Spring 2001 Whooping Crane Migrational Survey Protocol Implementation Report

Prepared by
Executive Director's Office

For
Committee's of the
Platte River Cooperative Agreement

November 19, 2001

I. Introduction

The draft protocol, "Monitoring whooping crane migrational habitat use in the central Platte River valley", was implemented for testing during the Spring 2001 migration season. A contract was awarded to Assessment Impact Monitoring Environmental Consulting (AIM) on March 6, 2001 to implement the protocol. Aerial flights and the associated monitoring began on March 18, 2001, and the fieldwork was completed on April 30, 2001. Data sheets, maps, photographs, a draft summary report, and recommendations for modifying the protocol were provided by AIM to the Technical Committee (TC) through the Executive Director's office (EDO) on May 18, 2001 with a revised final report provided on August 16, 2001. The EDO designed a Microsoft Access database and entered the data, while AIM reviewed the database for accuracy and provided additional data and clarifications. This report summarizes the data and provides recommendations for modifying the protocol.

II. Methods

The contract with AIM specified the implementation of the protocol dated February 23, 2001 (Appendix A.). AIM was provided with datasheets (Appendix B) and guidance in protocol interpretation from the EDO and TC during a training session in Kearney, Nebraska. The U.S. Fish and Wildlife Service Nebraska Field Office was also present at the training to facilitate communication during the monitoring season and to train observers in whooping crane identification.

An Access database was designed to hold all the data collected during the implementation of the protocol (Appendix C). Five tables are in the database and can be linked on crane group ID, observation date, and location ID. The raw datasheets are in the AIM report and stored in the Platte River Project library maintained at the EDO. The tables in the database are:

- Activity Log- The data for this table comes from the Activity Log data sheet. One record in this table corresponds to one location used by a crane group. There are 36 records in this table in the database.
- Use Data- The data in this table comes from the Location Log data sheet and pages 1 and 2 of the Use Site Characteristics data sheet. One record in this table corresponds

to one location used by a crane group. There are 40 records in this table in the database.

- Use Profiles- The data in this table comes from the profile measurements on the Use Site Characteristics data sheet. One record in this table corresponds to one point along a depth profile measured at riverine use sites. There are 1241 records in this table in the database.
- Flight Data- The data in this table comes from the Aerial Survey Log. One record corresponds to one leg of an aerial survey flight. There are 110 records in this table in the database.
- Flight Observations- The data in this table comes from the Aerial Survey Log. One record corresponds to an observation of whooping crane (WHCR) or decoy during an aerial flight. There are 20 records in this table in the database.

Independent ground surveys were conducted by the Nebraska Wildlife Federation's Whooper Watch program. The EDO at the request of the TC drafted a ground survey protocol for implementation during Whooper Watch (Appendix D). Two driving survey routes were defined in each of the 12 bridge segments, one on the North and one on the South side of the river (Appendix E).

III. Results

The February 23, 2001 draft protocol directs aerial flights during spring migration, classified as the period from March 18 to April 30 for a total of 44 flight days. Due to weather there were only 30 aerial survey flights flown in the Eastern half of the study area and 25 aerial survey flights flown in the Western half of the study area. Two of the returning surveys (flying east) in the Eastern half were aborted due to bad weather, resulting in 66% and 57% of the 88 possible flight legs (44 flight days, a riverine and upland leg each day) 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 travelling West and one of 6 upland transects on the return leg travelling East. The six upland transects were aligned parallel to the riverine transect and were located 1, 2, and 3 miles North and South of the river. AIM designated the order of the return flights to be 1S, 1N, 2S, 2N, 3S, 3N and repeated this order though the 44 flights. AIM did not deviate from this order when a scheduled flight was cancelled, resulting in a different number of flights for each transect (Table 1).

There were five observations of whooping crane groups during the aerial surveys (Table 2). The protocol used during implementation did not attempt to define 'new' crane groups so there is no estimate of the number of individual crane groups the five observations represent. There were many possible sightings of whooping crane groups by the aerial flight crew. Possible sightings are defined as sighting reports from the aerial crew to the ground crew, and are requests for confirmation of the sighting by the ground crew. These sightings could not be designated as anything other than a whooping crane group by the aircrew. In following up the possible sightings on the ground, five possible sightings were confirmed as crane groups, six possible sightings were unconfirmed (i.e., the "white object" was never located on the ground), and an unknown number of possible

sightings were found to be something other than a whooping crane on the ground (i.e., the ground crew located the white object and it was not a whooping crane).

Ninety-four ground survey routes, totaling 1976 miles, were driven by Whooper Watch participants between March 20, 2001 and April 20, 2001 (Table 3). There was 1 crane group detected. One group of 3 cranes was detected on April 11, 2001 by Larry Rogers, Nebraska Wildlife Federation Whooper Watch Coordinator, and was confirmed by the USFWS as sighting 01A-07 (Wally Jobman, USFWS, pers. comm.). This crane group (01A-07) was located in T8N, R13W, Section 8, South ½. The location of this group was not forwarded to the ground monitoring crew in time to observe use sites or measure use site characteristics. Therefore this crane group did not receive a Program number and is not in the database.

Use site characteristics were measured at each location a whooping crane was sighted by the air crew, tracked by the ground crew, or reported by public. The protocol did not define the movements or actions required by a crane group to constitute a new use location. During the spring 2001 implementation, AIM designated a new location for a whooping crane group whenever the group flew between two locations. There were 36 unique use sites identified during the ground monitoring by AIM (Figure 1). One of the riverine use sites was observed in use on two consecutive days resulting in 37 use sites.

The 37 use sites were entered in the Program dataset as representing use sites by either crane group 01 or 03 (Table 4). The USFWS classified all confirmed sightings resulting from the spring aerial survey (Program crane group numbers 01 and 03) as occurring from the same individual whooping crane group and numbered the sighting in the USFWS database as 01A-03 (Wally Jobman, USFWS, pers. comm.).

Seven of the 37 use sites were located in the wetted channel of the Platte River. Five of the 7 riverine use sites were observed by the aircrew and recorded on the datasheets. One of these sites was reported by the City of Kearney personnel to Mark Humpert of NGPC and relayed to the ground crew. The ground crew observed this crane group on March 23, 2001 and also independently observed this crane group on March 24, 2001 during the aerial flight. The other two of the 7 riverine use sites were incidental observations, one of these was reported to the crew by Mike Forsburg, and one of these was seen by Terry Mendjo while driving.

At their March 14 meeting, the Technical Committee decided that water and sediment type information would not be measured at out-of-channel use sites without standing water. (*Text from March 2001 TC minutes: "The technical committee decided that in fields with no standing water, all measurements can be obtained off-site using a laser-range finder to get distance to visual obstruction and by using a soil map to get soil type. Fields with standing water will have all measurements taken.").* With the exception of the Land Cover Class information, the data reported below comes from the seven locations of crane groups in water, all of which were riverine use sites. Riverine use site number 4 was used on 2 consecutive nights, but the use site characteristics were measured only once.

III.A. Land cover class

Twenty-two of the 37 (59.46%) use sites were in corn fields, 7 (18.92%) use sites were in the wetted channel, 2 (5.41%) use sites were in corn/barren, 1 (2.70%) use site was in a barren field, 1 use site was in the grassy buffer strip between corn fields, 1 use

site was in other/barren, 1 use site was in a soy bean field, 1 use site was in lowland grass, and 1 use site habitat type was missing from the dataset.

