Implementation of the Whooping Crane Monitoring Protocol

Spring 2009

FINAL REPORT

Prepared by

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AIM Environmental Consultants

For
Committee's of the
Platte River Recovery and Implementation Program

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Assessment Impact Monitoring Environmental Consultants (AIM) was awarded a contract to assist the Governance Committee in implementing specific monitoring associated with the *Platte River Recovery and Implementation Program*. The specific task was to implement the protocols developed by the Technical Advisory Committee entitled *Monitoring Whooping Crane Migrational Habitat Use in the Central Platte River Valley* and *Rebar Marker Placement Protocol* during the spring and fall migrations. The contract specified the implementation of the draft protocol dated 16 September 2005 along with guidelines presented in the *Request for Proposal*. The term of the contract was January 1, 2008 through December 31, 2010. I present the results of spring 2009 Whooping Crane migration pursuant to the *Contract for Services* dated 2 February 2008.

Study Area and Methods

The study area was the Platte River reach between U.S. Highway 283 (near Lexington) and Chapman, Nebraska. This reach was about 90 miles long and included an area extending 3.5 miles either side of the outermost banks of the Platte River. I hired and trained eleven technicians and conducted field work from 21 March through 29 April 2009. A set of six data sheets was provided by Headwaters Corporation and all data were entered into a Microsoft Access 2000 database template developed by the former Executive Director's Office.

Two air services were contracted and aerial surveys were conducted along specified routes near sunrise from 21 March through 29 April 2009 as weather permitted. Censuses were initiated no earlier than 30 minutes before sunrise and typically were completed within 2 hours. Start times were delayed when weather/visibility conditions dictated. Flights were cancelled due to unsafe weather or mechanical problems. Cessna 172's were equipped with GPS units and each had two observers to conduct the surveys. Waypoints for each survey route were programmed into the GPS units onboard the aircraft. Surveys were flown at an altitude of 750' and at a speed of about 100 mph.

The study area was divided into two legs. The east leg surveyed the Platte River reach between Chapman and the Minden (Highway 10) bridges and the west leg surveyed from the

Minden to the Lexington (Highway 283) bridges. Each census began flying upstream (east to west) along the south side of the main river channel with both observers looking out the passenger side of the aircraft. This provided optimum light conditions such that observers looked away from the rising sun thereby minimizing glare off reflective surfaces. Start points were alternated for each leg to address the concern that one end of the river transect would always be flown earlier than the other end. On the east leg, day one began at Chapman, flew the river west to Minden then flew a predetermined route back to Chapman. Day two began at Wood River, flew the river to Minden, returned along a predetermined route back to Chapman, then flew the rest of the river transect from Chapman to Wood River. The start points for the west leg were Minden and Odessa bridges. Day one began at Minden, flew the river west to Lexington then flew a predetermined route back to Minden. Day two began at Odessa, flew the river to Lexington, returned along a predetermined route back to Minden, then flew the rest of the river transect from Minden to Odessa. When the initial portion of the river transect was completed, one of 7 possible return routes located along the centerline of the main channel and 1, 2, and 3 miles north and south of the river respectively was flown with observers looking out opposite sides of the aircraft.

Four ground observers were stationed along the survey routes. Communication between the ground observers and the aircraft was accomplished through the use of two-way radios. In the event of a possible Whooping Crane sighting by the air crew, the ground person nearest the sighting was contacted and immediately dispatched to the location in an effort to confirm the identity of the white object. Each technician had a set of color aerial photos of the river . The photos were inserted in polypropylene sheet protectors that enabled the observer to mark sighting locations on the photo for later reference. Efforts were made to photograph Whooping Cranes from the air using digital cameras. In addition, a GPS reading of the location was taken by air crew.

If a Whooping Crane was located by ground personnel, habitat use and activity monitoring commenced. These observations were continuous until the bird was either lost from view or went to roost for the night. Each Whooping Crane sighting was assigned a unique number and later compared with the U.S. Fish and Wildlife Service's (USFWS) sighting records in Grand Island. A Whooping Crane sighting was defined as:

"…the observation of a single whooping crane or a group of whooping cranes that are migrating together through the area. Confirmed sightings in the same general area (within a reasonable distance of daily crane activities) along the Platte and within one to several days of another sighting is assumed to be the same bird/bird group, unless: 1) the number of birds differs, 2) the bird(s) constitute a bird/bird group in addition to those already known to be in the general area, or 3) the original birds were observed to migrate from the valley or are known to have moved to a different area of the valley. This assumption is necessary because individual cranes cannot be distinguished; very few birds are marked and continuous surveillance of a crane or crane group using the study area is not possible." (Aransas – Wood Buffalo Population Whooping Crane Contingency Plan 2006, Whooping Crane Committee of the Central Flyway Council).

Profiles were measured at Whooping Crane roost sites and ten predetermined decoy locations on riverine sites using surveying equipment owned by the Program. Three parallel transects 25m apart were established perpendicular to the general flow of the river at each site such that the middle transect crossed the crane or decoy location. Elevation measurements were taken about every 3m along each transect using a stadia and transit. End points were determined when an obstruction greater than 1.5 m in height was encountered such that it formed a visual barrier to a crane. A 24-inch long steel rebar stake was driven level with the ground into the high bank or other location along one of the transects so that water elevation could be determined at a later date. A second rebar marker was driven level with the ground in case the first stake was lost due to bank sloughing. A GPS location was recorded for each stake. Stream flow data was collected from the U.S. Geological Survey (USGS) at gauging stations located at Overton, Kearney, and Grand Island. Leica laser rangefinders were used to measure the length of sandbars and distance to visual obstructions >1.5m. Whooping Crane movements, behavior, and diurnal habitat use was recorded when possible. All monitoring activities followed USFWS guidelines. Martha Tacha, USFWS Coordinator for the Cooperative Whooping Crane Tracking Project, kept our team apprised of the latest sighting reports and census results from the wintering grounds on a regular basis. Tom Stehn, refuge manager of Aransas National Wildlife Refuge in Texas, conducted surveys on the wintering grounds and provided the results via email. Landowner permission was obtained prior to entering any property.

Whooping Crane decoys were placed at 15 randomly selected locations provided by Headwaters Corporation (Table 1) for the purposes of determining survey detection rates. Five locations were off-river and the others were in the river channel. The air crew did not know when or where the decoys were placed. Observations of Whooping Crane decoys by the air crew were reported to the ground crew for confirmation.

A toll-free telephone number for the public to report Whooping Crane sightings was sponsored by the Platte River Whooping Crane Habitat Maintenance Trust. This volunteer effort was known as *Whooper Watch*. AIM personnel distributed *Whooper Watch* flyers to prominent bird-watching centers alerting the public of this number. All Whooping Crane sightings reported to officials by the public were classified as opportunistic locates. Following a report, ground crew procedures were implemented as outlined above.

Results

Opportunistic Locates.—

We received 10 reports of possible Whooping Cranes from the public, Whooper Watch, or USFWS. Five resulted in confirmed Whooping Crane sightings.

Aerial Survey.--

CONFIRMED WHOOPING CRANE SIGHTINGS-

Of a possible 40 morning flights per leg, the West Leg completed 31 (78%) flights while the East Leg flew 32 (80%). Fog, low ceiling, precipitation, and high winds were factors in cancellations. We recorded 17 confirmed and 1 probable Whooping Crane sightings. All sightings were on transect 0SE (Figures 1-5).

INDEX OF USE-

We completed 126 (79%) aerial survey transects out of a possible 160. Eighteen Whooping Crane sightings were made on these transects. This resulted in an index of use (frequency of occurrence) of .14 sightings per transect. All sightings occurred on river transects.

OPPORTUNISTIC FLIGHTS-

Two Whooping Crane sightings were considered opportunistic during the regular aerial surveys. Both sightings occurred when the plane deviated from the survey route at the request of the ground observer. No additional flights were deployed.

OTHER WHITE OBJECT SIGHTINGS-

Nineteen ground searches were conducted on objects at the request of the air crew. These resulted in confirmation of Whooping Cranes, Sandhill Cranes, American White Pelicans, or no finding.

Searcher Efficiency Trials.—

Whooping Crane decoys were placed at 15 locations between March 29 and April 28 (Table 1). The air observers detected a decoy at eight sites for an overall detectability rate of 53%. When broken down by strata, there was a 20% and 70% detectability rate for strata 0-3.5 and 0 respectively. Factors contributing to the detectability rate included decoys located in woodlands or tall grass, decoys in the "blind spot" below the underbelly of the aircraft, and inexperienced observers.

Table 1. Random locations of decoys for detectability trials.

Strata	Random number	Date Placed	Detected?
0-3.5	40	4/20/2009	no
0-3.5	41	4/20/2009	no
0-3.5	42	4/28/2009	no
0-3.5	43	4/20/2009	no
0-3.5	44	4/17/2009	yes
0	75	4/22/2009	yes
0	76	4/22/2009	yes
0	77	4/19/2009	no
0	78	3/29/2009	no
0	79	4/3/2009	yes
0	80	4/16/2009	no
0	81	4/20/2009	yes
0	82	4/13/2009	yes
0	83	4/13/2009	yes
0	84	3/29/2009	yes

Use-Site Characteristics, Diurnal Movements, and Activity.--

FLOW-

Streamflow measured at the USGS gauging stations located near Grand Island, Kearney, and Overton was generally below the median streamflow for each site during the survey (Figures 6-8). Median flows were exceeded when releases were made for hydropower generation and pulse flows from the Environmental Account in Lake McConaughy. Note all flow data are provisional and subject to revision. Table 2 depicts the minimum and maximum values for unit (instantaneous) flows at each station.

