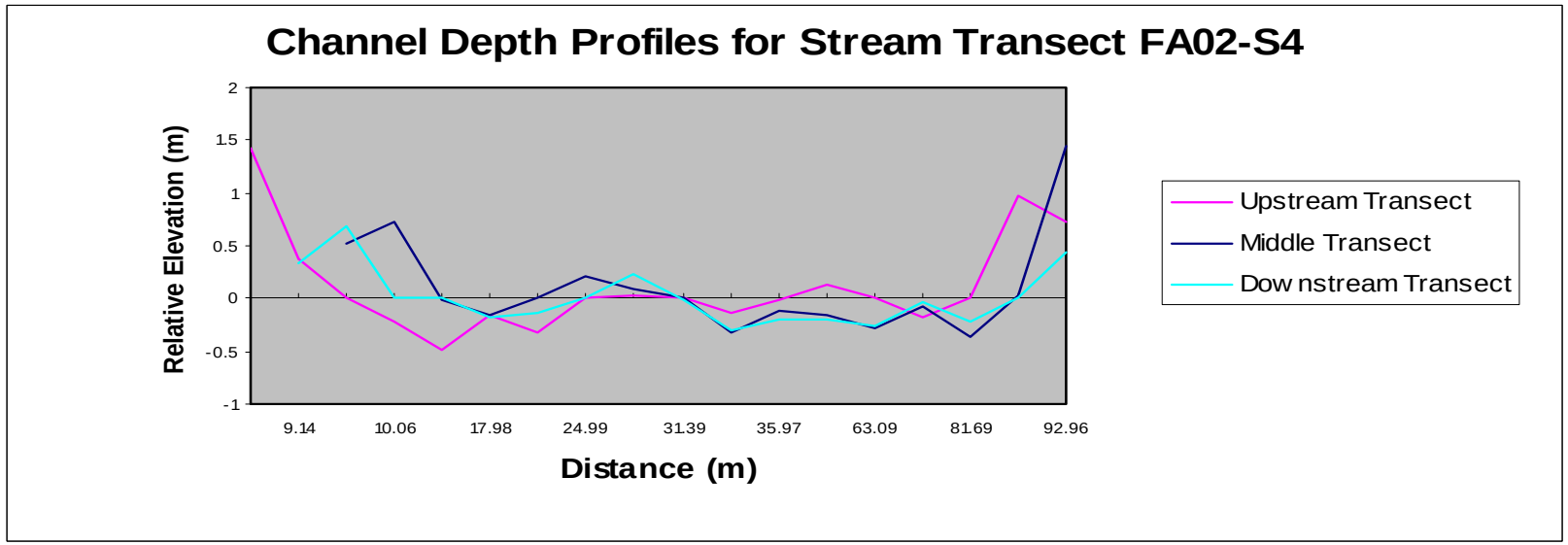
Transect Date/time: 11/19/2002, 12:30



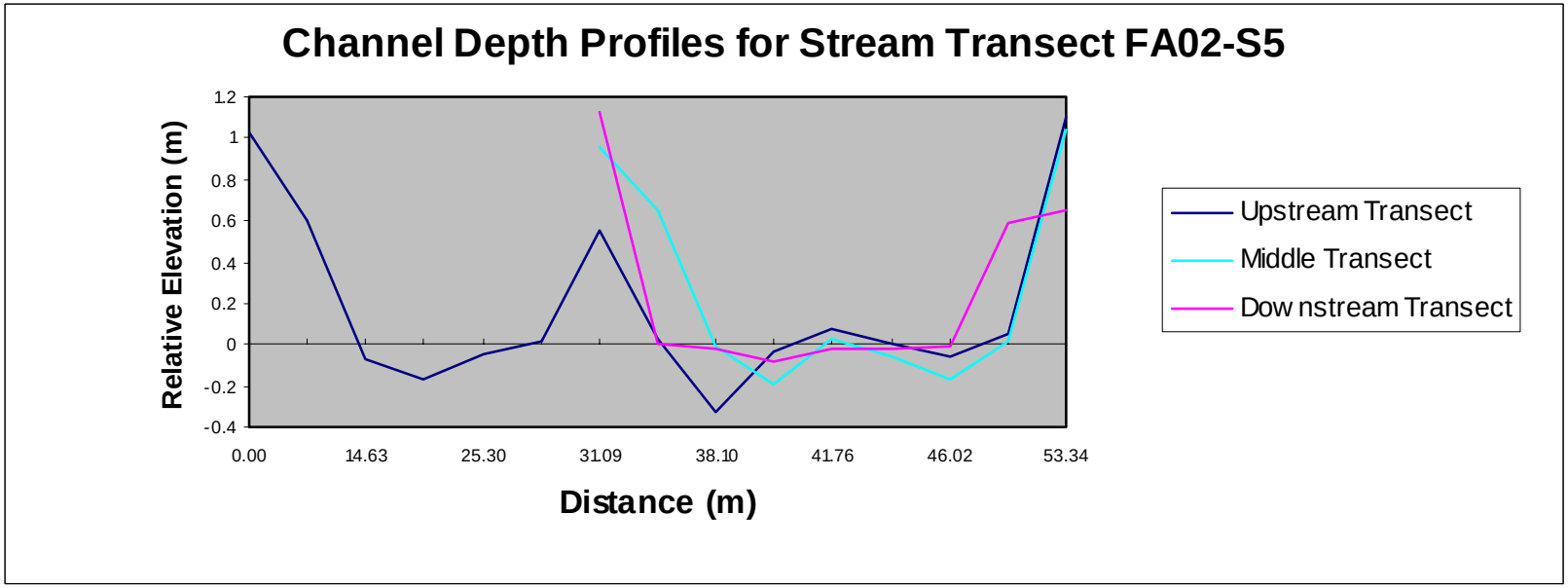
Transect Date/time: 11/08/2002, 13:45



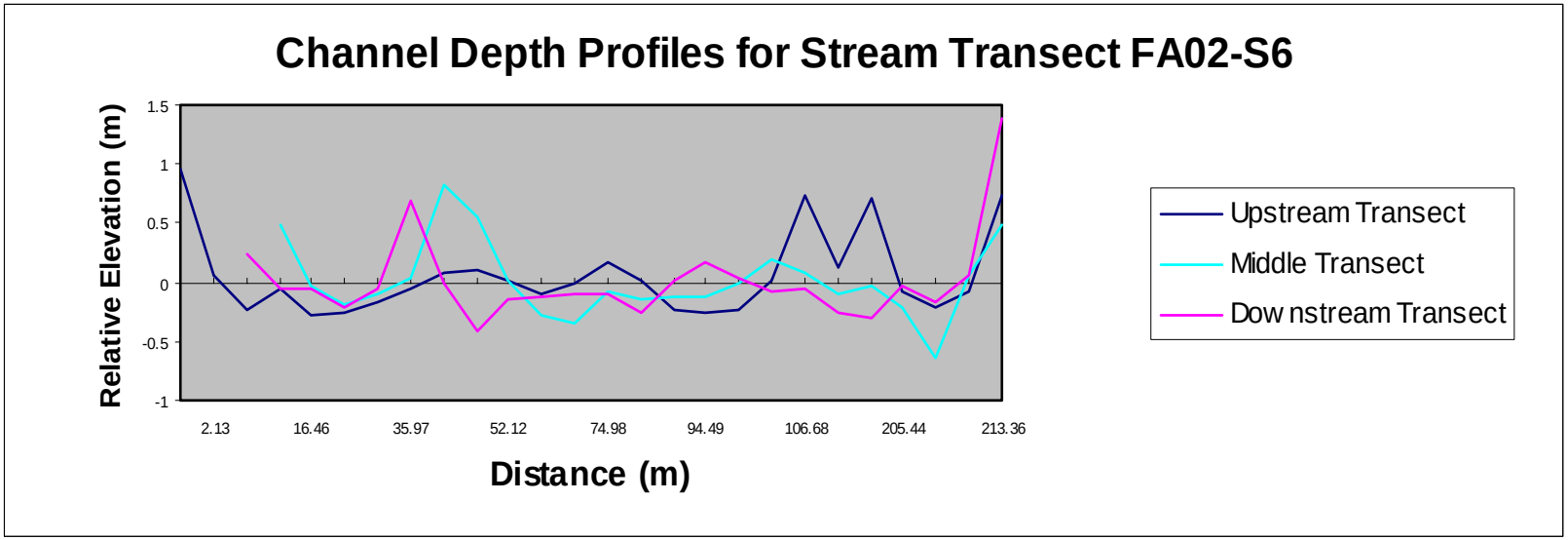
Transect Date/time: 11/21/2002



