Fall 2001 Whooping Crane Migrational Survey Protocol Implementation Report

Prepared by
Executive Director's Office

For
Committee's of the
Platte River Cooperative Agreement

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I. Introduction

The draft protocol, "Monitoring whooping crane migrational habitat use in the central Platte River valley", was implemented during the Fall 2001 migration season. The Technical Committee agreed by consensus at their July 25, 2001 meeting that the Whooping Crane Monitoring Protocol should be implemented in Fall 2001 by the Executive Director's office.

II. Methods

The draft protocol dated September 12, 2001 (Appendix A) was used to guide field activities. This protocol requires aerial flights during fall migration from October 17 to November 10 (the 10^{th} and 95^{th} percentile for initial observations of birds in Nebraska; Jane Austin, pers. comm.). Each crewmember was trained and tested on the protocol specifics at a training session held in Kearney, Nebraska on October 15, 2001. The U.S. Fish and Wildlife Service (USFWS) Nebraska Field Office was present at the training to describe the requirements for avoiding disturbance to migrating whooping cranes and facilitate communication between the crew and the USFWS during the monitoring season.

During each flight, four ground observers were stationed at bridges within the study area, one each at the Overton, Odessa, Gibbon, and Wood River bridges. Four-watt VHF hand held radios were used to communicate observations of possible whooping cranes from the planes to the ground crews. Ground crews were also available to respond to sightings of whooping cranes called into a publicized 800 number. The ground crew searched at least 2 hours for each sighting of a potential whooping crane reported by the aerial crew or incidentally. In-channel use site characteristics were measured for each use site and for 15 decoy locations. Three depth profiles were measured at each use site (one through the use location and one 25m on either side of the use location) using a stadia rod and transit.

The data collected during the implementation of the protocol was entered into an Access database modified after the Spring 2001 survey. Most analyses were conducted

through queries in Access. Profile measurements were output from Access into Matlab for interpolation and the calculation of relative elevations and widths.

Searcher efficiency trials were conducted to estimate the percentage of whooping cranes located by the aerial surveys. Sandhill crane decoys painted to look like whooping cranes were placed in random locations in the study area. The decoys were placed in the study area by the ground monitoring crew the evening prior to an aerial survey without knowledge by the personnel conducting aerial surveys.

Thirty-three points within the study area were selected as locations for searcher efficiency trials by overlaying systematically placed points on the "accessible" lands in the study area. Accessible lands are defined by the BOR GIS coverage titled *land_own.shp*. The systematic points were compiled from 207 points randomly placed from 0.5 to 3.5 miles north or south of points (one every 1/2 mile) along the main channel and from 104 points systematically placed with a random starting point (one every mile) along the main channel of the river for a total of 311 points. The two sets of points were selected to coincide with the aerial return (upland) and riverine flights respectively. Nine points were identified as "accessible" from the 207 upland points, and 24 points were identified as "accessible" from the 104 riverine points, respectively.

Twenty-five decoys were placed in the study area during flights from October 8 to November 9. These locations were assumed to be a random sample of points from the random sample of 33 decoy points. Estimates of searcher efficiency are based on the proportion of decoys seen and confidence intervals are calculated using a large sample approximation to a binomial proportion (Zar 1984).

III. Results

Aerial flights and the associated monitoring began on October 17, 2001, and the fieldwork was completed on November 10, 2001. Of the 25 total possible flight days, there were 22 aerial surveys flown in the eastern half of the study area and 19 aerial survey flights flown in the western half of the study area, resulting in 88% and 76% of the days in the east and west respectively that had adequate weather conditions for flight.

Each aerial flight covered the riverine transect on the first flight leg and one of 6 upland transects on the return leg (Table 1). The riverine transects were flown at an altitude of 750 feet while the return transects were flown at an altitude of 1000 feet. The six upland transects were aligned parallel to the river centerline and were located 1, 2, and 3 miles north and south of the river. The direction of flight was scheduled to alternate every day (river transect flown east to west one day and then west to east the next day), but was set into a fixed rotation with random start to comply with flight service needs (since the west to east flight requires an earlier departure, the flight service pilot would have had to determine if the flight had flown the day before to know when to arrive at the airport).