Table 2. Discharge values (cfs) at USGS gauging stations (provisional data).

	Overton	**Kearney**	**Grand Island**
Minimum	311	362	596
Date	3/27	4/1	3/31
Maximum	3730	3290	3510
Date	4/19 & 20	4/20	4/22

The streamflow when Whooping Cranes were observed on the river and when roost channel profiles were measured are shown in Table 3.

Table 3. Flow conditions during Whooping Crane use and channel profile measurements. (Discharge is at the Platte River gauging station near Kearney).

Use Site	Use Date	Use Time	Measured Date	Discharge (cfs)	
				Use	Measured
1	4/2	7:22	4/13	908	656
2	4/8	6:51	4/13	698	642
3	4/15	6:47	4/27	1680	1570
4	4/12	7:15	4/28	656	977
5	4/8, 4/10	7:03, 7:10	4/28	705, 1760	977
6	4/6	7:02	5/18	608	303
7	3/28	8:07	5/18	550	290
8	4/1	7:31	5/4	484	1860
9	3/25	7:16	5/4	642	1930

RIVERINE/WETLAND USE SITES-

We collected riverine channel profile data at 10 Whooping Crane decoy locations and 9 Whooping Crane roost sites (data entered into Microsoft Access database) (Figures 9-17). A total of 1149 stations (3 readings at each station) from 54 transects were surveyed. Photographs depicting the habitat used at the Whooping Crane Use Sites are shown in Figures 18-26.

DISTANCE TO VISUAL OBSTRUCTION, SUBSTRATE, AND WATER DEPTH-

Visual obstructions at Whooping Crane use sites are given in Table 4. Substrate was characterized as fine sand to large gravel. The average water depth at the Whooping Crane roost locations was 0.17 $\pm$ .10m.

Table 4. Location, visual obstruction distance (m), substrate, and roost depth (m) at Whooping Crane riverine use sites.

Use Site ID	UTM X	UTM Y	VO Upstream Distance	VO Right Distance	VO Downstream Distance	VO Left Distance	Fine Sand %	Coarse Sand %	Small Gravel %	Large Gravel %	Roost Depth (m)
1	540805	4512408	86	188	126	110	80	20			.08
2	539775	4511947	79	98	89	56	60	40			.18
3	519254	4506173	112	50	25	226	100				.27
4	521526	4507013	56	72	39	43	70	30			.34
5	527544	4507387	36	24	36	21	50	30	15	5	.22
6	543425	4513771	160	155	130	101	60	40			.04
7	544773	4514567	264	176	178	146	70	30			.10
8	545617	4514642	95	99	112	91	70	30			.22
9	546859	4515378	111	61	48	47	85	15			.08

UNOBSTRUCTED WIDTH-

Table 5 depicts unobstructed width as measured at riverine use locations. The width was the average of the 3 river profiles measured at each Use Site.

Table 5. Unobstructed channel width at riverine use sites (units in m).

Use Site ID	Unobstructed Width	Standard Deviation
1	242.9	56.5
2	145.8	15.4
3	195.1	105.4
4	110.6	3.7
5	49.9	4.8
6	255.6	6.7
7	314.4	8.9
8	197.1	10.4
9	103.0	7.0

DIURNAL USE SITES-

Diurnal movements and activity data was collected when possible. We documented 24 diurnal use locations during 13 days of observation (Figures 1-5). Whooping Cranes were observed within 0.3- 5.5 miles from their riverine roost locations.

CRANE-USE DAYS

Crane-Use days were calculated by multiplying the number of Whooping Cranes by the number of days present. For this calculation, we assumed that a Whooping Crane observed during the morning aerial survey was present the previous day. Whooping Cranes were present in the study area 26 (65%) of the 40 days of the survey. This was a record number of days present since monitoring began in 2001. A total of 42 crane-use days was recorded (Table 6). Crane Group 2009SP28 was considered a probable sighting from the air based on photographs but not confirmed from the ground. Consequently, it was not determined if this individual was a juvenile. The "Shelton" juvenile was not observed from the air that morning so it is possible this was the same individual although the location was about 8.5 miles west of Shelton/Denman. There were six Whooping Cranes in four groups present this spring.

Table 6. Whooping Crane dates of occurrence and crane-use days (juveniles in parentheses).

Crane Group (Prefix 2009SP)	Number of Cranes	Dates of Occurrence	# of days present	Crane-Use Days
01-15, 20, 23, 24, 26	1 (1)	March 21- April 14	25	25
16	3 (1)	April 7-8	2	6
17-19, 21, 22, 25, 27	1 (1)	April 7-15	9	9
28	1 (1?)	April 10-11	2	2
TOTAL	6 (4?)	March 21- April 15	26	42

LAND-COVER CLASS-

Ag-Corn, Ag-Alfalfa, Ag-Soybeans, Grassland-Upland, Lowland Grasses, and Wooded Floodplain were the cover-types Whooping Cranes were observed using during the day. Twenty-two locations were in AG-Corn, 5 were in Lowland Grasses, 3 were in AG-Soybeans, 2 were in Grass-Upland, 1 was in Ag-Alfalfa, and 1 was in Wooded-Floodplain. This was first year Wooded-Floodplain was recorded. All of the known nocturnal roost locations (100%) were in Wetted Channel.

ACTIVITY-

A total of 61 hours of Whooping Crane continuous and instantaneous use (time budget) data was collected by ground personnel during 13 days of observation. The breakdown of observation time in various habitats is depicted in Table 7. Most of the diurnal activity recorded occurred in corn (84%) followed by lowland grasses (6%), upland grasses and alfalfa (3% each), soybeans (2%), wetted channel and wooded floodplain (1% each). Two hundred thirty-nine data points of activity (time budget) were recorded. Feeding (83%) was the most frequently observed activity followed by alert (6%), resting (6%), preening (5%), and defensive (<1%) (Table 8).

Table 7. Count of instant points by habitat.

Habitat	Hours	n	Percent
Ag-Alfalfa	2	8	3
Ag-Corn	51	204	84
Ag-SoyBean	1	4	2
Grassland-Upland	2	8	3
Lowland Grasses	3.5	14	6
Wetted Channel	.75	3	1
Wooded-Floodplain	.75	3	1

Table 8. Whooping Crane activity by habitat.

Habitat	Activity	n	Total	Percent
Ag-Alfalfa	Alert	1	8	12.5
Ag-Alfalfa	Feeding	6	8	75
Ag-Alfalfa	Preening	1	8	12.5
Ag-Corn	Alert	12	200	6
Ag-Corn	Defensive	1	200	0.5
Ag-Corn	Feeding	170	200	85
Ag-Corn	Preening	8	200	4
Ag-Corn	Resting	9	200	4.5
Ag-SoyBean	Feeding	4	4	100
Grassland-Upland	Alert	1	8	12.5
Grassland-Upland	Feeding	7	8	87.5
Lowland Grasses	Alert	1	14	7.1
Lowland Grasses	Feeding	9	14	64.3
Lowland Grasses	Preening	2	14	14.3
Lowland Grasses	Resting	2	14	14.3
Wetted Channel	Resting	3	3	100
Wooded-Floodplain	Feeding	2	2	100

Search Effort.--

Ground searches were initiated on 53 occasions. A total of 74.7 hours was expended in this effort and 1839 miles were driven. Search duration extended from 0.1 to 3.8 hours. Objects were located on 24 occasions (45%) and resulted in 1 leucistic Sandhill Crane and 22 Whooping Cranes. Searches were terminated when the object was found or after a sufficient search effort was made.

Program ID and U.S. Fish & Wildlife Service ID Comparisons.--

Table 9 compares the Program numbering system with the USFWS database (Martha Tacha, personal communication). We had six Whooping Cranes in four groups present in the study area during the survey.

Table 9. Comparison of Program Crane ID and USFWS Crane ID.

Program Crane ID (Prefix 2009SP)	Program Name	USFWS Crane ID	Dates of Occurrence	# of cranes
01-15, 20, 23, 24, 26	Alda juvenile	09A-01	2/20-4/14	1
16	Shoemaker family	09A-06	4/7-8	3
17-19, 21, 22, 25, 27	Shelton juvenile	09A-07	4/7-15	1
28	Minden adult/juv?	09A-39	4/10-11	1

Summary of Confirmed Sightings in the U.S.--

The number of confirmed Whooping Crane sightings in Nebraska was 19 including those contained herein (Martha Tacha, personal communication). As of 7 July 2009, there were 39 confirmed sightings in the United States as follows: North Dakota- 6; South Dakota- 5; Nebraska-19; Kansas- 5; and Oklahoma- 4. Only 247 Whooping Cranes (22 juveniles) were expected to migrate from their wintering grounds this spring despite a record 270 (38 juveniles) present in December. A record 23 Whooping Cranes died on the wintering grounds this past season.