Transect Date/time: 12/02/2002, 12:45



Transect Date/time: 1/22/2002, 13:00



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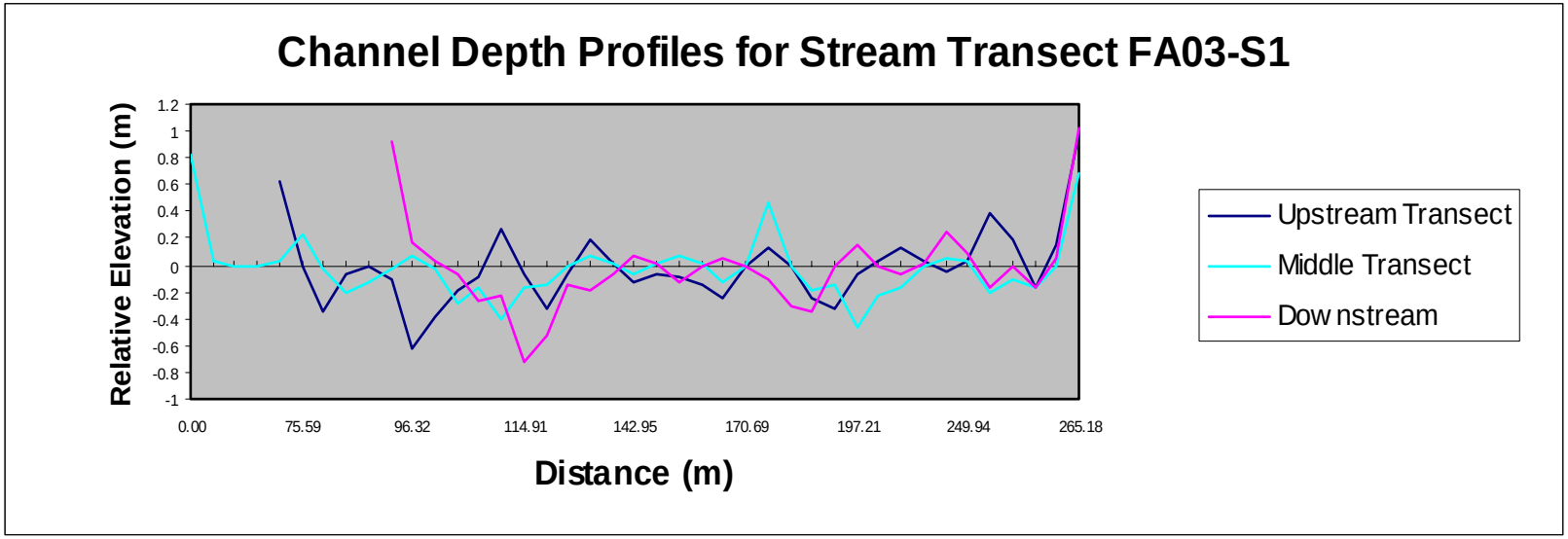
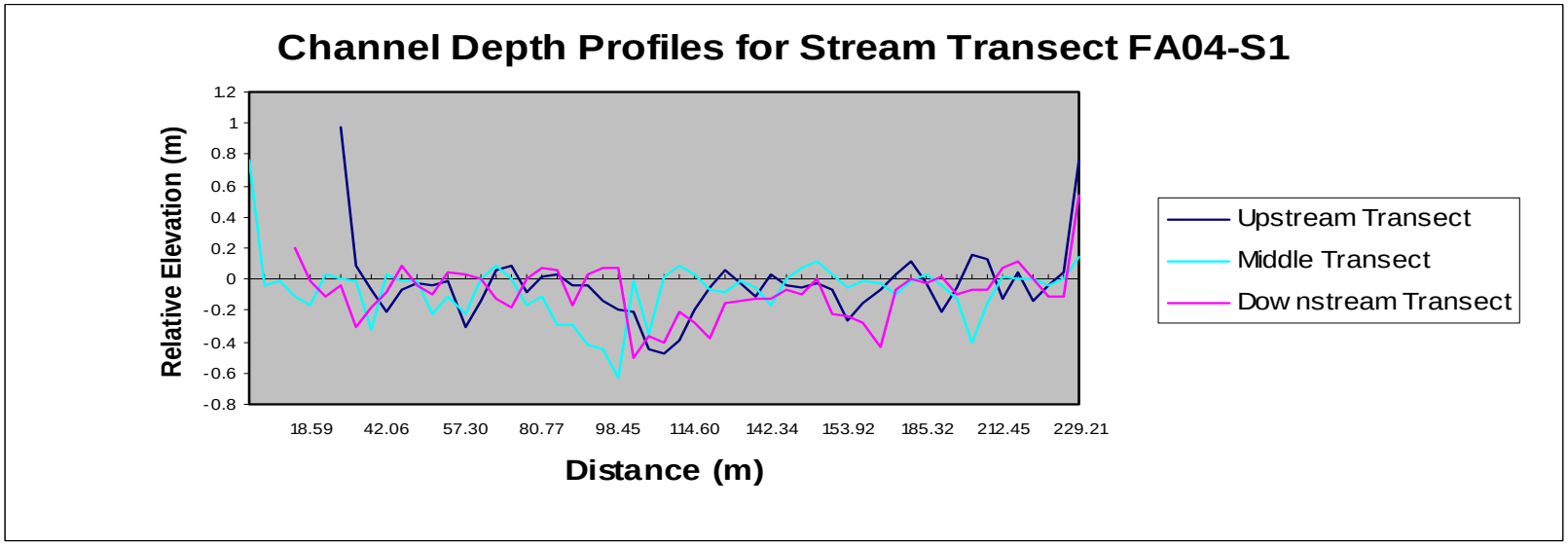
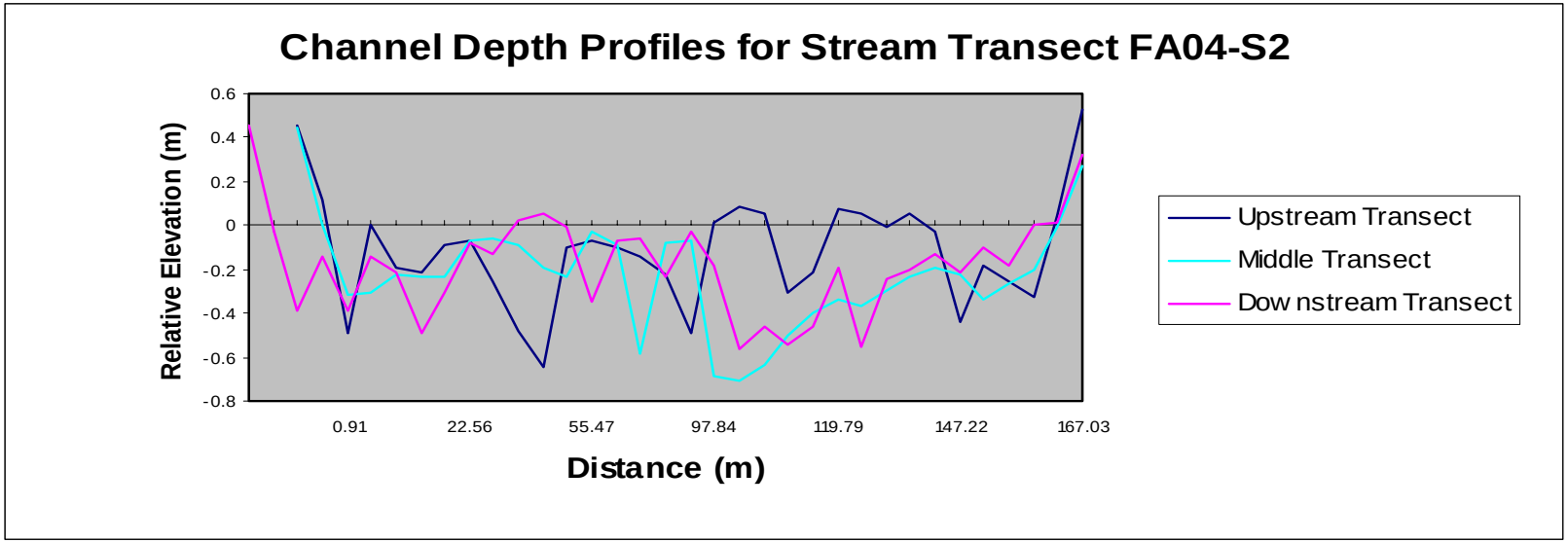