III.B. Distances to visual obstruction >1.5m

The visibility in the four directions was not averaged over the use sites because the data contains the value 'infinity' as well as missing data (Table 5). Visibility measurements were not taken at use sites without standing water.

III.C. Flow

The 7 riverine use sites were all located between the Grand Island and Kearney gages (Table 6). The flow during the spring migration season was highly variable within a daily cycle due to management for power generation at the Johnson Power Plant, Central Nebraska Public Power and Irrigation District (Figures 2, 3, 4 and 5). According to Glenn Engle (US Geological Survey, pers. comm.), the provisional record appears to show ice in the channel at Grand Island for the first part of March (the flows appear too high when compared with flows at Kearney). The mean daily flow will likely be updated for this period.

III.D. Substrate

All 7 use sites in the wetted channel reported sediment type as coarse sand, between 1 and 4.9 mm.

III.E. Unobstructed width

Unobstructed width directly measured in the field at each use site in the wetted channel was not measured as described in the protocol. The measurements contained in this report were derived from the measured depth profile data. The average unobstructed width for each transect at each riverine use site is in Table 7.

III.F. Water depths

The depth profiles for each transect at each riverine use are presented in Figures 6-11. For each profile, the average water depth was calculated by selecting points along the channel transect every 0.25m and predicting the depth based on linear interpolation between the two adjacent data points measured along the transect (Figure 12, Table 8). For areas of the channel too deep to wade a depth of –4 ft was assigned for calculations of average depth.

III.G. Sandbar Elevation

The protocol implemented in spring 2001 did not specify that sandbar elevations should be estimated. This parameter was not consistently recorded and cannot be summarized.

IV. Searcher Efficiency

The objective of the searcher efficiency trials was 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. Cooperators placed decoys in the evening, notified the ground crew leader, and retrieved decoys the

next day. The personnel conducting aerial surveys for AIM did not know the location of the searcher efficiency decoys

IV.A. Details of Detectability Trial Point Selection

Forty-five 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 (Appendix F). Accessible lands are defined as the BOR GIS coverage titled *land_own.shp* and additional properties with known accessibility (i.e., Grand Island Well Field Property). The systematic points were compiled from 414 points placed from 0 to 3.5 miles North or South of points (one every ¼ mile) along the main channel (Figure 13) and from 26 points (one every 4 miles) along the main channel of the river for a total of 440 points. The latter set of points was selected because the TC was concerned that too few points would be in the main channel. Thirty-seven points were identified as "accessible" from the 414 points, and 8 points were identified as "accessible" from the 26 points, respectively (Figure 14).

The 45 points were assigned to 5 volunteer cooperators (Jim Jenniges, Paul Tebbel, Dave Carlson, Paul Currier, and Mark Czaplewski) for decoy placement from April 18 to April 30th. The decoy placement protocol recommended decoys be in place from 6 am to 10 am but did not specify which day the decoys should be placed. Thirty-two of the 45 points were placed by cooperators and are assumed to be a random sample of decoys from the random sample of decoy points. Two of these decoys were removed from the searcher efficiency analysis because the aerial flights did not fly within a mile of the decoy location when the decoy was in place.

The aerial flight crews observed 17 decoys. Because the decoy locations sighted by the aerial survey crew were not described with UTM's, there was difficulty in determining which decoys the observers detected. In 2 of the 17 observed decoys, the descriptions of decoy locations by the flight crew could not reliably be connected to locations of decoys placed in the study area on that day. Three cases could explain the situation: 1) the decoy was in the wrong place, 2) the description of the decoy location provided by the flight crew was wrong, 3) the flight crew observed a whooping crane or other white bird. The two decoys closest to the descriptions were removed from the analysis.

IV.B. Spring 2001 Estimates

Searcher efficiency estimated following the sampling plan results in study area and channel estimates. The analysis estimates the percentage of the 28 decoys detected by the aerial flights (Table 9). For accessible lands in the entire study area, 47.6% (95% CI: 26.3, 69.0) of the decoys were observed by the aircrew. For the in-channel accessible lands, 71.4% (95% CI: 38.0, 100.5) of the decoys were observed by the flight crew. If we choose to combine these two samples and estimate searcher efficiency by land cover class, 80.0% (8 of 10) of the decoys were observed in the channel habitat and 38.9% (7 of 18) of the decoys were observed in the upland habitats. Confidence intervals cannot be calculated for these estimates. Estimates of searcher efficiency from this implementation were based on flights at altitudes of 1000 feet and conditions associated with the Spring survey.

V. Spring 2001 Costs

The cost of field implementation by AIM Environmental Consulting was approximately $57,500 for groundwork and report. The analysis report cost for the Executive Director's office was approximately $9,500.

VI. Recommended Changes for Future Implementation of the Protocol

VI.A. Aerial Flight Recommendations

1. Fly aerial surveys at 500 feet altitude, as safety allows.
2. Alternate the direction each survey leg is flown.
3. Continue using distance bands in an effort to define the area visually surveyed. Increase the precision of flight height with the use of GPS.
4. Fly each upland flight transect in sequential order, keeping the order after a flight day has been missed.

VI.B. Ground Monitoring Recommendations

1. Increase ground presence to locate 'possible' whooping crane sightings identified by the aerial crew.
2. Follow-up every possible whooping crane sighting by the aerial crew, standardize and document the effort expended by the ground crew trying to confirm each sighting.
3. Develop protocol to standardize the determination of a 'new' crane group sighting.

VI.C. Habitat Data

1. Document how each crane location was found (i.e. aerial flight, ground crew, public).
2. Develop protocol to determine when a crane group has moved to a new location.
3. Document when each observer arrives at and departs from a crane use location or crane group.
4. Document UTMs of each endpoint of each profile transect.
5. Measure sandbar elevations using transit or survey grade GPS.

VI.D. Searcher Efficiency

1. Maintain records of decoy detection by flight crew separately from Whooping Crane detections.
2. Stratify sampling into upland and channel strata, and give each strata equal effort so that searcher efficiency estimates can be made for each strata.

Table 1. Distribution of upland and riverine transects flown for the Spring 2001 protocol implementation. Note that the East crew flew the riverine transect on both legs on April 16, 2001 because of poor visibility.

Transect Leg	Number of Surveys
East Transects	
Riverine	31
1N	5
1S	4
2N	7
2S	6
3N	3
3S	4
West Transects	
Riverine	25
1N	5
1S	3
2N	6
2S	6
3N	2
3S	3

Table 2. Possible crane groups observed from the plane. Crane group size represents the number of sightings that were considered possible whooping crane sightings by the aerial crew. 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, X=missing data), third digit is the flight leg (East or West).

DATE	Transect	Crane Group Size	Airplane Height	Distance Band	Confirmed on Ground?	Program Crane Group #	Riverine use Number
3/24/01	0XE	1	1000	C	Y	2001SP01	1
3/24/01	0XE	1	1000	A	N		.
3/25/01	0XE	1	1000	A	N		.
3/29/01	0XE	1	1000	D	Y	2001SP03	3
3/31/01	0XE	1	1000	D	Y	2001SP03	4
4/1/01	0XE	1	.		Y	2001SP03	4
4/2/01	0NW	2	1000	B	N		.
4/2/01	0XE	1	.		Y	2001SP03	5
4/12/01	0NW	2	.		N		.
4/13/01	2SW	2	.		N		.
4/17/01	0SE	1	1000	C	N		.