There was 1 observation of a whooping crane group during the aerial surveys (Table 2). This sighting of one bird was on October 23 and was observed standing in the water within the channel of the Platte River approximately 400m upstream from Audubon's Rowe Sanctuary headquarters (Figure 1). The UTMs for the location were 4502035 Northing and 509186 Easting and the legal description was T8N, R14W, S10, SW ¼. This crane was not observed by ground monitoring personnel (searches were made for 5.75 hours) but was confirmed as a whooping crane during the flight by an

experienced observer. The plane circled down to an elevation of 500 feet and the observer noted the crane bending its neck down to the water. The ground location was determined using the aerial flight notes and a digital photograph taken of the crane during the flight. Use site characteristics were measured at this whooping crane location on November 9.

The Program crane group number for the above observation was 2001FA01 and the use site was location A. The USFWS classified this as a confirmed sighting with the number 01B-13 (Wally Jobman, USFWS, personal communication). There was one other sighting confirmed by the USFWS in the study area during the 2001 fall migration (Table 3). Local resident Rex Hand made this sighting on November 4, 2001 at 3pm. The group was composed of 2 adults and 1 juvenile and was observed at T8N, R14W, S16, NE ¼, NE ¼; 2-¾ mi East of the Hwy 10 bridge. Because this information was not relayed to the monitoring crew until on November 13 (after the monitoring period), the ground crew did not search the area, use site characteristics were not measured, and the group did not receive a Program crane group number.

There were no incidental observations relayed to the monitoring crew through the 800 number during the monitoring time period. One incidental observation was forwarded to the monitoring crew through air service personnel. The information detailed an observation on October 19 during an aerial survey with Jeff Drahota from USFWS Rainwater Basin Office. The ground monitoring crew searched the area of the observation for 2.5 hours and did not locate the group. All results presented below are based on sightings from the systematic aerial surveys.

III.A. Land cover class

The use site located by this survey was in the wetted channel. The distance from the riverine use site to the nearest potential disturbance, a house on the Rowe Sanctuary, was 517 meters.

III.B. Distances to visual obstruction >1.5m

The nearest objects greater then 1.5 meters in each of four quadrants were 10 meter high trees at 160 meters in the upstream quadrant, 2 meter high bank and vegetation at 106 meters in the right quadrant, 4 meter high trees at 132 meters in the downstream quadrant, and 12 meter high trees at 352 meters in the left quadrant. If the distances in each quadrant are squared, multiplied by ¼π, and summed, there was an estimated 139929.68 m^2 (13.99 hectares) of unobstructed area around the use site.

III.C. Flow

The riverine use site was located between the Grand Island and Kearney gages. The uncorrected hourly average flows during the assumed crane use time (7:30 pm October 22 to 7 am October 23, 2001) were 289.53 cfs at Kearney and 974.50 cfs at Grand Island (Table 4). The uncorrected hourly average flows during the use site measurements (from 11:30 am to 3:00 pm on November 9, 2001) were 187.00 cfs at Kearney and 443.00 cfs at Grand Island. There was a stage difference between the use date and profile measurement date of 0.13 feet (0.039 meters) at the Kearney gage, and a difference of 0.34 feet (0.104 meters) at the Grand Island gage (Figures 2, 3, 4 and 5).

No attempt has been made in this report to adjust the flow related measurements to the flow conditions on the date of bird use.

III.D. Substrate

The substrate at the use site was qualitatively recorded as 50% fine sand and 50% coarse sand.

III.E. Width of Unobstructed View

Unobstructed view was calculated as the width of the channel between obstructions on the three profiles measured at the crane observation. The width at the middle transect was 372.16 meters. The average of these estimates across the three transects was 375.51 meters (95% CI: 341.72, 409.30) (Table 5).

Bank to bank width was calculated as the distance between banks on the three profiles measured at the crane observation. The bank to bank width at the middle transect was 347.79 meters. The average of these estimates across the three transects was 367.39 meters (95% CI: 328.67, 406.12) (Table 5 and 6).