Transect Date/time: 11/12/2002, 13:30



Transect Date/time: 11/20/2002, 10:30



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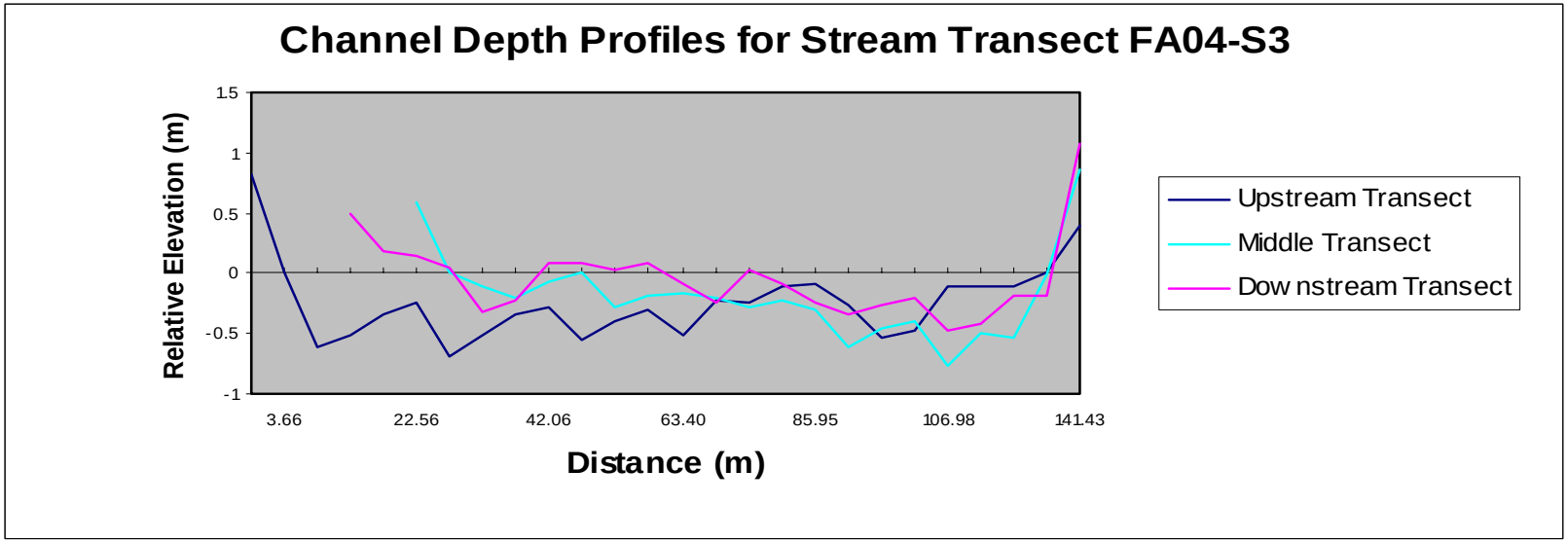