Table 3. Number of times each ground survey route was driven by Nebraska Wildlife Federation's Whooper Watch program in Spring 2001.

Route	Count	Percent
1	0	0
2	15	16.129
3	14	15.0538
4	13	13.9785
5	11	11.828
6	3	3.2258
7	6	6.4516
8	9	9.6774
9	5	5.3763
10	4	4.3011
11	2	2.1505
12	7	7.5269
13	4	4.3011

Table 4. Relationship of the crane group numbers assigned by the Program and the USFWS.

Program Crane Group #	USFWS Crane Group ID	Riverine Use Site Numbers	Use Site Numbers	Dates of Use
2001SP01	01A-03	1,2	1-8	3/23/2001 - 3/25/2001
2001SP03	01A-03	3,4,5,6	10-37	3/29/2001 - 4/2/2001 4/4/2001 - 4/6/2001
*	01A-07	*	*	4/11/2001

* Crane Group identified by Whooper Watch and was not forwarded to the Program ground monitoring crew in time to observe use sites or measure use site characteristics. Therefore this crane group did not receive a Program number and is not in the Program database.

Table 5. Visibility in meters in four directions from the riverine use sites. Distances are to any object taller than 1.5m in height.

Riverine Use Site Number	Riverine Use Site Name	Use Date	Upstream Distance	Right-bank Distance	Downstream Distance	Left-bank Distance
1	Minden	3/24/01	778	197	103	49
2	Rowe	3/25/01	Inf.	211	310	97
3	Woodman	3/30/01	155	62	207	88
4	Short	3/31/01 4/1/01	261	64	33	74
5	Suck	4/2/01	.	48	.	34
6	Uridil	4/6/01	Inf.	174	Inf.	116

Table 6. Mean discharge (cfs) and stage (ft) during crane use at each riverine use site using hourly provisional data averaged from 7:30 pm to 7 am at the Kearny gage (KN) and the Grand Island gage (GI). Riverine use site number 4 was observed in use two mornings.

Riverine Use Site Number	Morning Use Date	Gage	Mean Discharge	SE Discharge	Mean Stage	SE Stage
1	3/24/2001	KY	1362.47	59.94	3.41	0.03
1	3/24/2001	GI	1612.77	15.60	2.11	0.01
2	3/25/2001	KY	1234.37	61.64	3.34	0.03
2	3/25/2001	GI	1581.20	16.24	2.10	0.01
3	3/30/2001	KY	1004.38	70.88	3.21	0.04
3	3/30/2001	GI	1272.43	8.29	1.95	0.00
4	3/31/2001	KY	1005.00	71.21	3.22	0.04
4	3/31/2001	GI	1298.15	9.13	1.97	0.00
4	4/1/2001	KY	980.69	71.12	3.21	0.04
4	4/1/2001	GI	1317.03	6.11	1.98	0.00
5	4/2/2001	KY	1050.71	68.18	3.25	0.04
5	4/2/2001	GI	1381.24	12.17	2.02	0.01
6	4/6/2001	KY	1029.12	80.38	3.24	0.05
6	4/6/2001	GI	1173.91	9.60	1.92	0.01

Table 7. Average unobstructed width (meters) at riverine profile transects. Averages are across the 3 transects (through the crane use site, a parallel transect 25m upstream, and a parallel transect 25m downstream) measured at each riverine use site.

Riverine Use Site	Use Site Transect Width	Mean Unobstructed Width	Standard Error
1	247.80	254.93	7.03
2	314.00	301.00	6.56
3	143.00	132.33	9.21
4	139.00	170.00	32.01
5	82.00	78.67	4.91
6	281.00	279.33	3.28

Table 8. Average depth (meters) of riverine use transects. Data for the average was obtained at equally spaced intervals (0.25m) from a linear interpolation of the field data.

Riverine Use Site	Transect	Average Including Land as 0	Average Excluding land
1	Upstream	-0.247	-0.253
	Middle	-0.244	-0.246
	Downstream	-0.228	-0.236
2	Upstream	-0.210	-0.238
	Middle	-0.199	-0.231
	Downstream	-0.194	-0.227
3	Upstream	-0.130	-0.176
	Middle	-0.110	-0.152
	Downstream	-0.108	-0.155
4	Upstream	-0.168	-0.175
	Middle	-0.154	-0.180
	Downstream	-0.284	-0.315
5	Upstream	-0.287	-0.335
	Middle	-0.278	-0.325
	Downstream	-0.490	-0.494
6	Upstream	-0.333	-0.334
	Middle	-0.327	-0.333
	Downstream	-0.347	-0.370

Table 9. Number of decoy location points in each sample and analysis.

Area	Systematic Points	Accessible Points	Decoys Placed	Decoys in Analysis	Decoys Observed	Searcher Efficiency
Entire study area	414	37	25	21	10	47.62%
Main channel	26	8	7	7	5	71.43%
	440	45	32	28	15	

Figure 1. Use sites identified during the Spring 2001 protocol implementation. Riverine use sites are numbered.

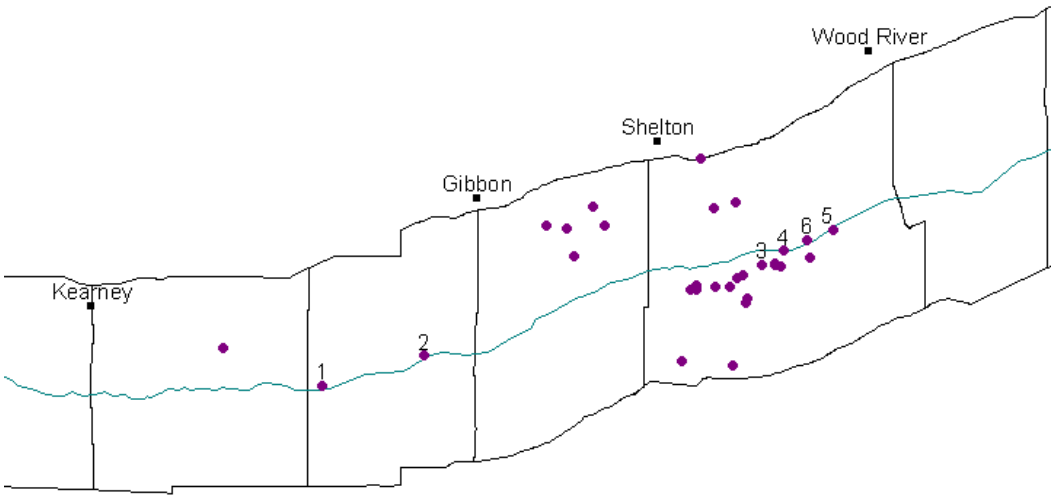


Figure 2. Discharge (cfs) at Kearney, Nebraska (Gage No. 06770200) during protocol implementation.