III.F. Water width

Water width was calculated as the distance of water along the bank to bank profile. The width at the middle transect was 135.30 meters. The average of these estimates across the three transects was 131.86 meters (95% CI: 128.18, 135.54) (Table 6).

Conversely, land width was calculated as the distance of land along the bank to bank profile. The width at the middle transect was 212.49 meters. The average of these estimates across the three transects was 235.53 meters (95% CI: 196.25, 274.82) (Table 6).

III.G. Relative Sandbar Elevation

Relative sandbar elevation was calculated by averaging the elevations at and above water level every 0.01m along the bank to bank profile (Figure 6). A linear interpolation between the two adjacent data points was used to estimate elevation between measured points. The relative sandbar elevation at the middle transect was 0.38 meters. The average of these estimates across the three transects was 0.32 meters (95% CI: 0.23, 0.42) (Table 6).

III.F. Water depth

Water depth was calculated by averaging the relative elevations at and below water level every 0.01m along the bank to bank profile. A linear interpolation between the two adjacent data points was used to estimate elevation between measured points. The water depth of the middle transect was 0.09 meters. The average of these estimates across the three transects was 0.09 meters (95% CI: 0.08, 0.11) (Table 6).

The portion of the bank to bank width that was less than 0.7 feet in depth was 125.86 for the middle channel. The average of these estimates across the three transects was 124.11 meters (95% CI: 120.23, 127.98) (Table 6).

IV. Fall 2001 Searcher Efficiency Estimates

Searcher efficiency estimated following the sampling plan results in upland and riverine estimates (Table 7). The analysis estimates the percentage of the 25 decoys detected by the aerial flights. For accessible lands in the upland study area, 20.0% (95% CI: 13.7%, 26.3 %) of the decoys were observed by the aircrew. For the riverine accessible lands, 45.0% (95% CI: 42.6%, 47.4%) of the decoys were observed by the flight crew. Estimates of searcher efficiency from this implementation were based on flights at altitudes of 1000 feet for the return strata (upland) and 750 feet for the riverine strata and conditions associated with a fall survey.

V. Fall 2001 Monitoring Costs

The cost of field implementation and report writing by the Executive Director's office was approximately $60,000.

VI. Recommended Changes for Future Implementation of the Protocol

The following recommendations are based on discussions at the Whooping Crane Subcommittee meeting November 8, 2001.

1. Add a 7th return transect directly over the river. This transect would be added into the return transect rotation (will be flown once every 7 flights). The 7 return transects will be one strata that are always flown on the return and will cover the entire study area. This will survey the area immediately adjacent to the river that is currently not surveyed. Both observers should look out the same side of the plane at the river for the outgoing riverine transect only. Observers will look out different sides of plane during the return transects.

2. Surveys should begin within ½ hour before and 2 hours after sunrise to allow later flights during foggy weather.

3. River transects should be flown at 750' and return transects at 1000' to comply with air service needs.

4. Continue Fall flights until 80% of the crane population is reportedly at Aransas, based on the most recent population estimates.

5. Biologists participating in the survey should be allowed to get closer to cranes on foot after completing training by the USFWS.

6. A confirmed WHCR designation should be assigned to sightings from the air and on the ground if the observers are experienced and confident of the sighting.

7. Profile transects should extend from the crane location until reaching vegetation or landforms that are greater than 1.5 m high and that can't be seen through. Also, items

that are greater than 1.5 m high but can be seen though should be recorded on the datasheet.

VII. References

Zar, J. H. 1984. Biostatistical Analysis. 2nd edition. Prentice-Hall, Inc, Englewood Cliffs, N.J. pp. 718.

APPENDICIES

A. Protocol: Monitoring whooping crane migrational habitat use in the central Platte River valley – dated September 12, 2001

B. Data tables:

- Observers
- Decoy Information
- Profiles
- Crane Group ID
- Profiles Header
- Survey Details
- Activity Log
- Flight Observations
- Flight Surveys
- Ground Monitoring
- Use Characteristics
- Use Locations
- Use Site Monitoring Header

Table 1. Distribution of upland (transects 1, 2, and 3) and riverine (transect 0) transects flown for the Fall 2001 survey.