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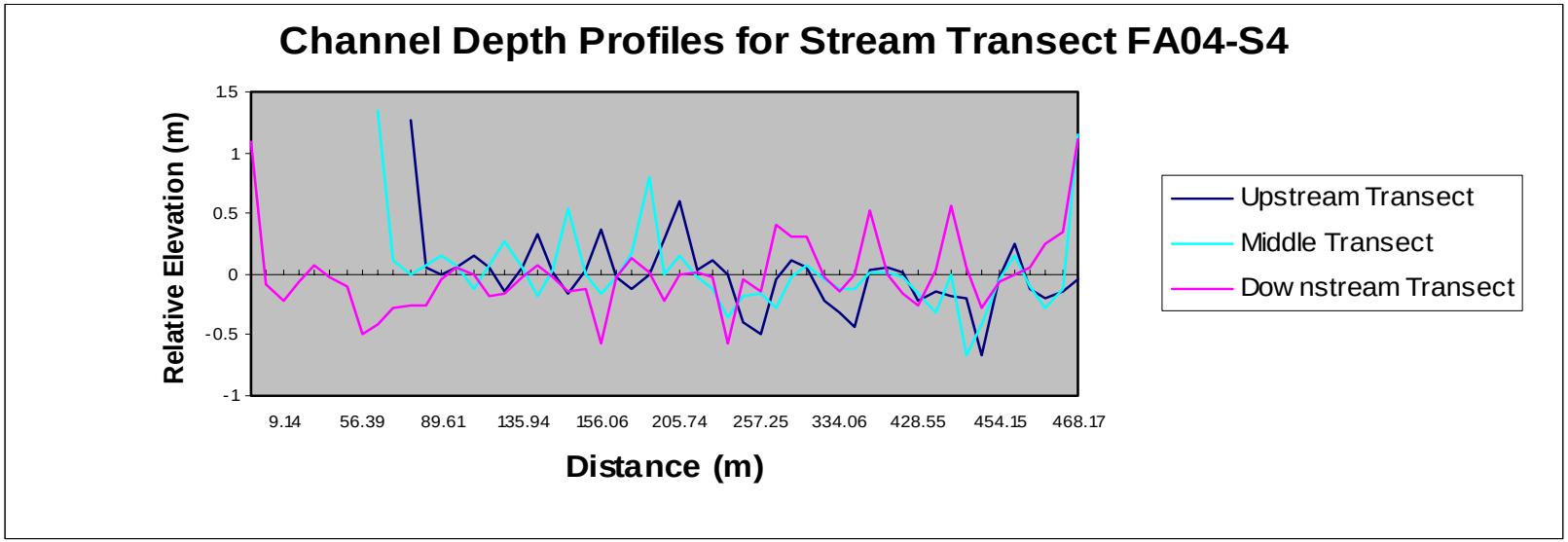

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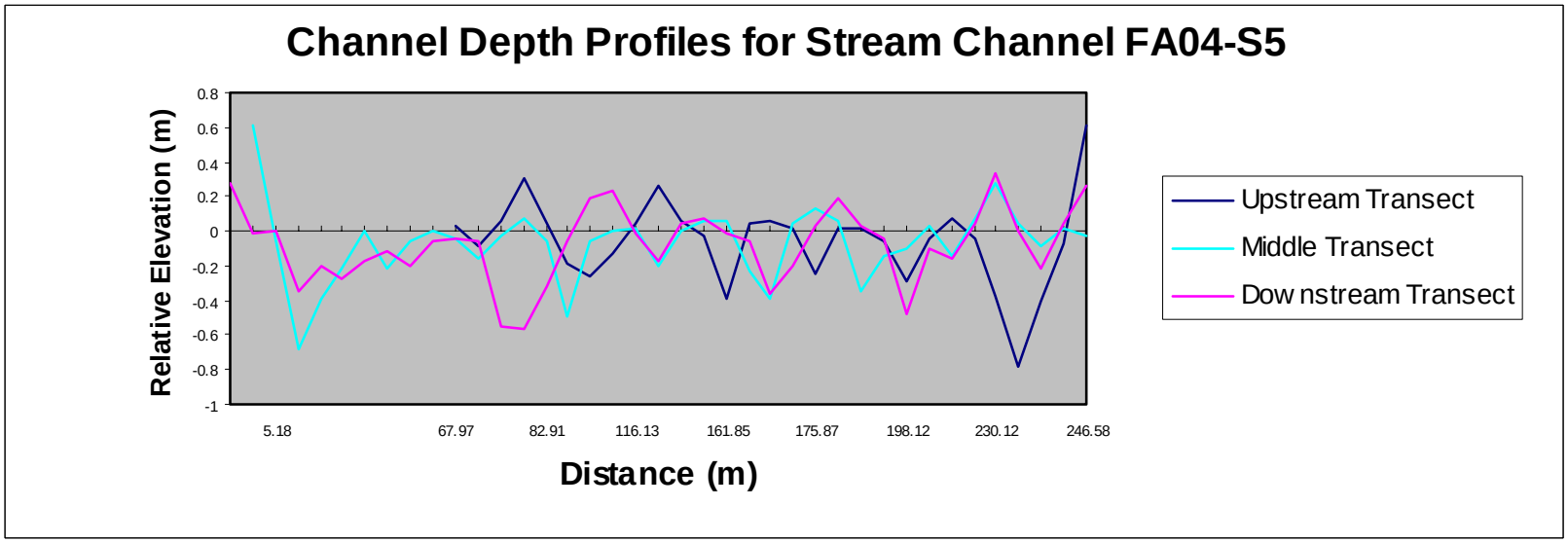

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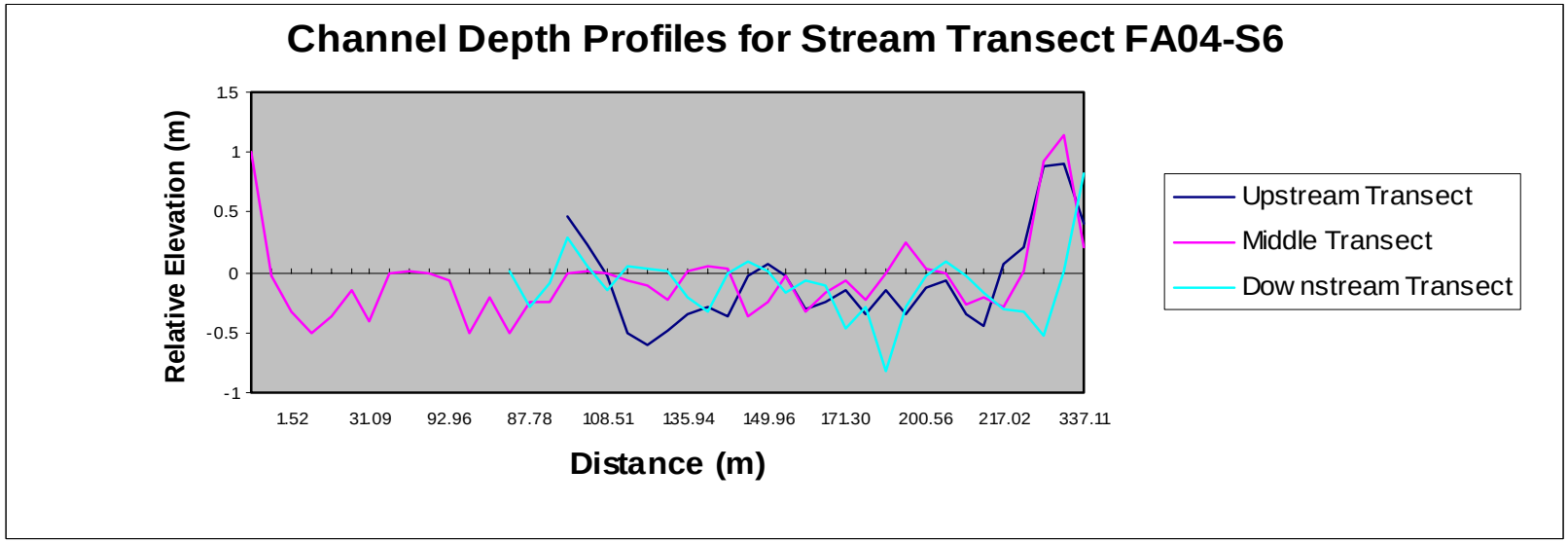