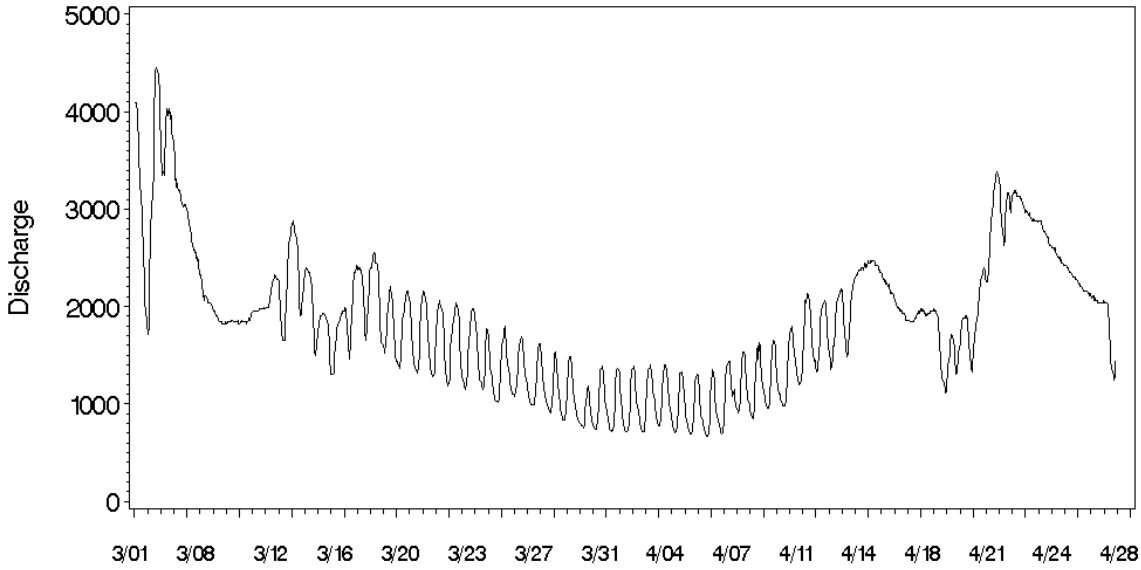


Figure 3. Stage (ft) at Kearney, Nebraska (Gage No. 06770200) during protocol implementation.

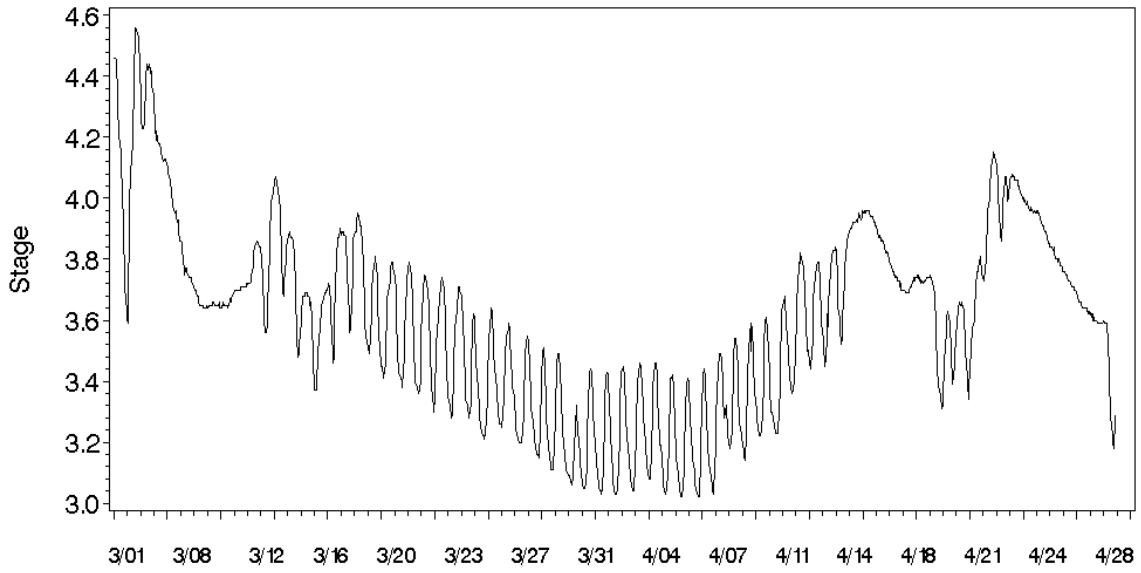


Figure 4. Discharge (cfs) at Grand Island, Nebraska (Gage No. 06770500) during protocol implementation.

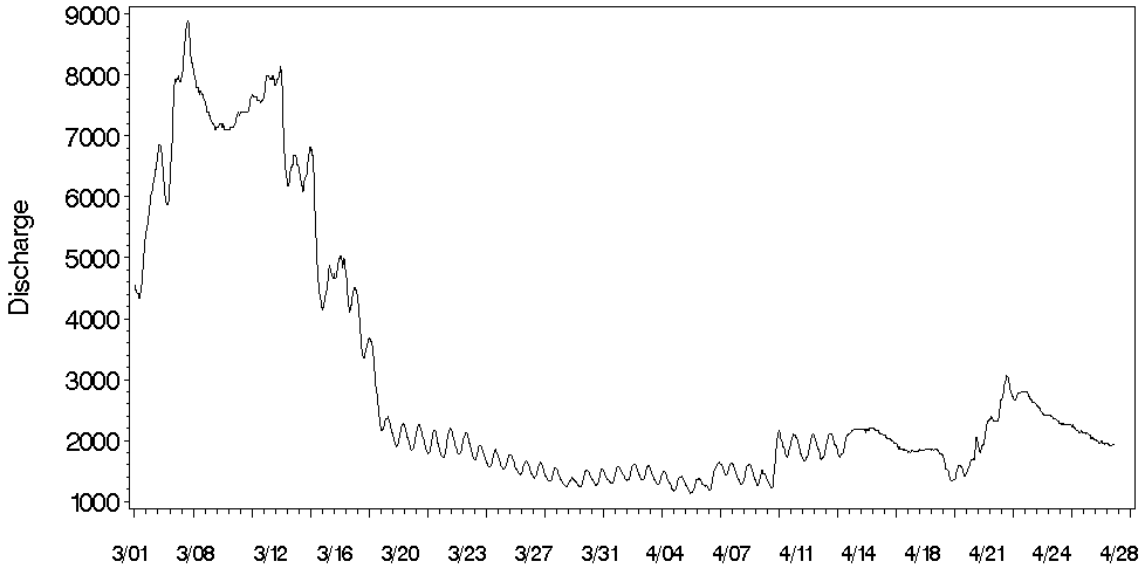


Figure 5. Stage (ft) at Grand Island, Nebraska (Gage No. 06770500) during protocol implementation.