Transect ID	Number of Surveys
East Transects	
0	22
1	8
2	7
3	7
West Transects	
0	19
1	6
2	6
3	7

Table 2. Whooping crane groups observed during the aerial surveys. The first digit of the transect variable is the number of miles from the main channel of the river, second digit is the side of the channel (N= north, S=south), third digit is the flight leg (East or West).

Flight Date	Transect ID	Crane Group Size	Confirmed WHCR (Y/N)	Program Crane Group #	Location ID
10/23/01	0SE	1	Y	2001FA01	A

Table 3. Relationship of the crane group numbers assigned by the Program to the numbers assigned by the USFWS during fall migration 2001. Program information was not obtained for USFWS crane group 01B-37.

Program Crane Group #	USFWS Crane Group ID	Program Riverine Use Site IDs	Program Non-Riverine Use Site IDs	Dates of Use
2001FA01	01B-13	1	None	10/23/2001
None	01B-37	None	None	11/04/2001

Table 4. Mean discharge (cfs) and stage (ft) from hourly provisional data at the Kearney and Grand Island gages during 1) crane use averaged over 7:30 pm to 7 am on October 22 to 23, 2001 and 2) measurements at the use site averaged over 11:30 am to 3:00 pm on November 9, 2001.

Date	GAGE	Mean Discharge (cfs)	Standard Error of Discharge	Mean Stage (ft)	Standard Error of Stage
10/22-23/2001	6770200 - Kearney	289.53	10.00	2.58	0.01
10/22-23/2001	6770500 - Grand Island	974.50	4.02	1.86	0.00
11/9/2001	6770200 - Kearney	187.00	2.86	2.45	0.00
11/9/2001	6770500 - Grand Island	443.00	0.00	1.52	0.00

Table 5. Average unobstructed and bank to bank width (meters) at riverine profile transects. Averages were made across the 3 transects (through the crane use site, a parallel transect 25m upstream, and a parallel transect 25m downstream) measured at the riverine use site.

Riverine Use Site ID	Width Type	Mean Width	Standard Error
1	Obstruction to Obstruction	375.51	17.24
	Bank to Bank	367.39	19.76

Table 6. Water width, land width, total width, width less than 0.7 feet, average elevation, depth and height (meters) from bank to bank of riverine use transects. Data for the average was obtained at equally spaced intervals (0.01m) from a linear interpolation of the field data.

Riverine Use Site ID	Transect	Water Width	Land Width	Total (bank to bank) Width	Width of water < .7 ft	Relative Elevation	Relative Depth	Relative Land Elevation
1	Upstream	131.45	275.46	406.91	120.16	0.21	0.10	0.37
	Middle	135.30	212.49	347.79	125.86	0.20	0.09	0.38
	Downstream	128.83	218.65	347.48	126.30	0.11	0.08	0.22

Table 7. Number of decoy searcher efficiency points in each detectability strata for Fall 2001.

Area (miles from centerline of river)	Systematic Points	Accessible Points	Decoys Placed	Decoys Observed	Searcher Efficiency
Upland (0.5 to 3.5)	207	9	5	1	20.0%
Riverine (0)	104	24	20	9	45.0%
Total	311	33	25	10	

Figure 1. Location of October 23, 2001 sighting in bridge segment 7.