Discussion and Recommendations

This was the third migration for the *Rebar Marker Placement Protocol*. The placement of rebar did add some time and additional expense to the project; however, it was minimal. We estimate that implementation of this protocol added about 10-15 minutes to the amount of time it took to survey each river channel profile location. Feedback from follow-up surveys of these sites by the surveying team will aid the Technical Advisory Committee in determining the efficacy of this effort.

We offer the following comments/suggestions to the Technical Advisory Committee as a result of this season's effort.

Data Sheets

- Add "Use Site ID" and "Crane Group ID" to the Aerial Observations form.
- Add "walking" as an activity to the "….. Instantaneous and Continuous Use Site Monitoring" sheet.
- Change "….. Instantaneous and Continuous Use Site Monitoring" to Time Budget.

Microsoft Access Database

- Correct the "Aerial Surveys II" form so that the correct number of flights appears in the "WC Flight Surveys" table. Currently, an extra line is added in the table.
- Correct the ""Use Site Monitoring" for so that the correct number of records appears in the "WC Use Instantaneous Points" table. Duplicate points are added in the table.
- Present discharge during use and when measured including dates for both in a Table.
- Add "Crane Group ID" to the Use Characteristics form.
- Add "Use Site ID" and "Crane Group ID" to the Aerial Observations form and link it to the Whooping Crane locations Table.
- Change Ground Monitoring to Ground Search
- Delete "activity" in locations subform of Use Site Monitoring form.
- Delete "vegetation" in the instant points subform of the Use Site Monitoring form.
- Automate "instant point ids" in the Use Site Monitoring form.
- Round the UTM's to whole numbers in the Decoy Information table.
- Add a query to calculate count and percent of time in various habitats from the Use Locations table.
- Incorporate additional USFWS confirmed sightings of Whooping Cranes on the Platte River into this database so that it is all inclusive.

Methods

- 240 decoys have been placed since the inception of the Whooping Crane monitoring protocol. Consider whether it is necessary to continue collecting river profile information at decoy locations.
- Eliminate the placement of off-river (0-3.5 mi) decoys. There is a statistically significant sample of 80 attempts with fewer than 5 observations. Further trials will not alter these results.
- Develop a contingency plan for monitoring those Whooping Cranes present in the study area outside the survey dates.

Spring 2009 Expenses

The cost of field implementation of this project was about $65,323. The total cost of the Spring 2009 monitoring effort was about $74,200.

Supplements

Original Data Sheets

CD containing the Microsoft Access database, the MS Word final report file, and a complete set of electronic photographs.

Figure 1. Probable Whooping Crane locations 1.5 miles east of the Minden bridge (Sec 17 T8R14 Buffalo County) (Pierce property). Blue indicates riverine site and yellow indicates off-river sites. Locations based on aerial photographs of the bird (see CD supplement for photos).

Figure 2. Whooping Crane Use Sites 2, 1, 6-9 (left to right) (blue), and diurnal use areas (yellow=juvenile; red=family) south of I-80 between Alda and Grand Island.

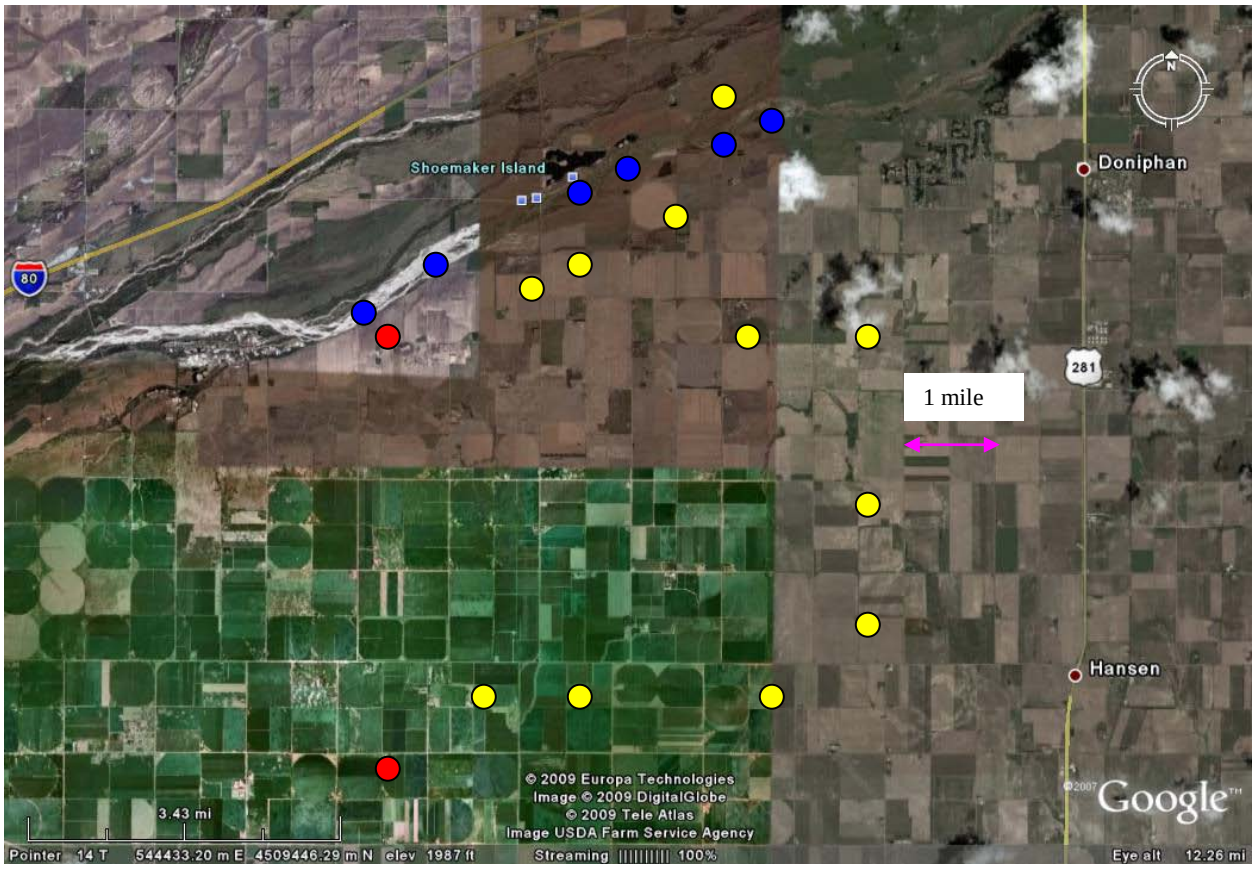

Figure 3. Whooping Crane diurnal use areas north of I-80 between Alda and Grand Island.

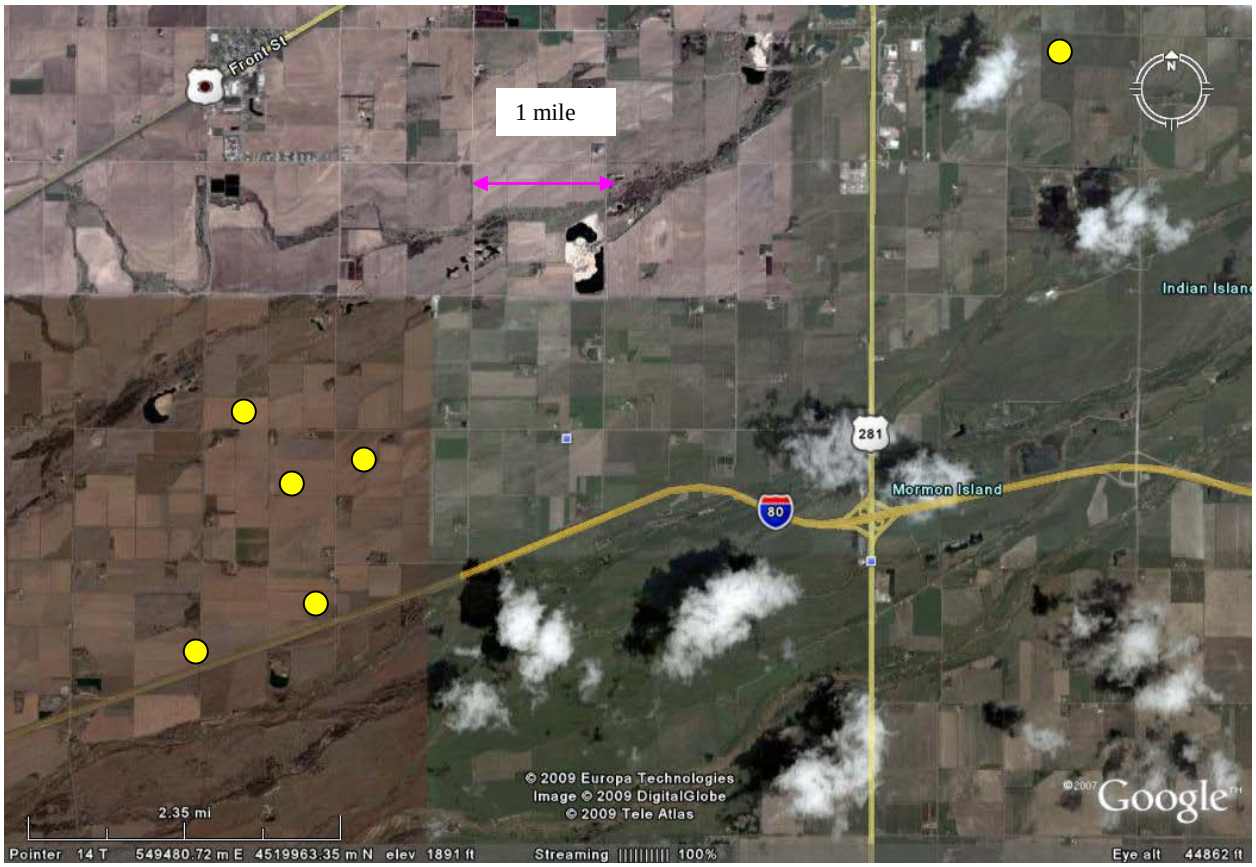

Figure 4. Whooping Crane Use Site 3-5 (blue) and diurnal use areas (yellow) south of I-80 near Denman.