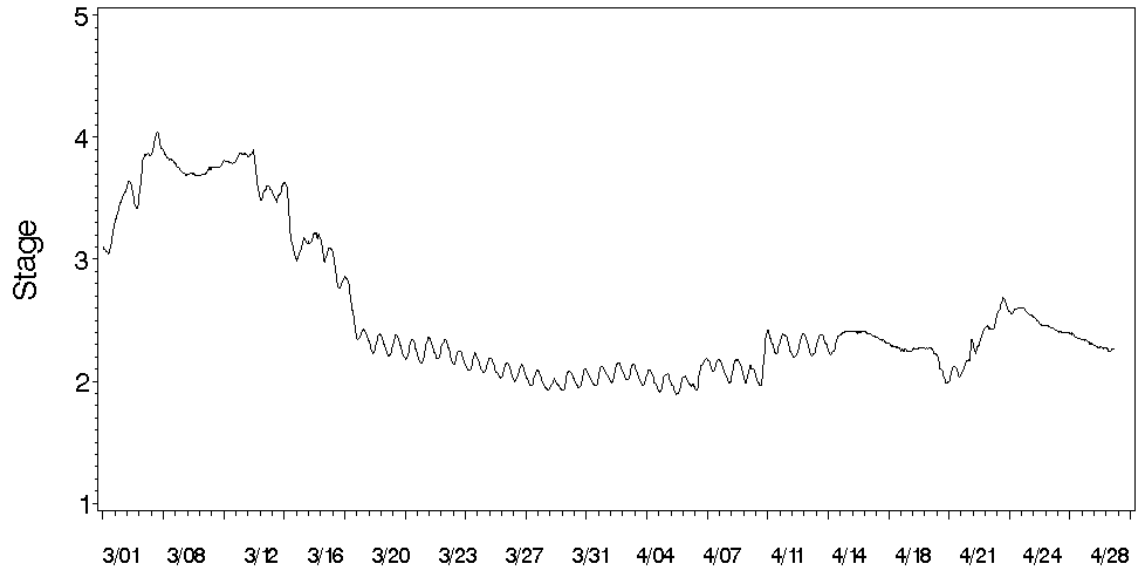


Figure 6. Depth profiles for three transects measured in the vicinity of riverine use site 1, used March 24, 2001. The solid circle on the middle transect is the use location.

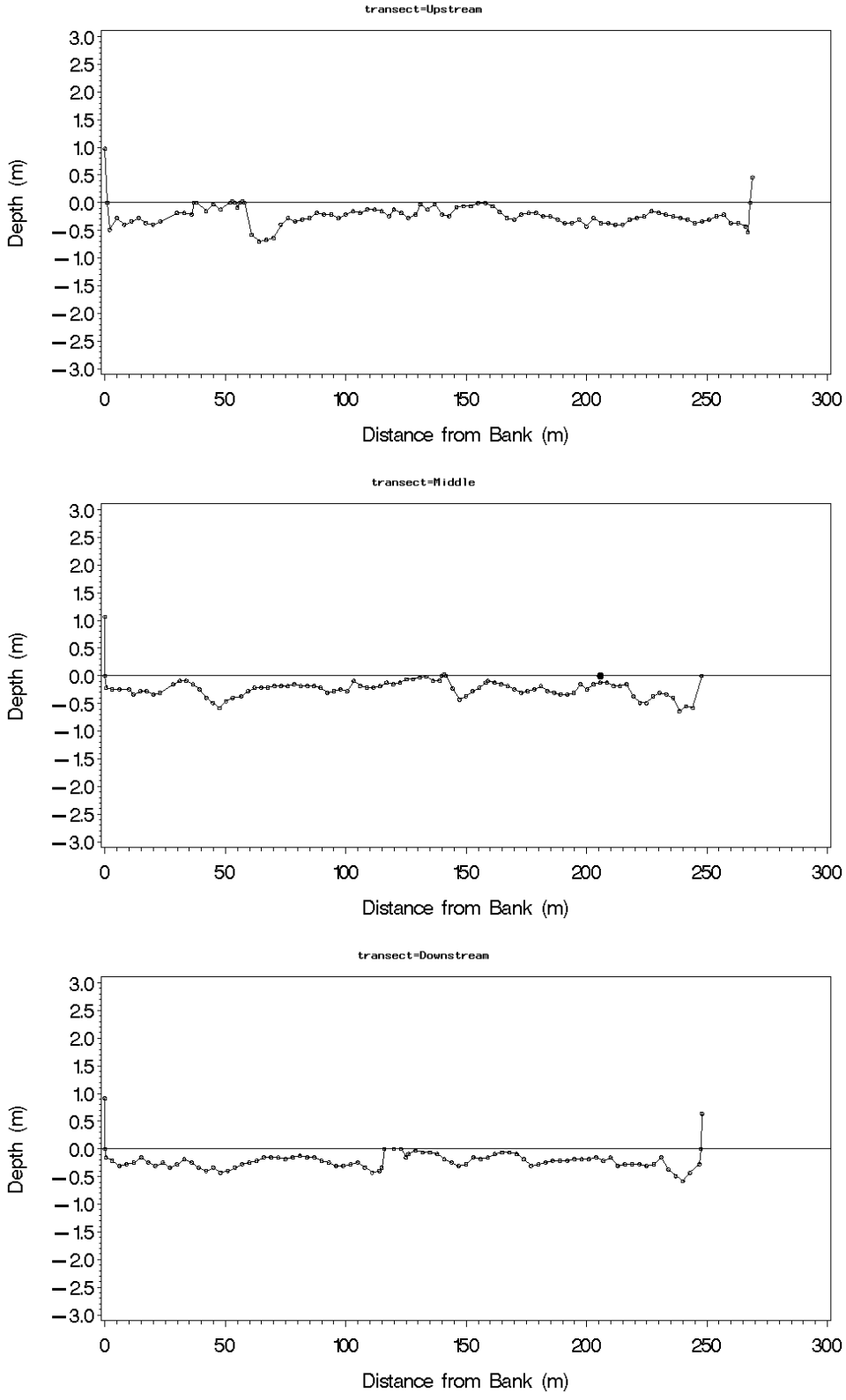


Figure 7. Depth profiles for three transects measured in the vicinity of riverine use site 2, used March 25, 2001. The solid circle on the middle transect is the use location.