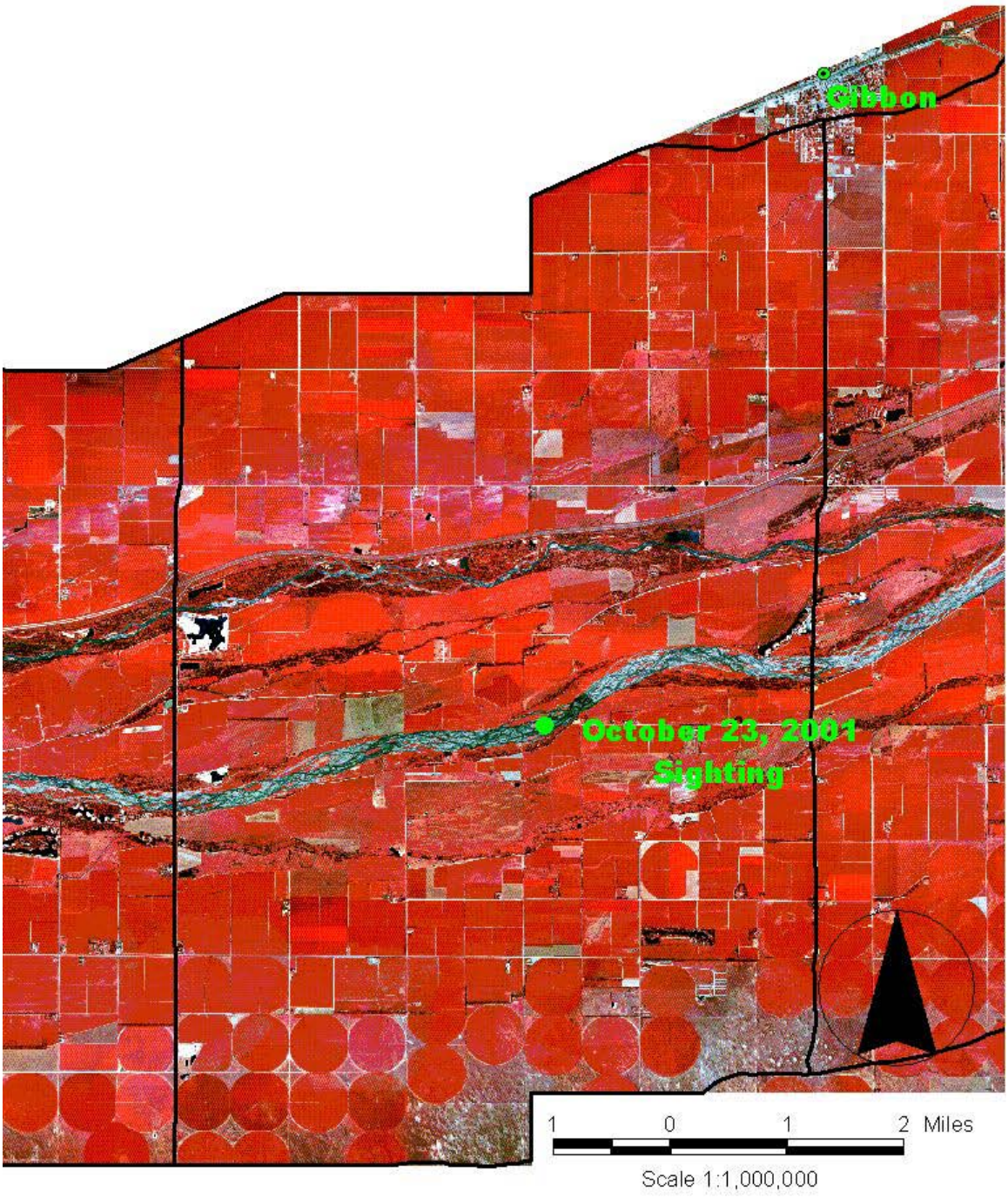

Figure 2. Discharge (cfs) at Kearney, Nebraska (Gage No. 06770200) during protocol implementation.