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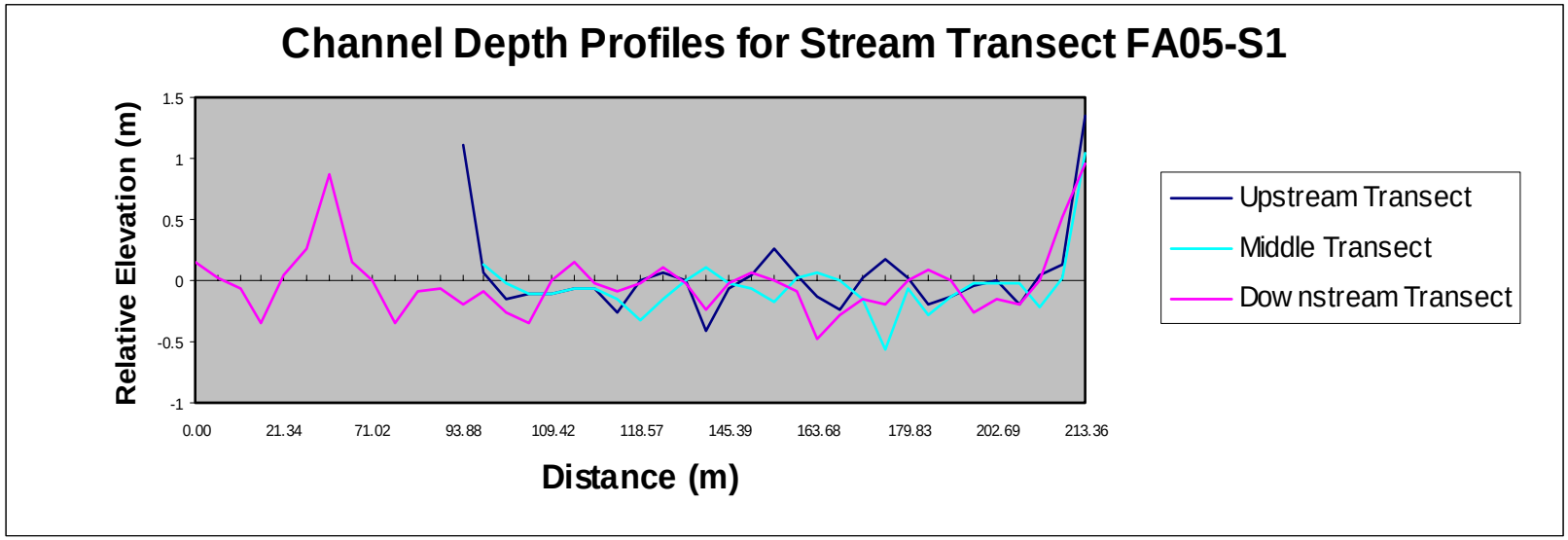

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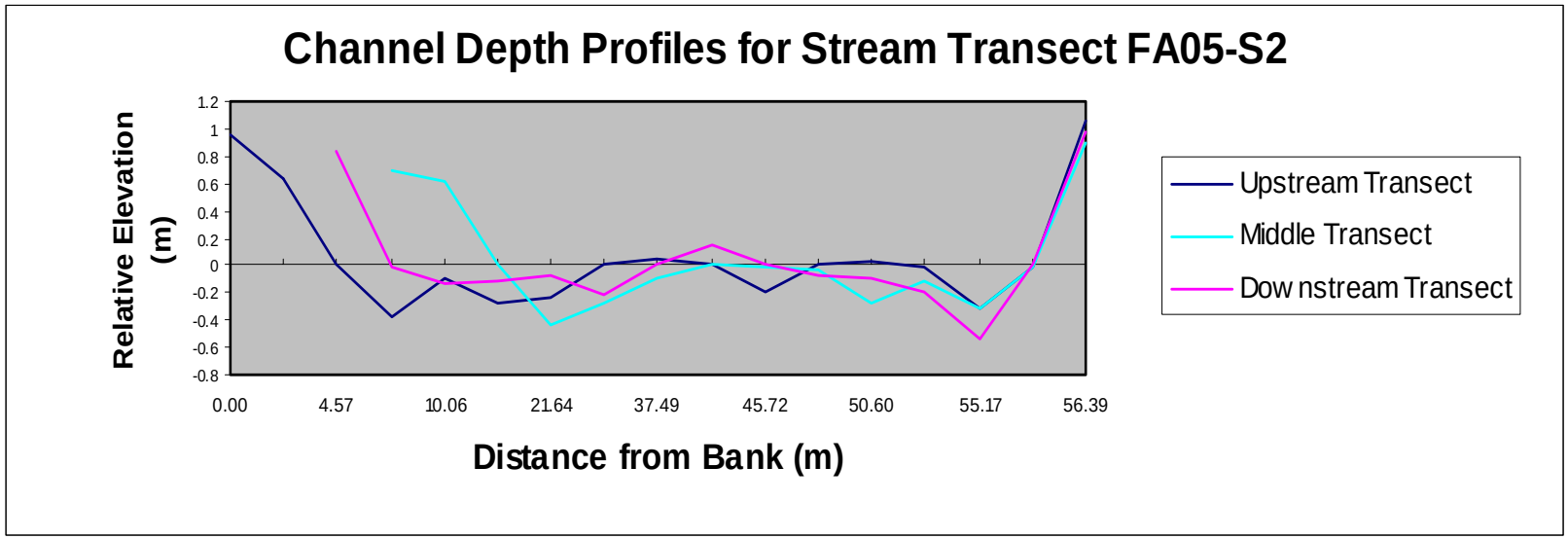