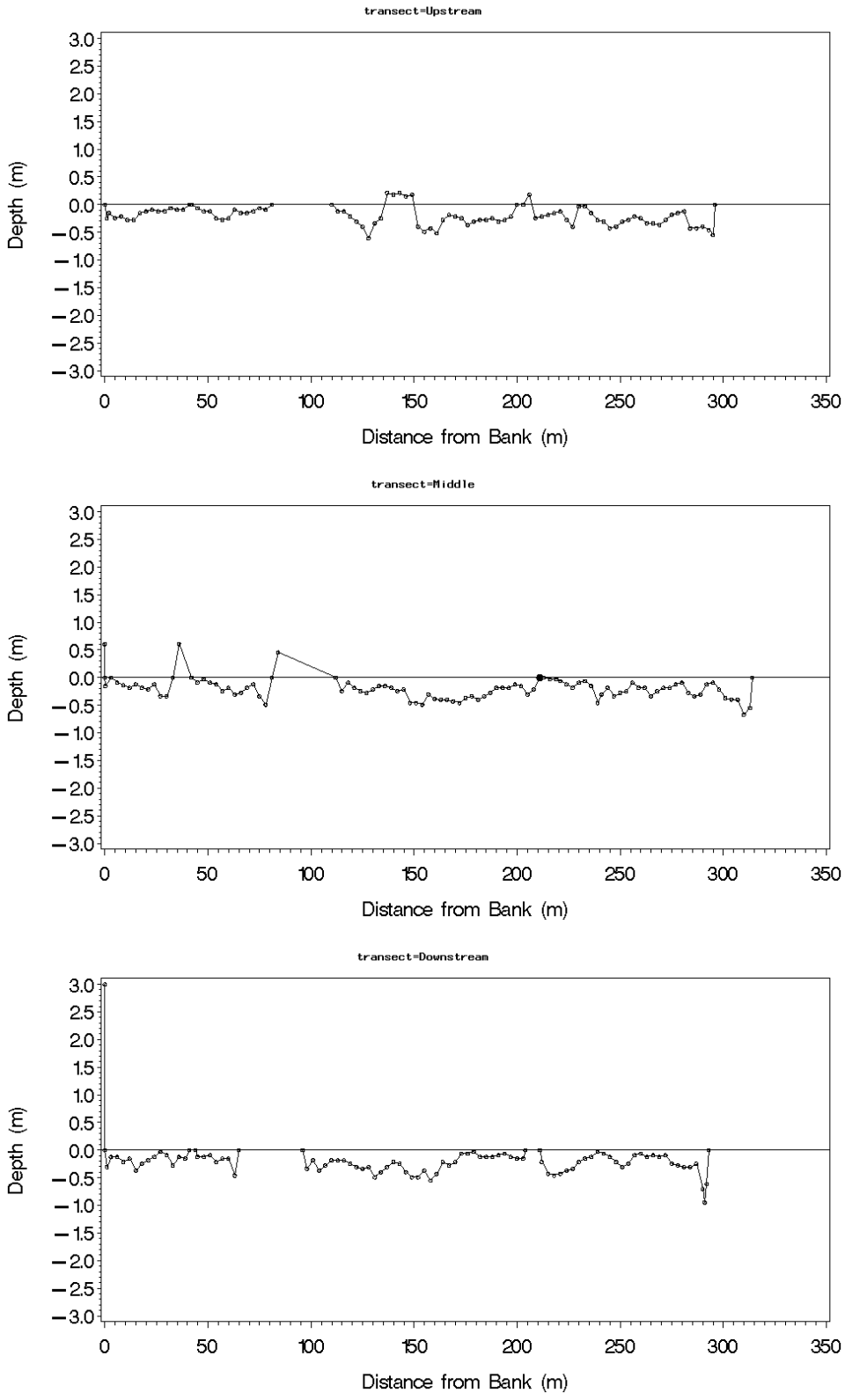


Figure 8. Depth profiles for three transects measured in the vicinity of riverine use site 3, used March 30, 2001. The solid circle on the middle transect is the use location.

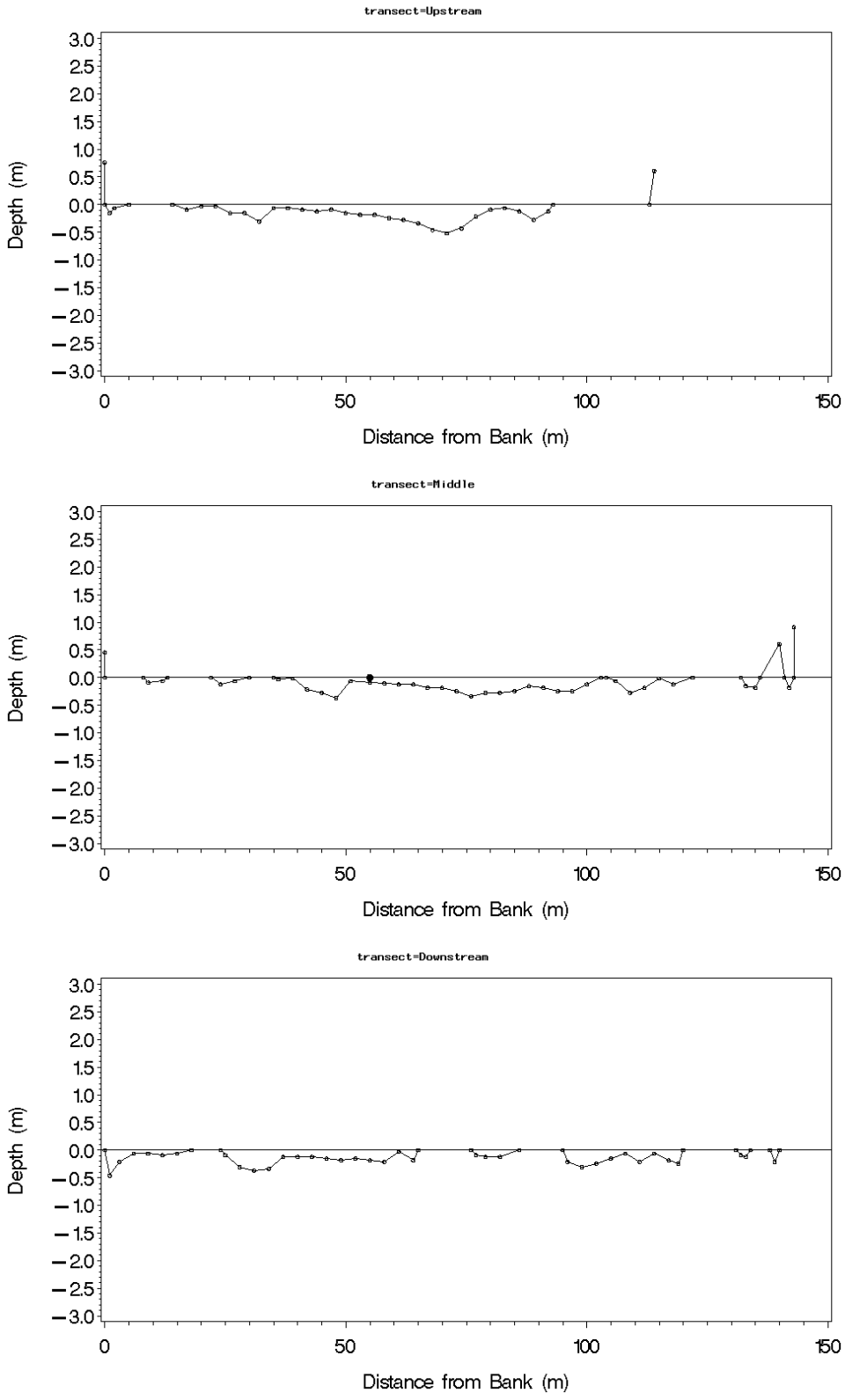


Figure 9. Depth profiles for three transects measured at riverine use site 4, used March 31 and April 1, 2001. The solid circle on the middle transect is the use location.