Figure 5. Whooping Crane Use Sites 3-5 (blue) and diurnal use areas (yellow) north of I-80 near Shelton.

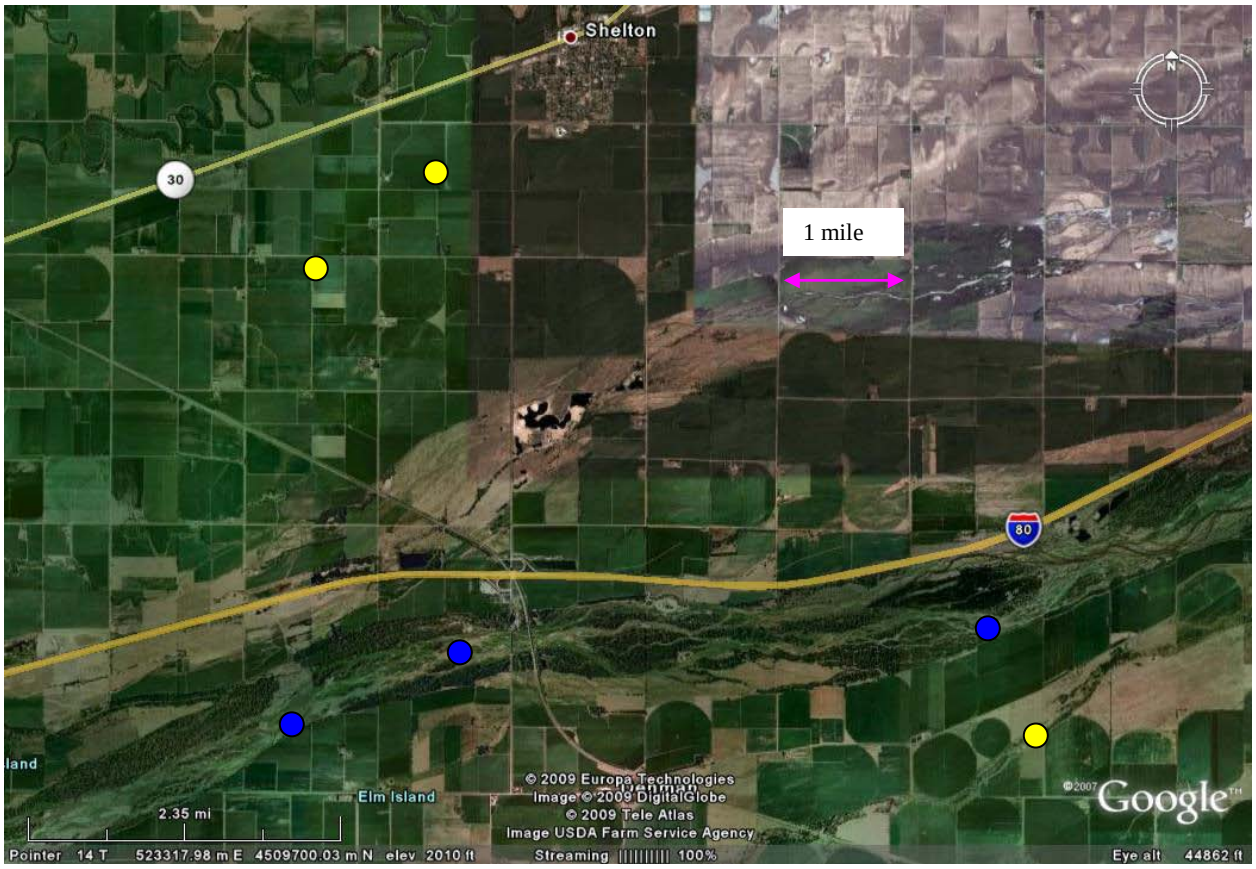

Figure 6. Platte River discharge (cfs) at Grand Island.

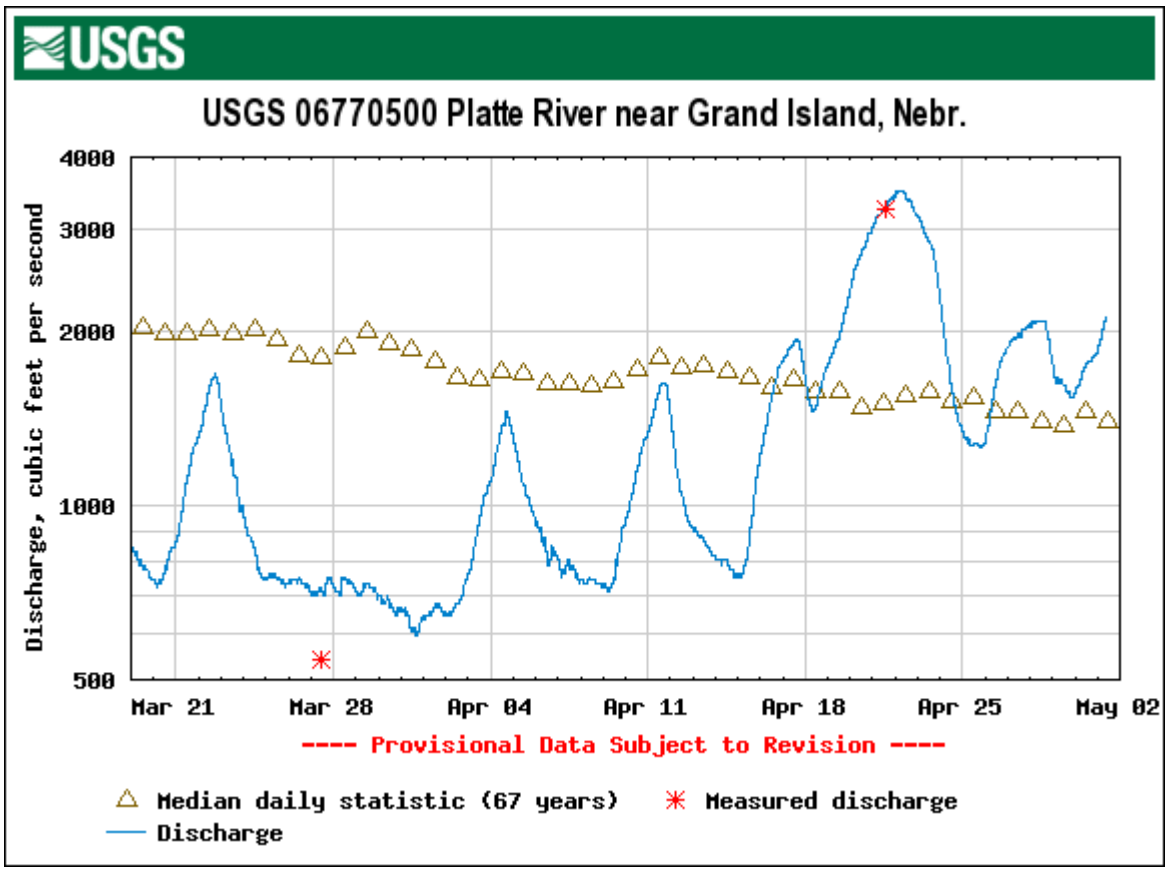

Figure 7. Platte River discharge (cfs) at Kearney.