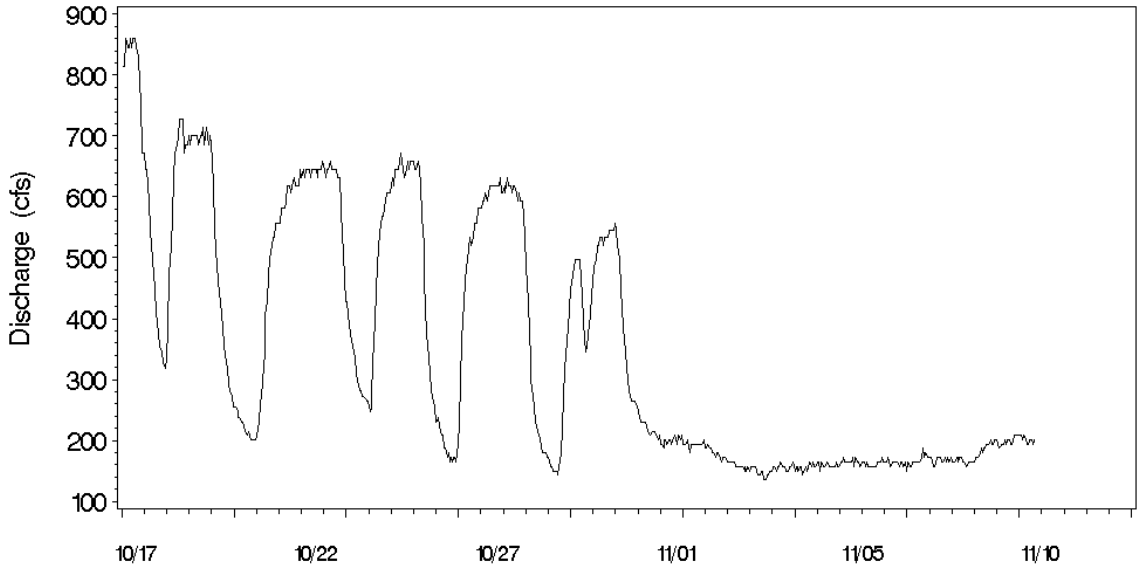

Figure 3. Stage (ft) at Kearney, Nebraska (Gage No. 06770200) during protocol implementation.

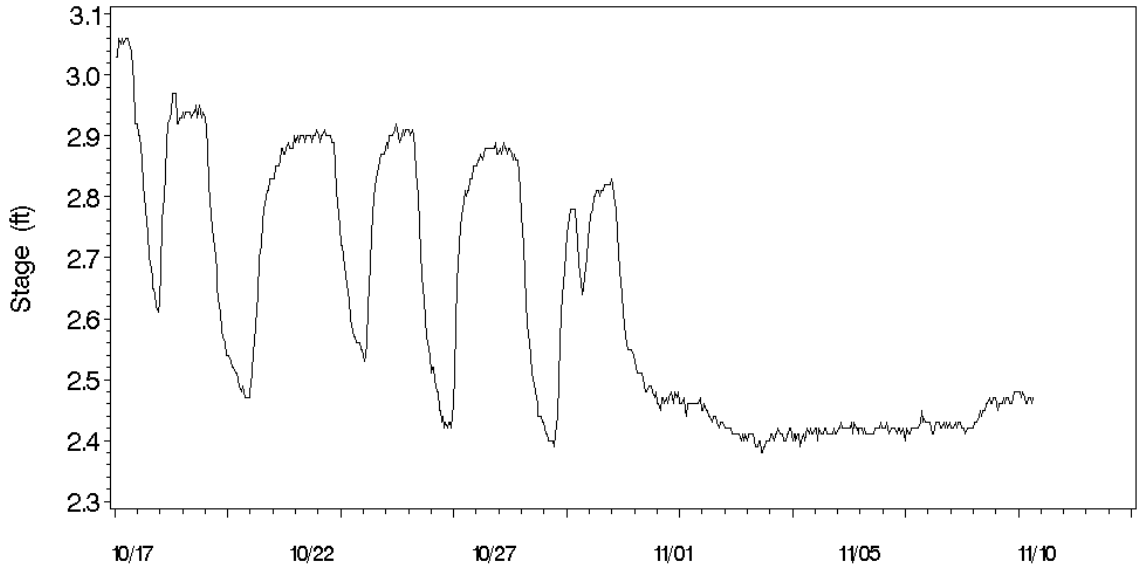

Figure 4. Discharge (cfs) at Grand Island, Nebraska (Gage No. 06770500) during protocol implementation.