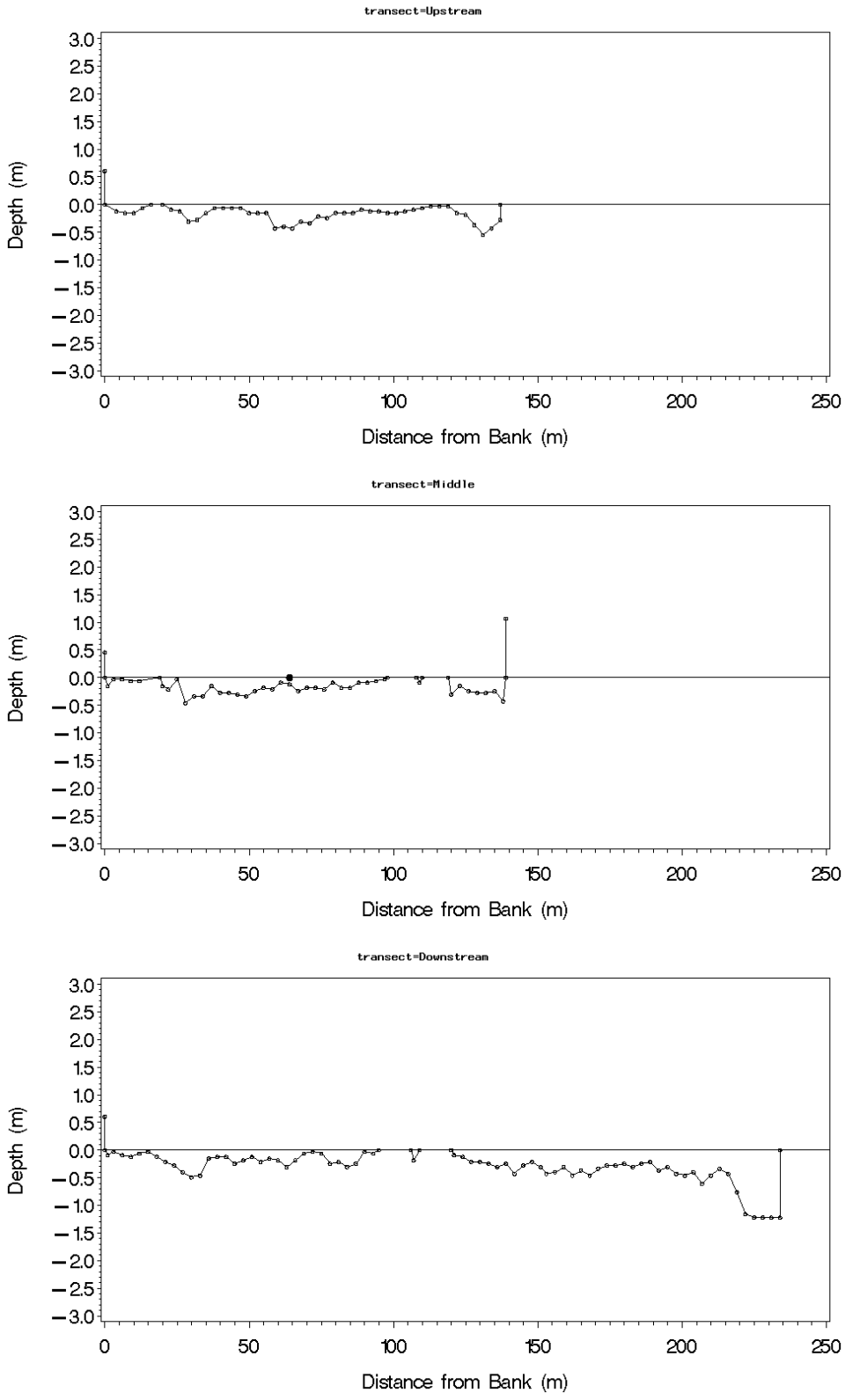


Figure 10. Depth profiles for three transects measured in the vicinity of riverine use site 5, used April 2, 2001. The solid circle on the middle transect is the use location.

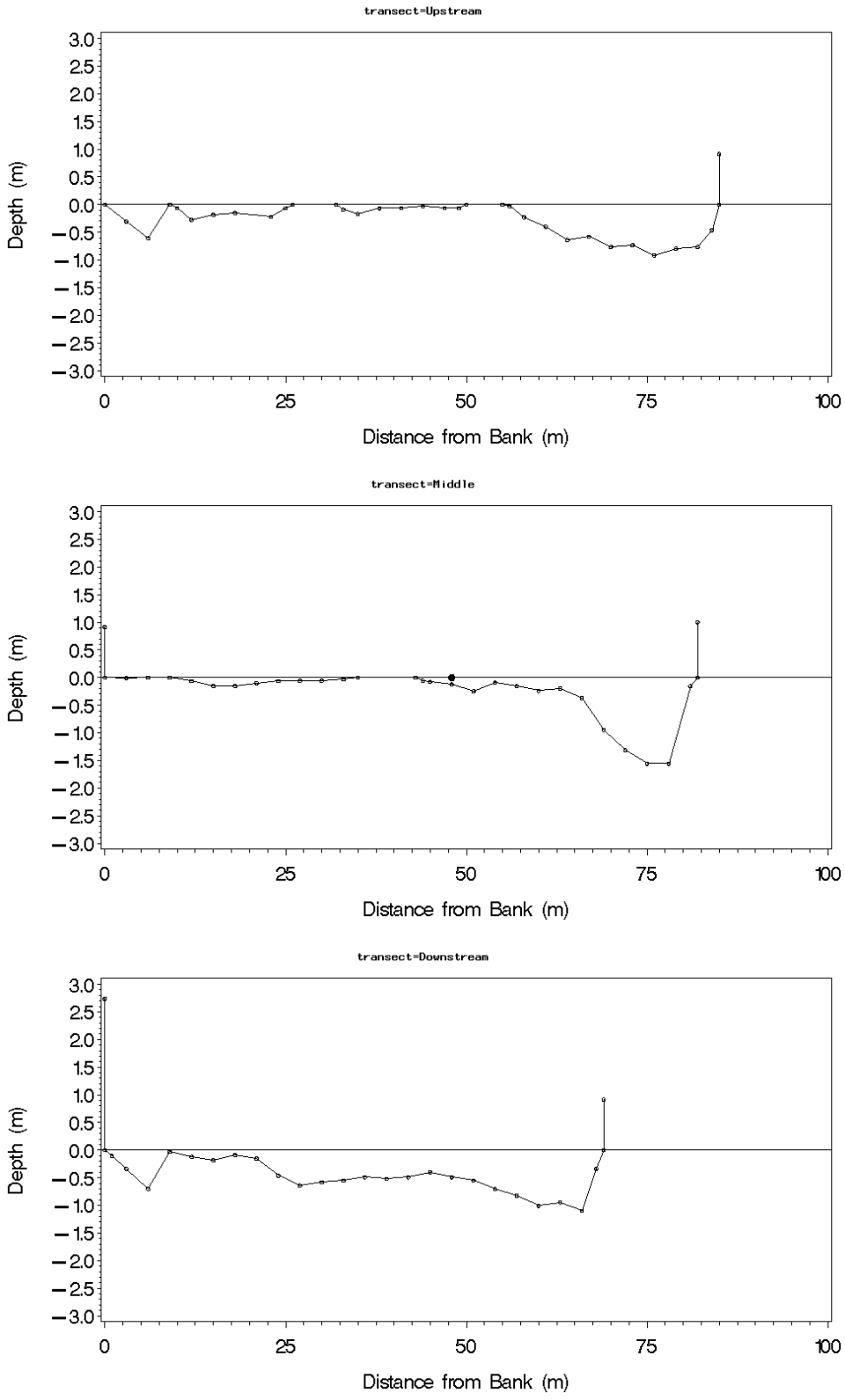


Figure 11. Depth profiles for three transects measured in the vicinity of riverine use site 6 used April 6, 2001. The solid circle on the middle transect is the use location.