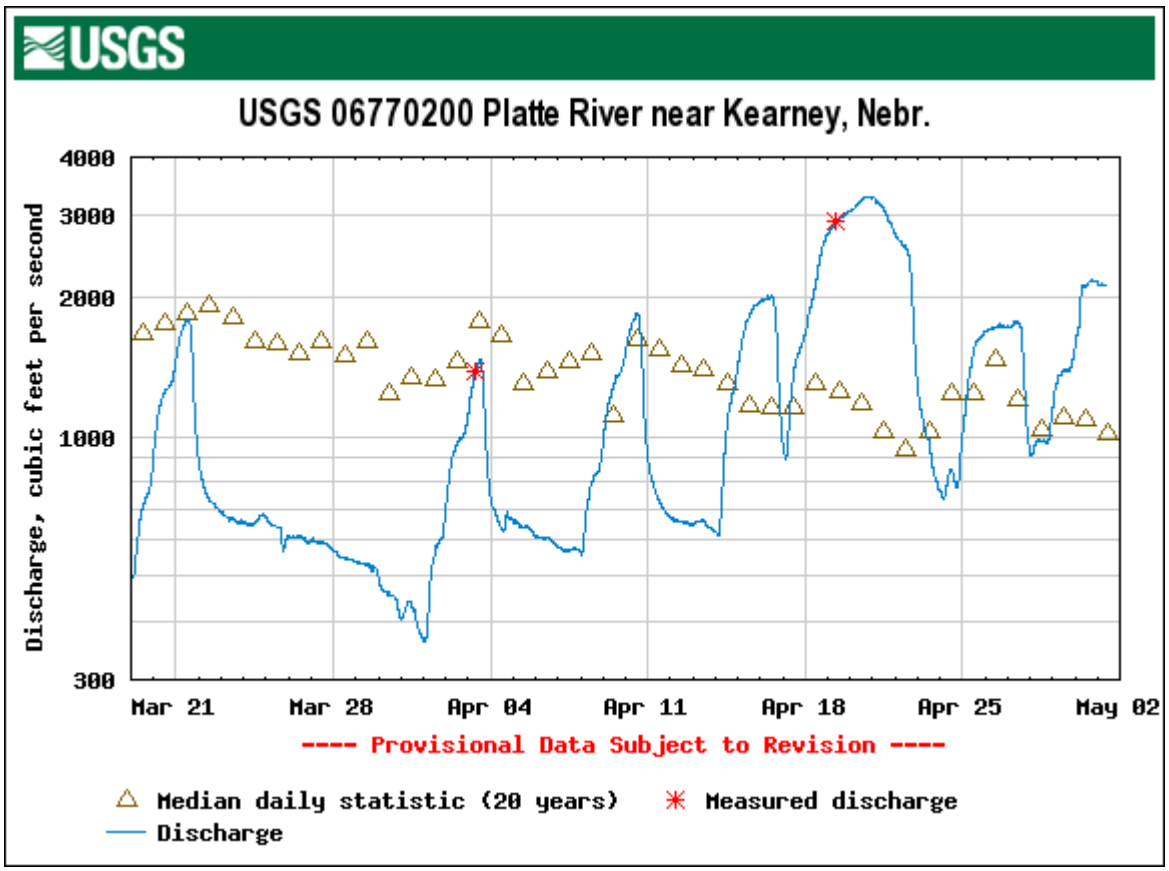

Figure 8. Platte River discharge (cfs) at Overton.

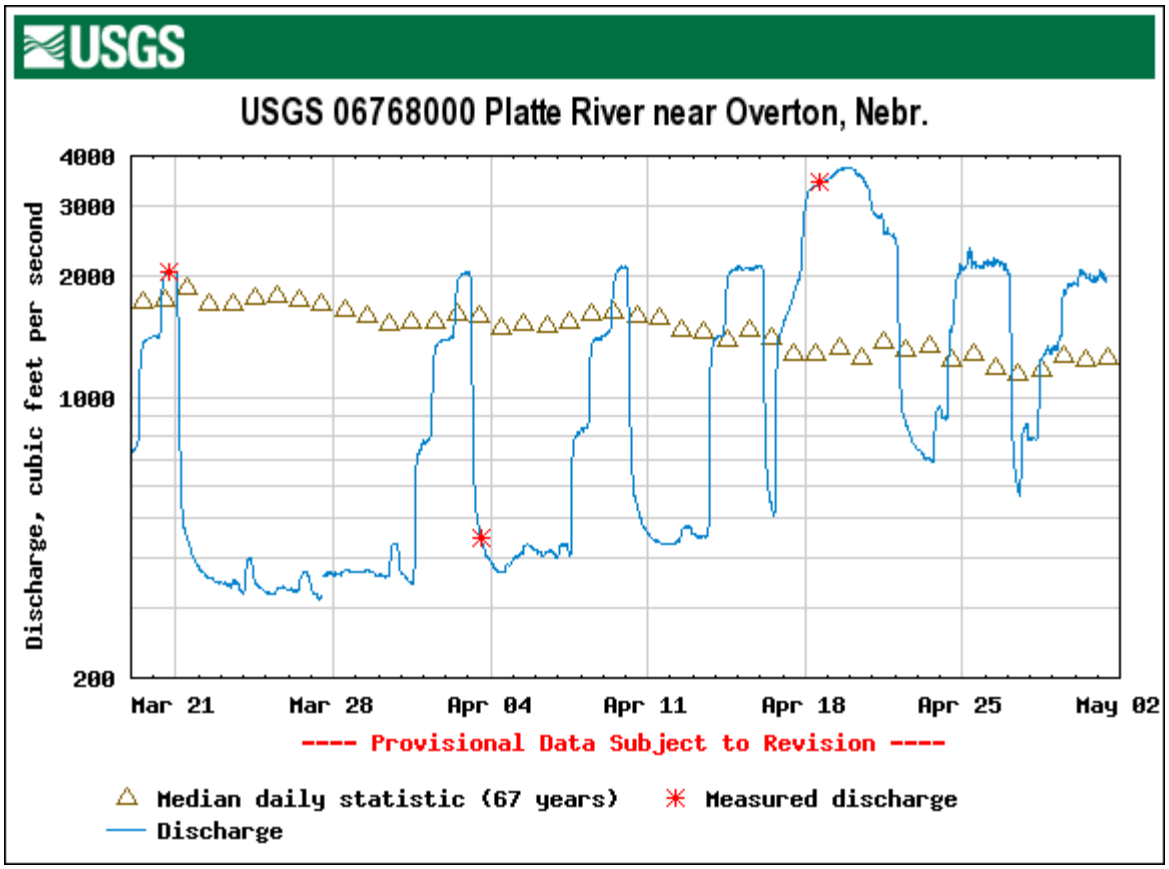

Figure 9. Roost channel profile for Use Site 1 (left to right bank).

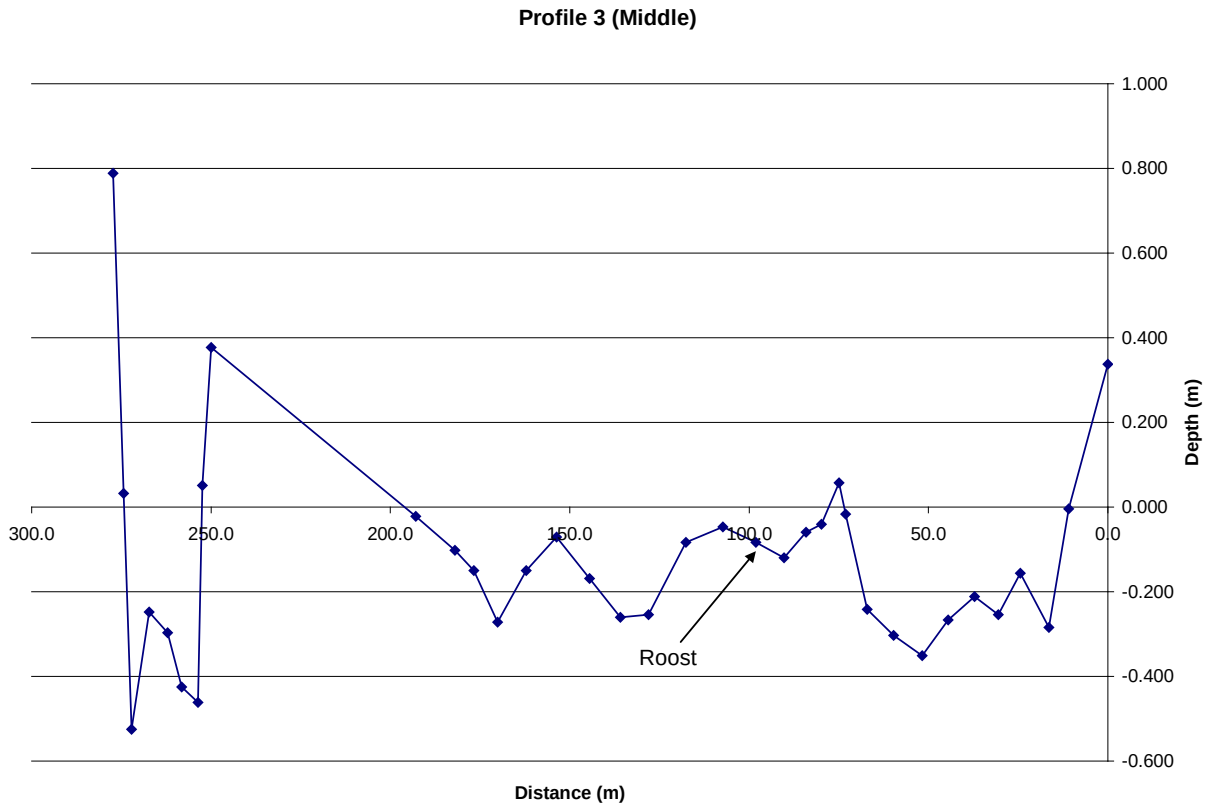

Figure 10. Roost channel profile for Use Site 2 (left to right bank).