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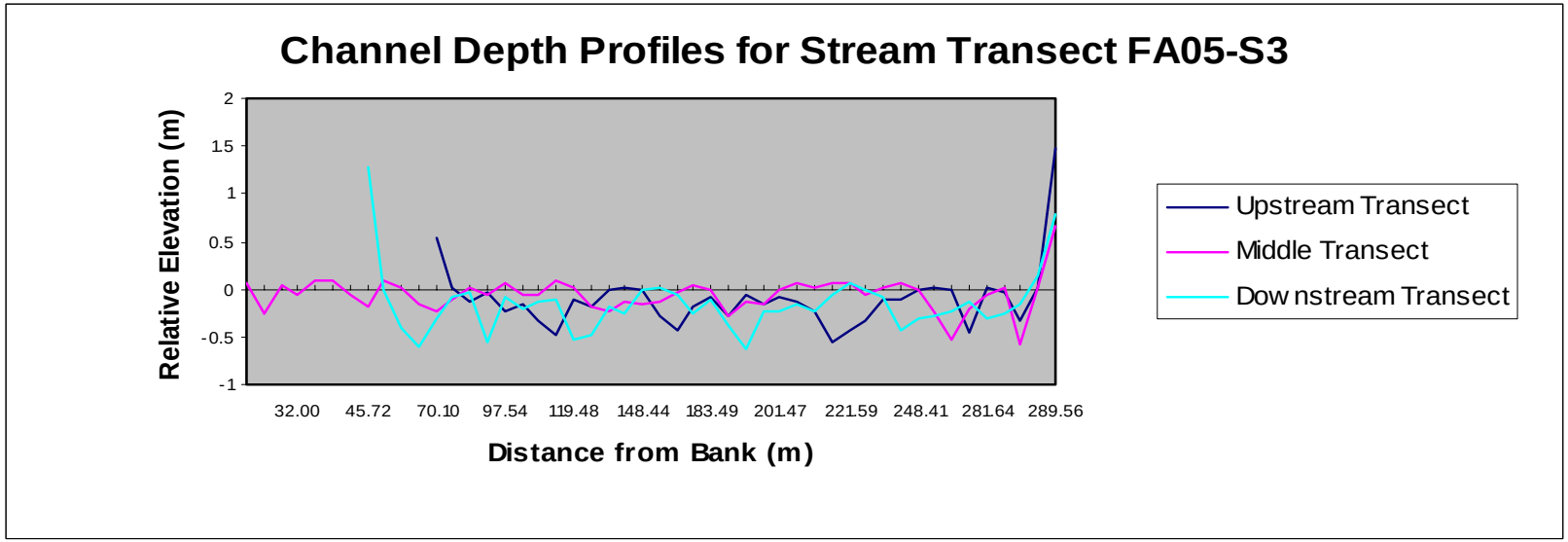

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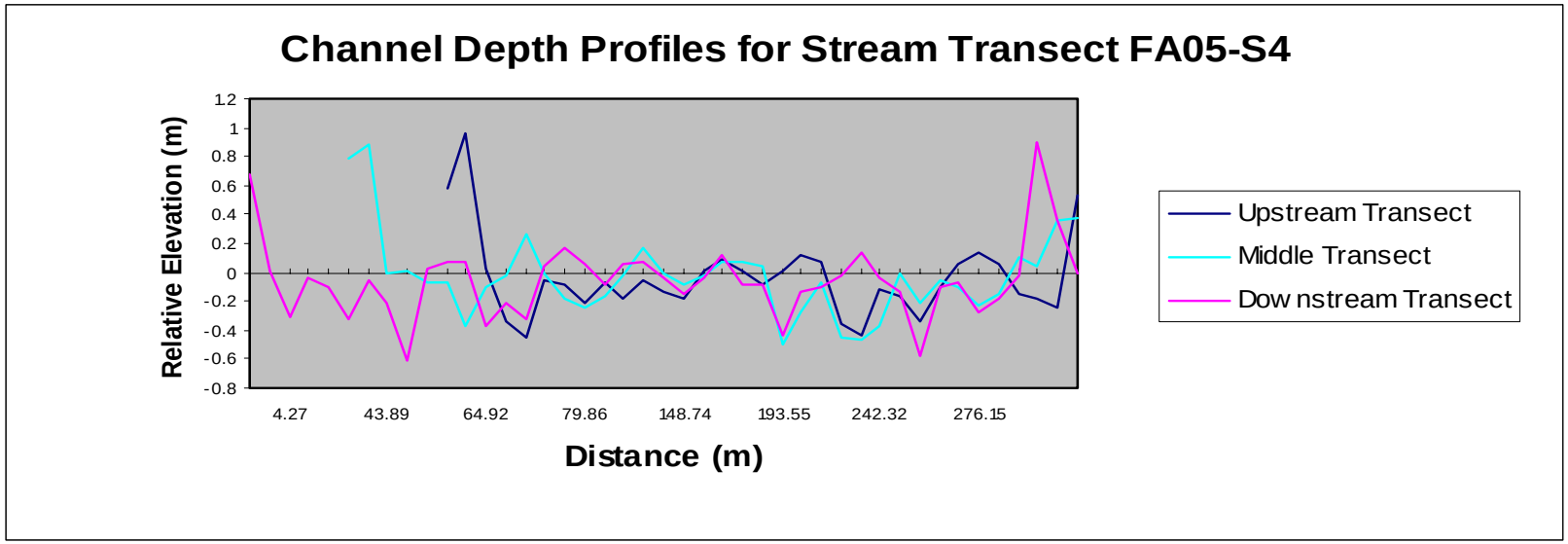
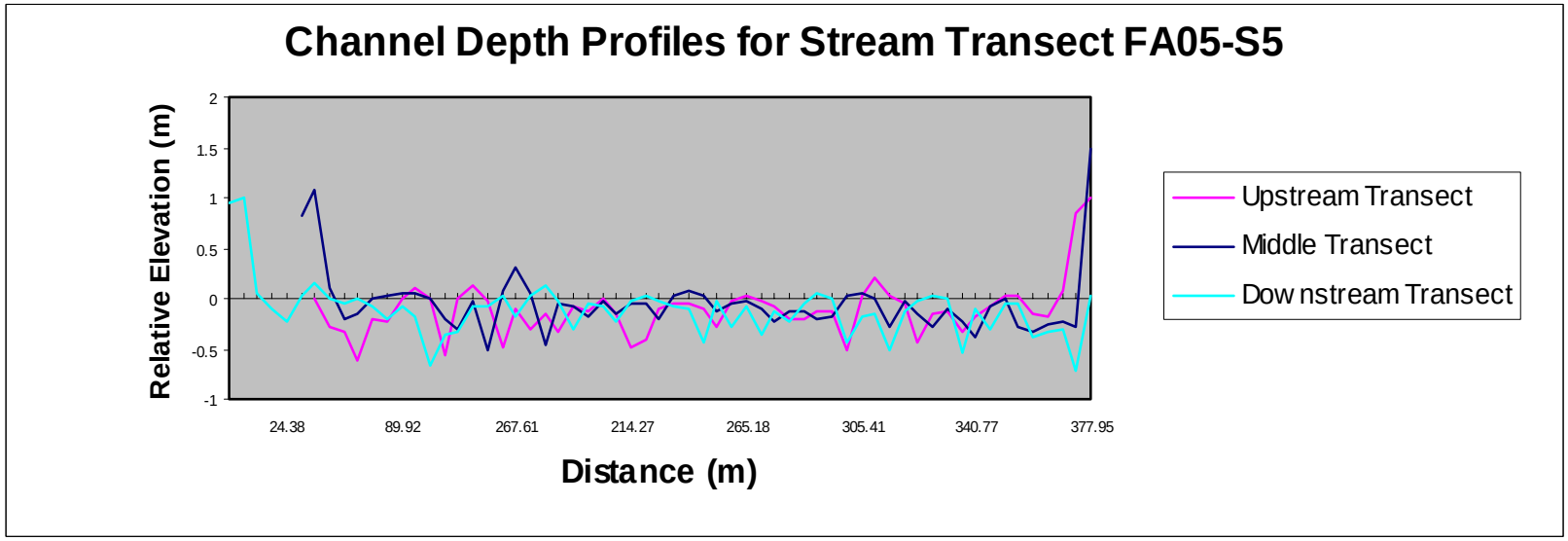
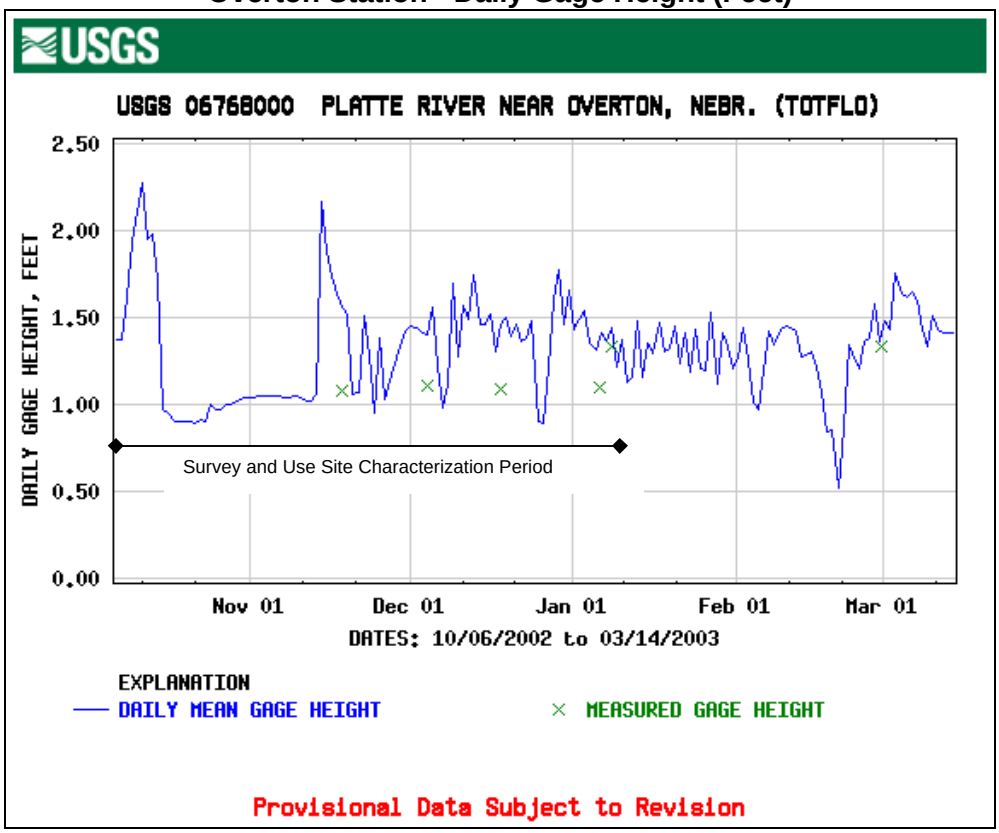