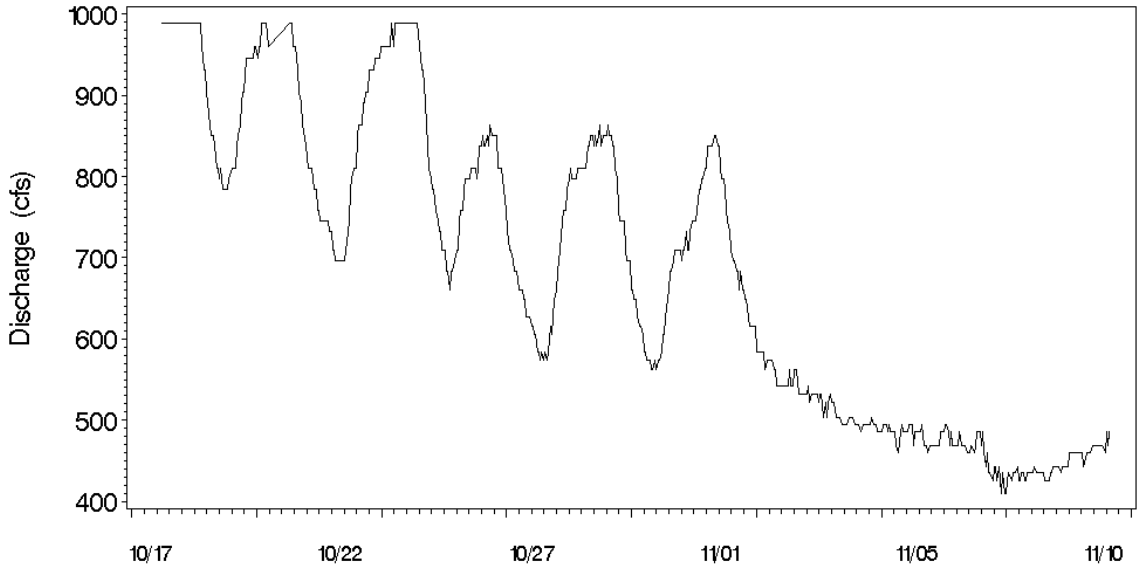

Figure 5. Stage (ft) at Grand Island, Nebraska (Gage No. 06770500) during protocol implementation.

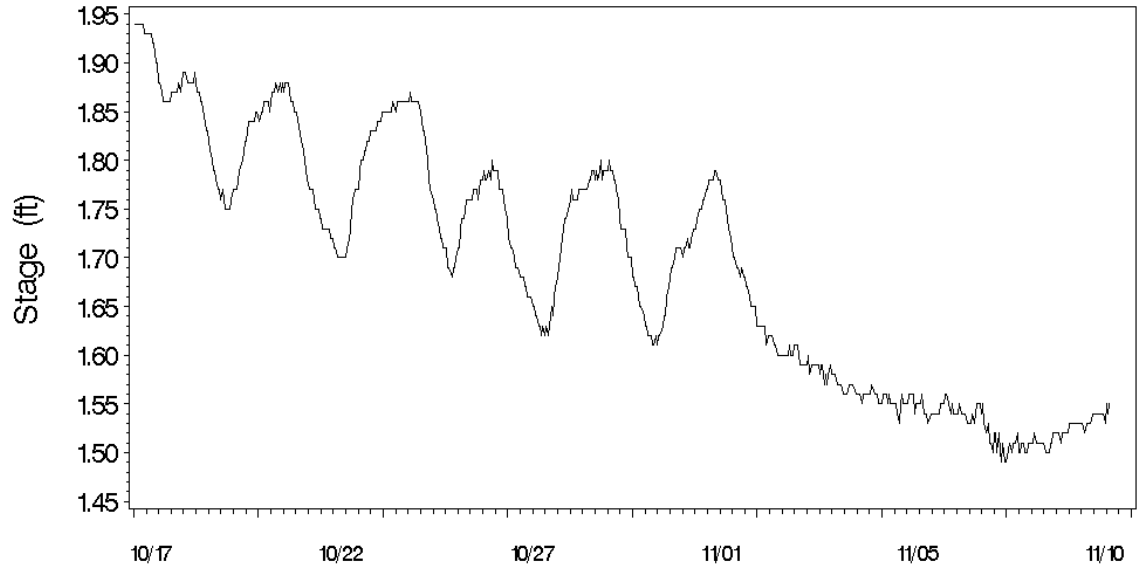

Figure 6. Depth profiles for three transects measured in the vicinity of riverine use site 1, used March 24, 2001. The solid circle on the middle transect is the use location.