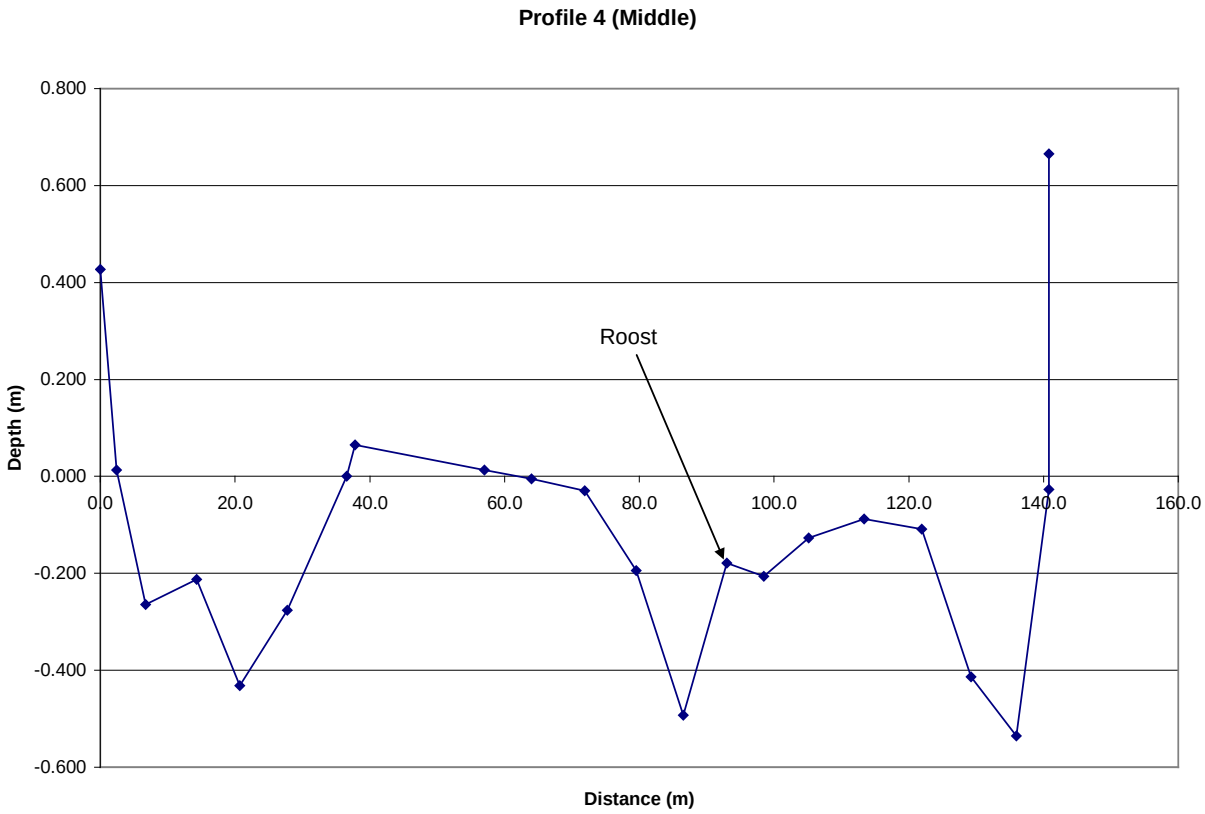

Figure 11. Roost channel profile for Use Site 3 (left to right bank).

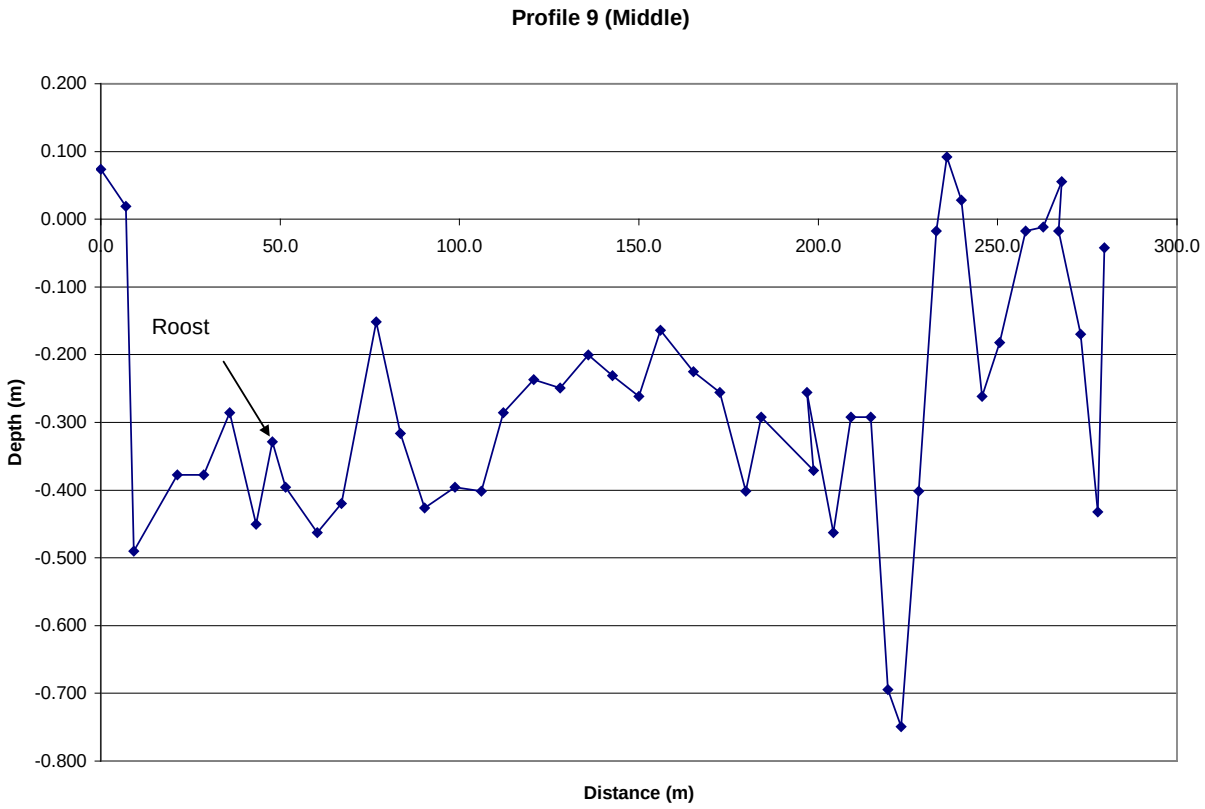

Figure 12. Roost channel profile for Use Site 4 (left to right bank).

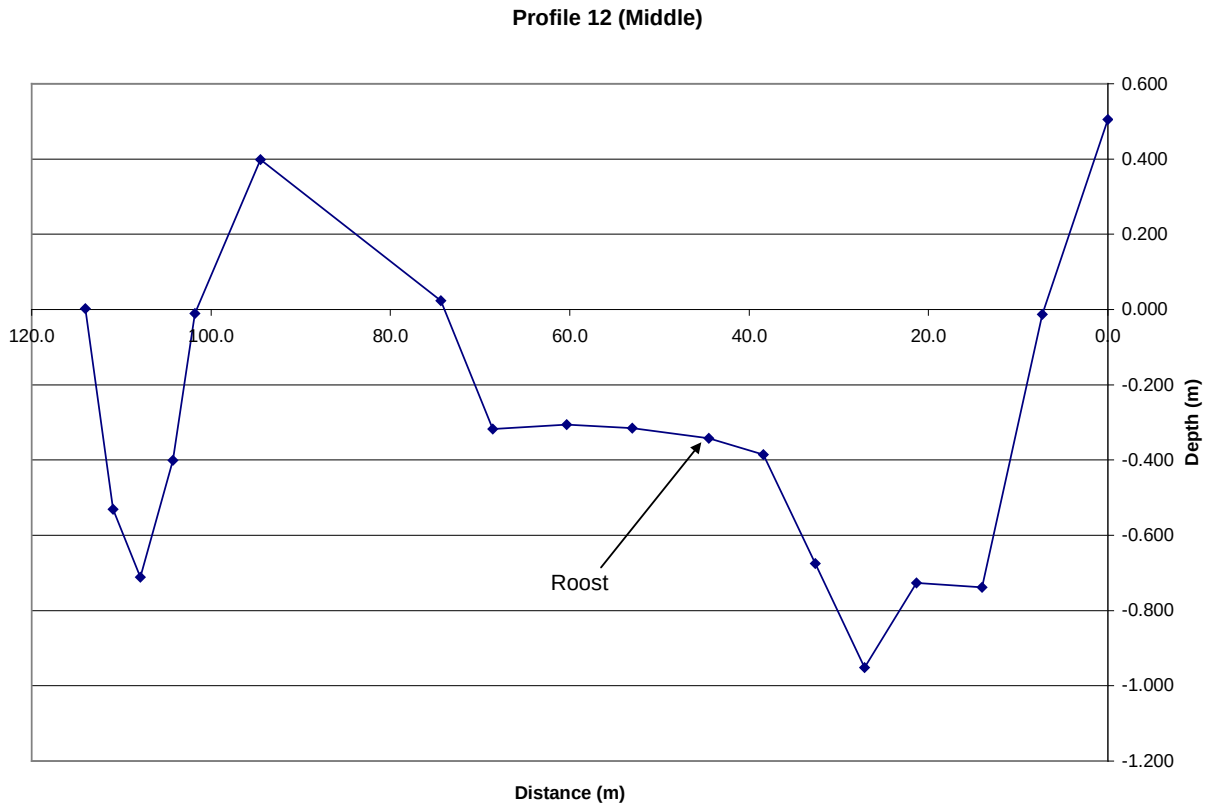

Figure 13. Roost channel profile for Use Site 5 (left to right bank).