Transect Date/time: 12/19/2002

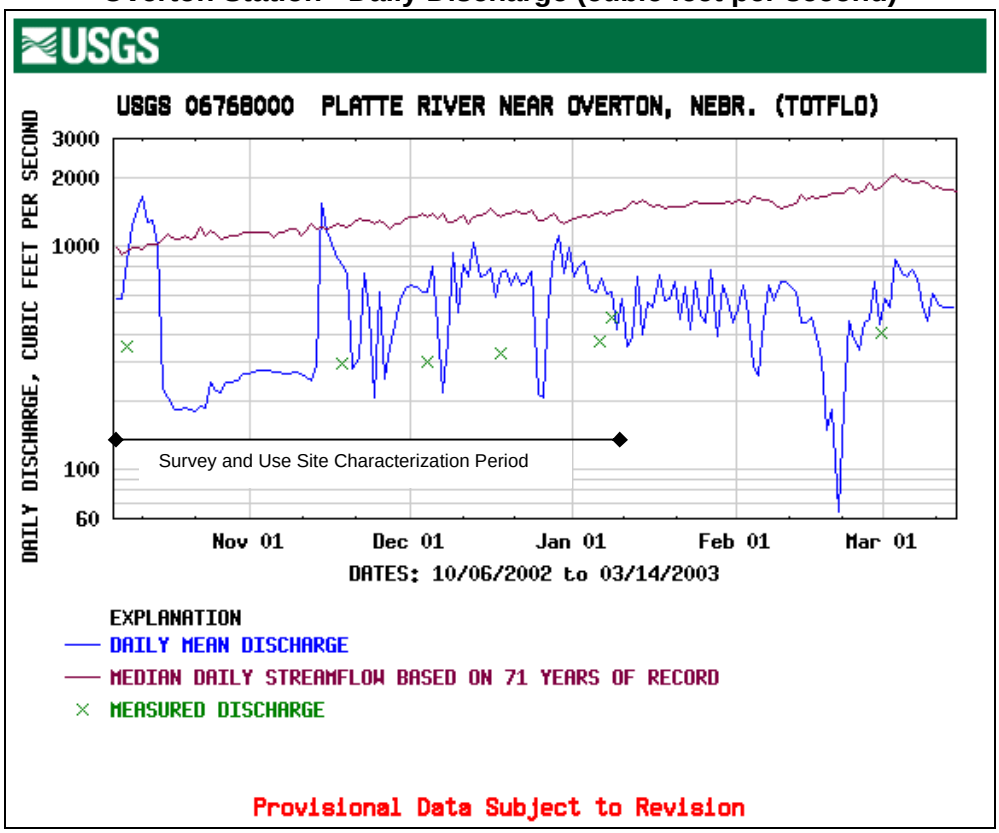


Transect Date/time: 12/19/2002, 10:00

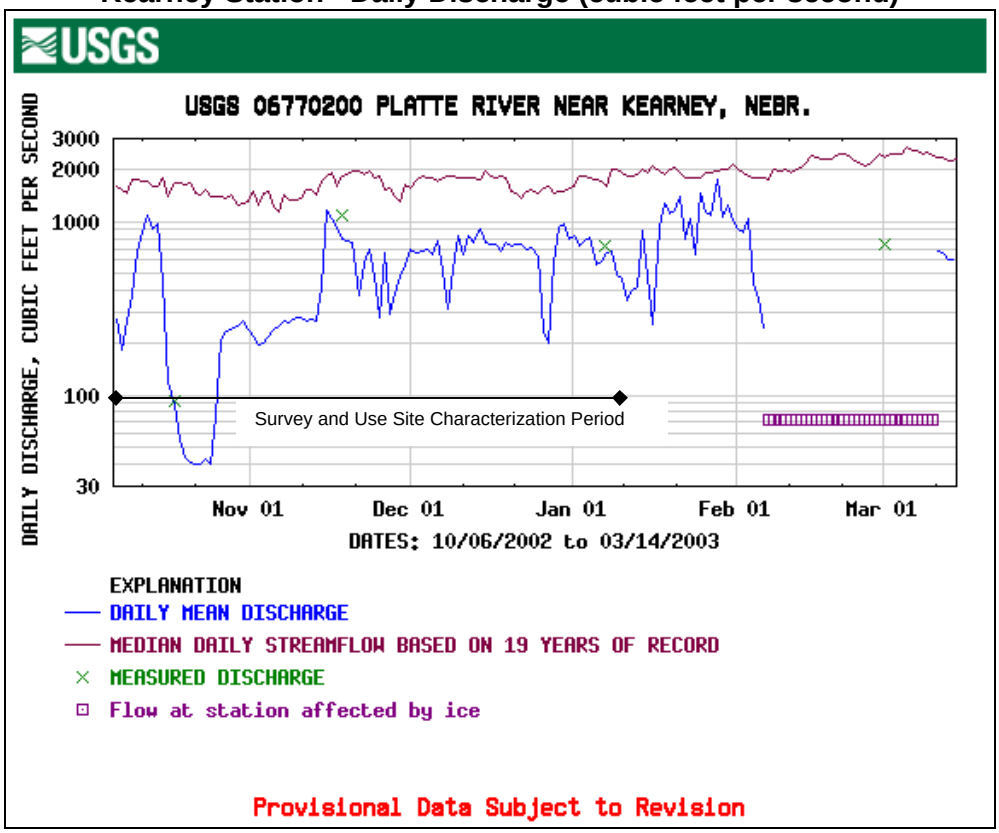
Overton Station - Daily Gage Height (Feet)