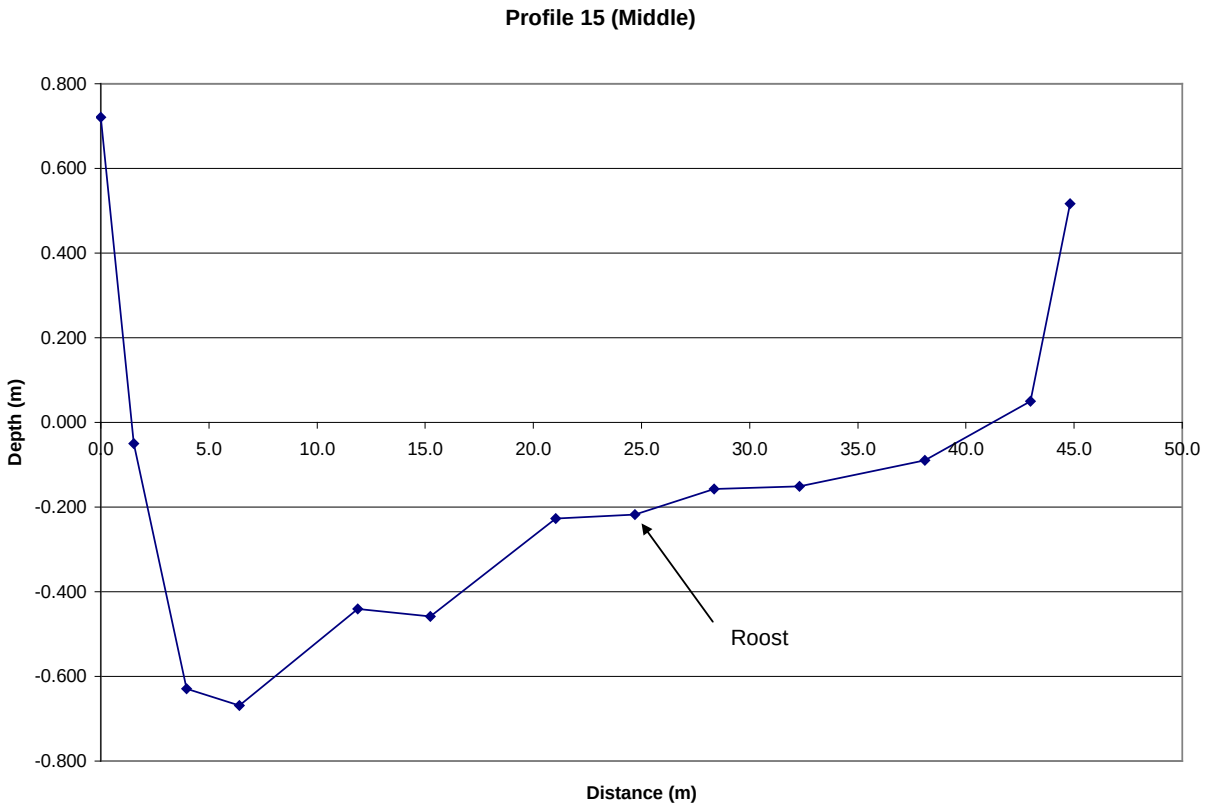

Figure 14. Roost channel profile for Use Site 6 (left to right bank).

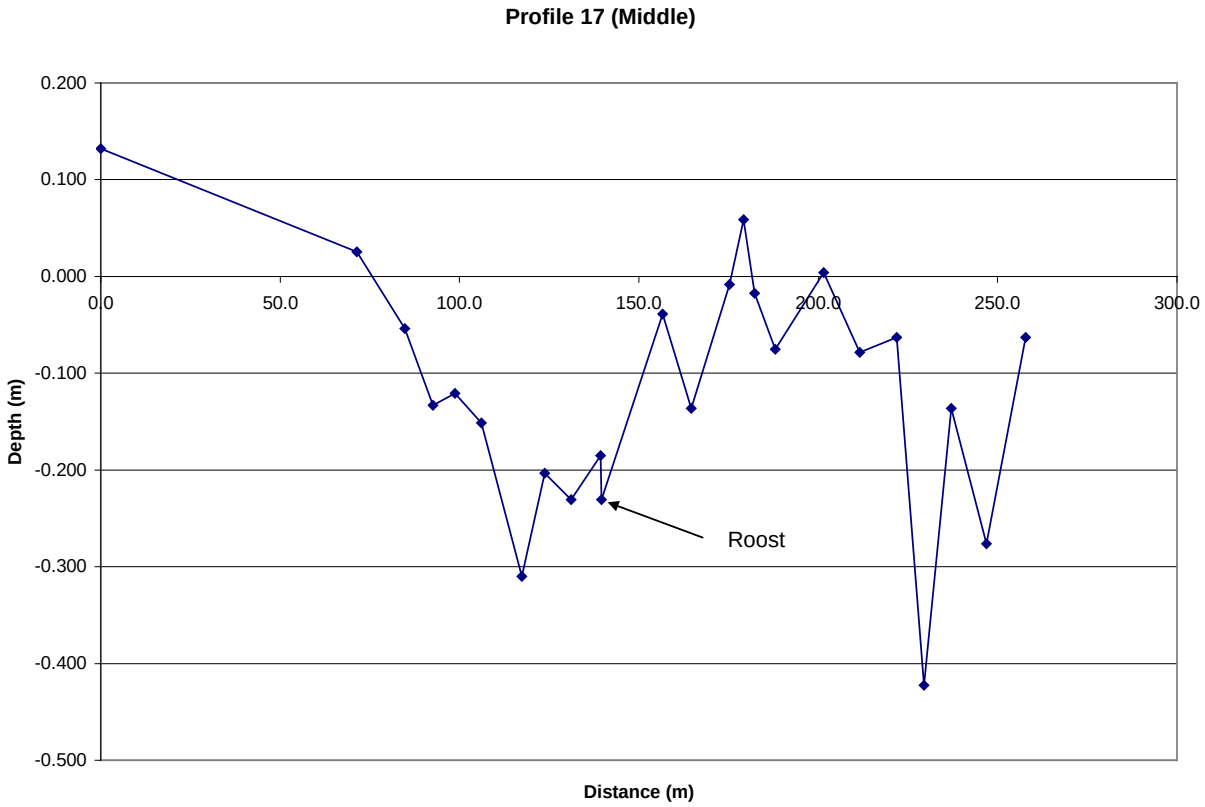

Figure 15. Roost channel profile for Use Site 7 (left to right bank).

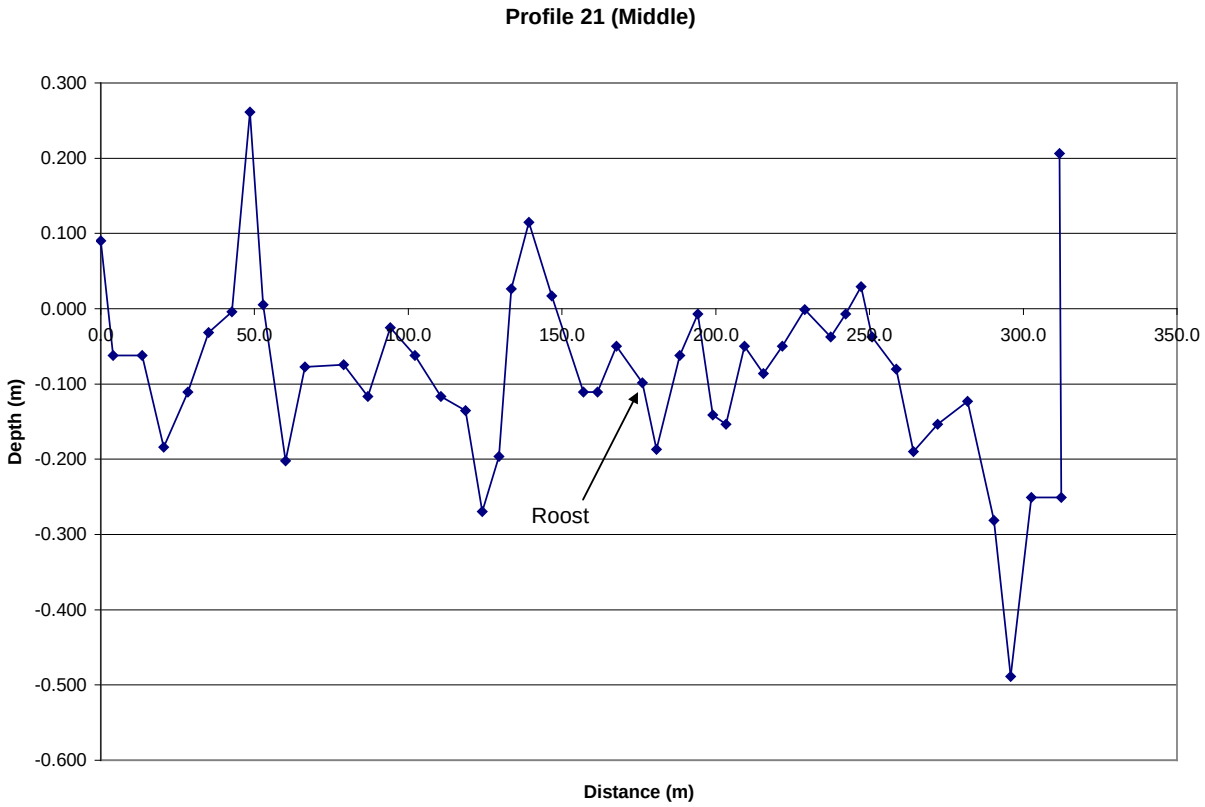

Figure 16. Roost channel profile for Use Site 8 (left to right bank).

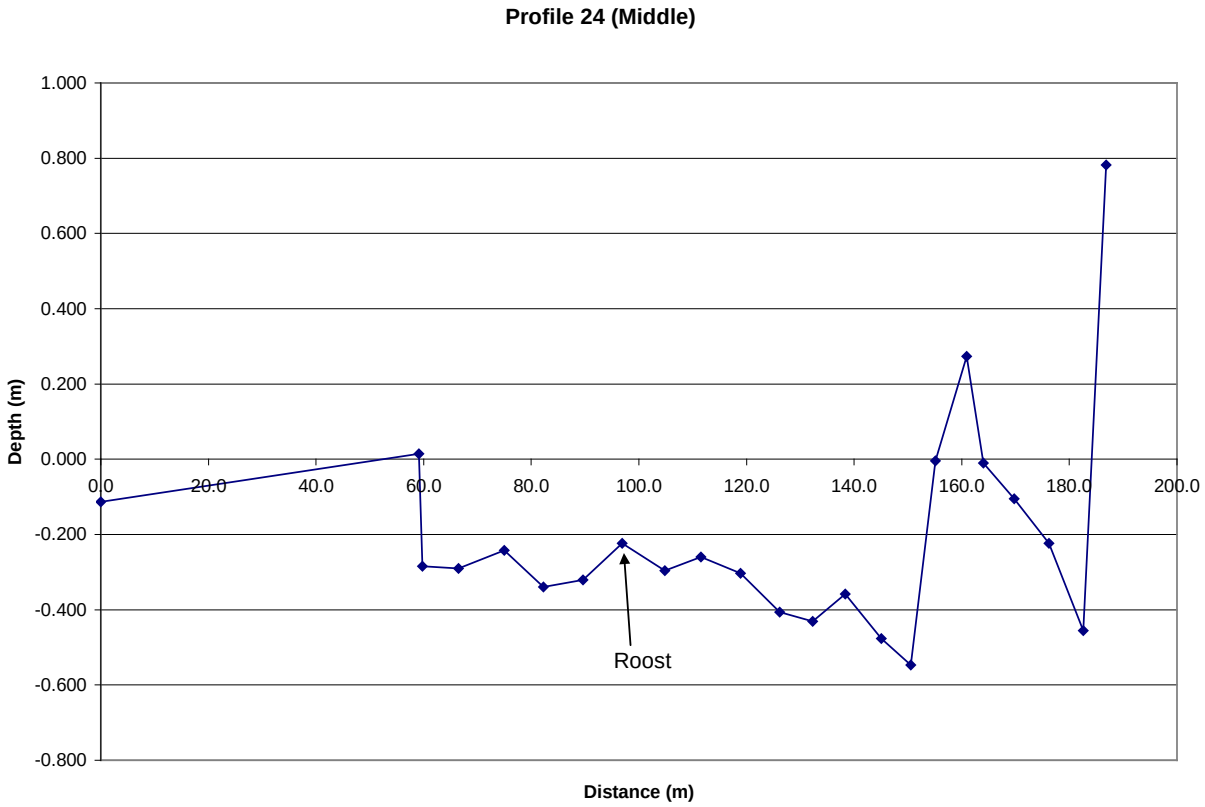

Figure 17. Roost channel profile for Use Site 9 (left to right bank).

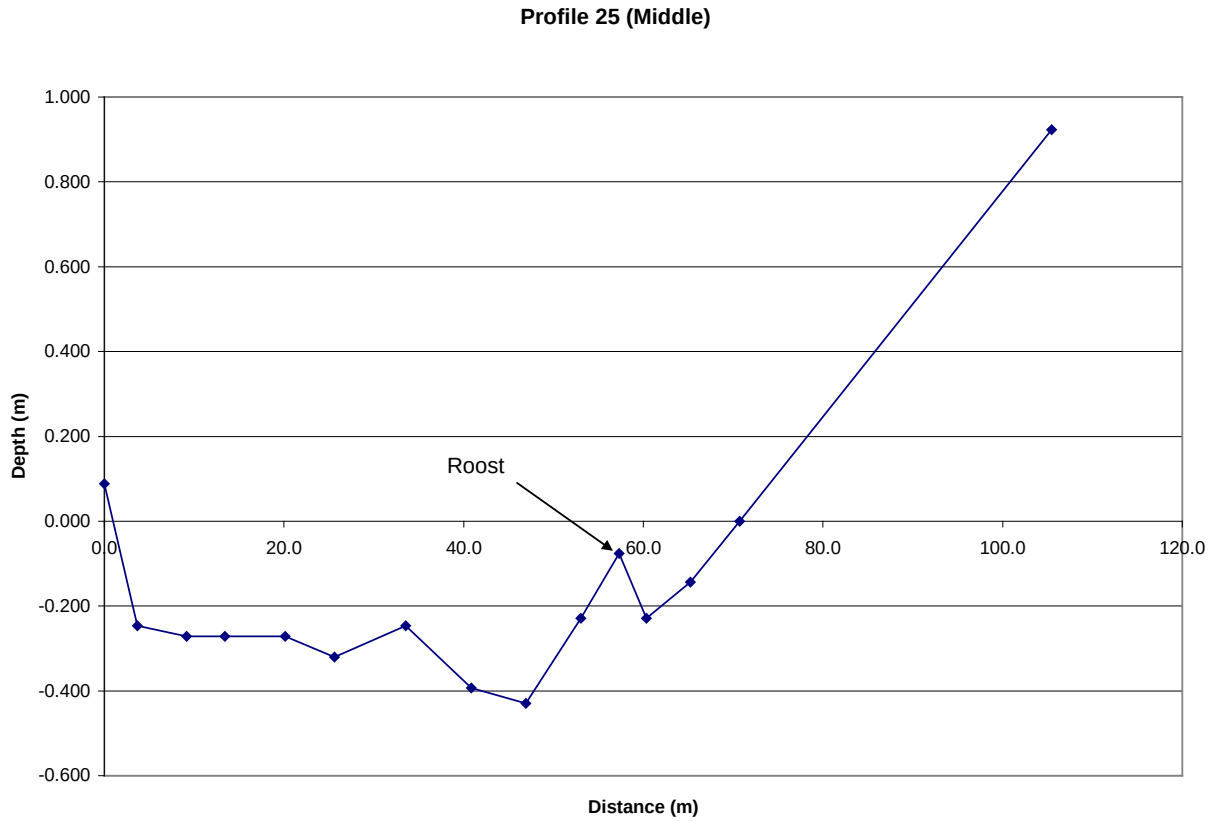

Figure 18. Whooping Crane Use Site 1 west of the Alda bridge (Sec 11 T9 R11 Hall County).

Upstream View

Left Bank View

Downstream View

Right Bank View

Figure 19. Whooping Crane Use Site 2 west of the Alda bridge (Sec 14 T9 R11 Hall County).

Upstream View

Left Bank View

Downstream View

Right Bank View

Figure 20. Whooping Crane Use Site 3 west of the Shelton bridge (Sec 34 T9 R13 Buffalo County).

Upstream View

Left Bank View

Downstream View

Right Bank View

Figure 21. Whooping Crane Use Site 4 west of the Shelton bridge (Sec 36 T9 R13 Buffalo County).

Upstream View

Left Bank View

Downstream View

Right Bank View

Figure 22. Whooping Crane Use Site 5 east of the Shelton bridge (Sec 26 T9 R12 Hall County).

Upstream View

Left Bank View

Downstream View

Right Bank View

Figure 23. Whooping Crane Use Site 6 east of the Alda bridge (Sec 6 T9 R10 Hall County).

Upstream View

Left Bank View

Downstream View

Right Bank View

Figure 24. Whooping Crane Use Site 7 east of the Alda bridge (Sec 5 T9 R10 Hall County).

Upstream View

Left Bank View

Downstream View

Right Bank View

Figure 25. Whooping Crane Use Site 8 east of the Alda bridge (Sec 5 T9 R10 Hall County).

Upstream View

Left Bank View

Downstream View

Right Bank View

Figure 26. Whooping Crane Use Site 9 east of the Alda bridge (Sec 33 T10 R10 Hall County).

Upstream View

Left Bank View

Downstream View

Right Bank View