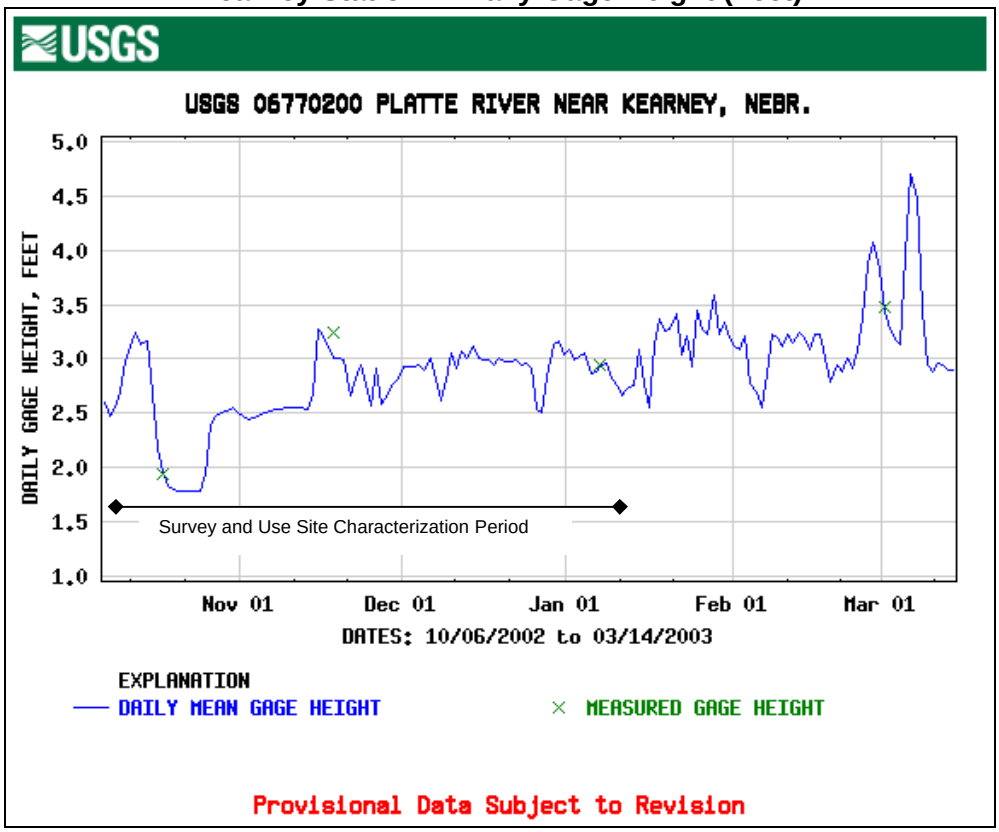
Overton Station - Daily Discharge (cubic feet per second)



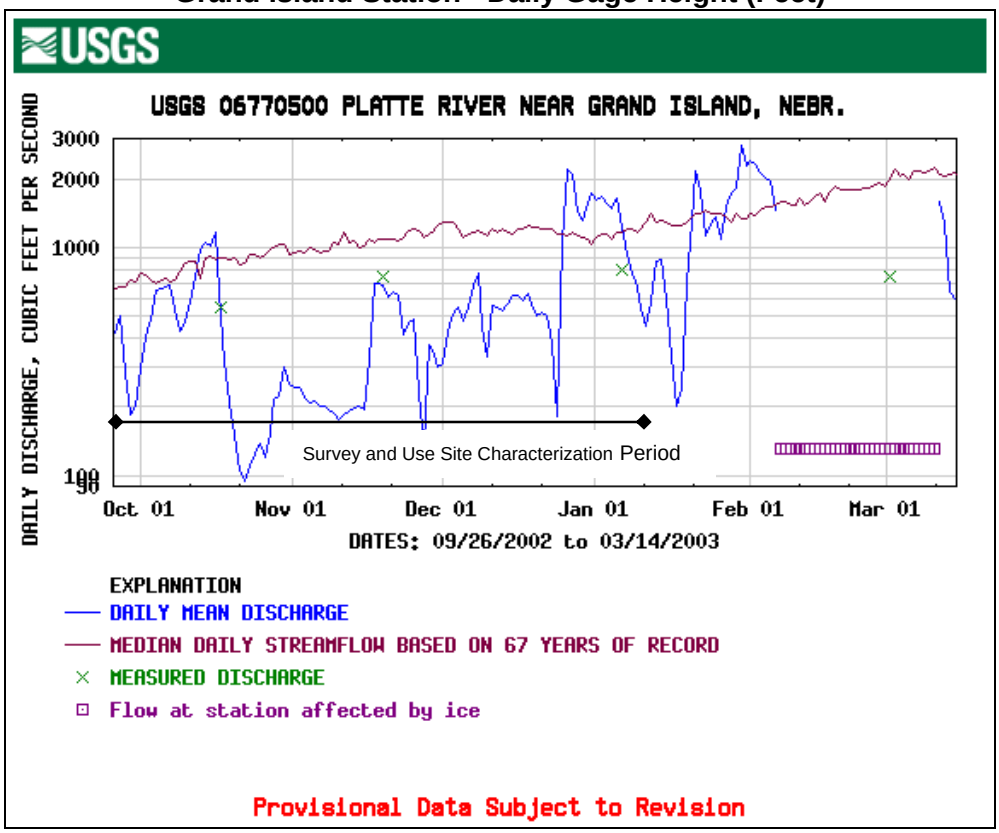
Kearney Station - Daily Discharge (cubic feet per second)



Kearney Station - - Daily Gage Height (Feet)



Grand Island Station - Daily Gage Height (Feet)



Grand Island Station - Daily Discharge (cubic feet per second)