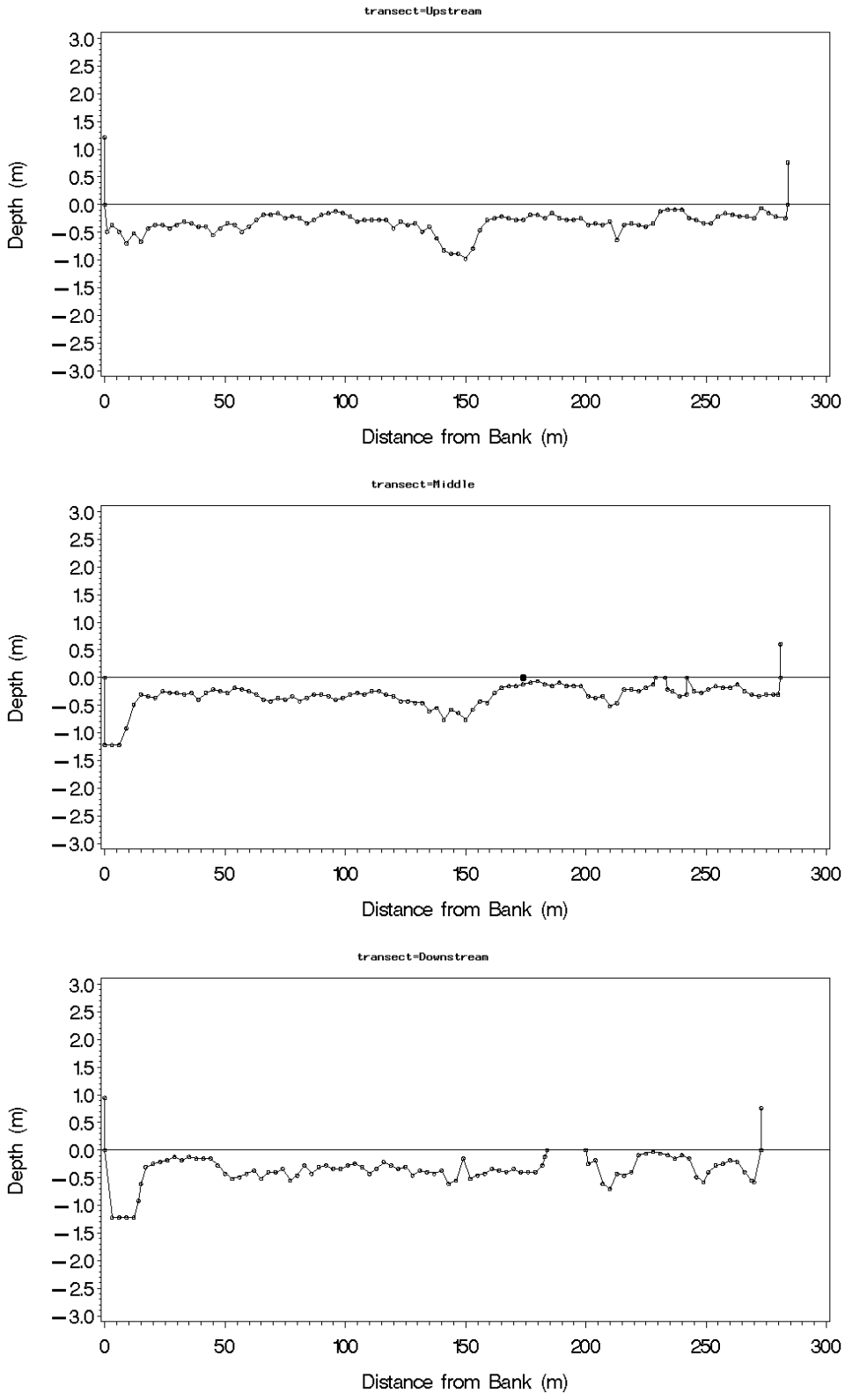


Figure 12. Depth profile measured (red, open circles) and estimated every 0.5m (blue, closed dots) on the downstream transect of riverine use site 3.

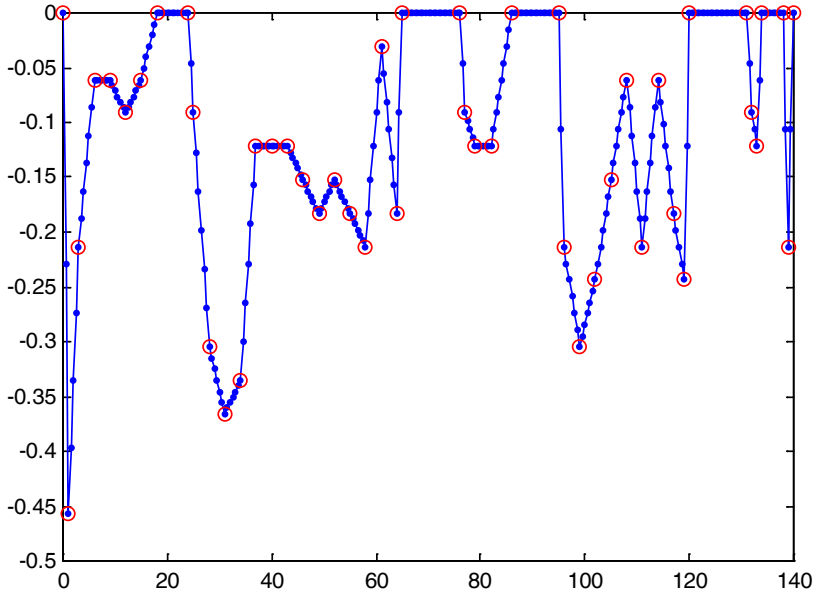


Figure 13. Systematic points placed from 0 to 3.5 miles North or South of the 414 points every quarter mile along the main channel in the study area.

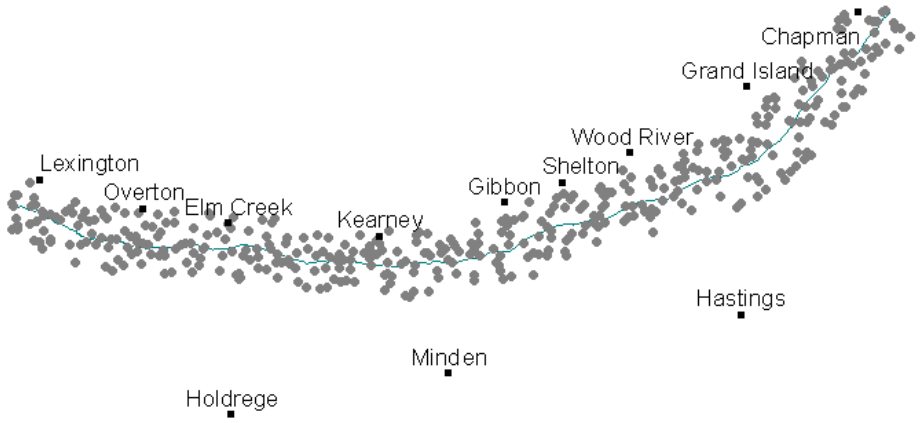
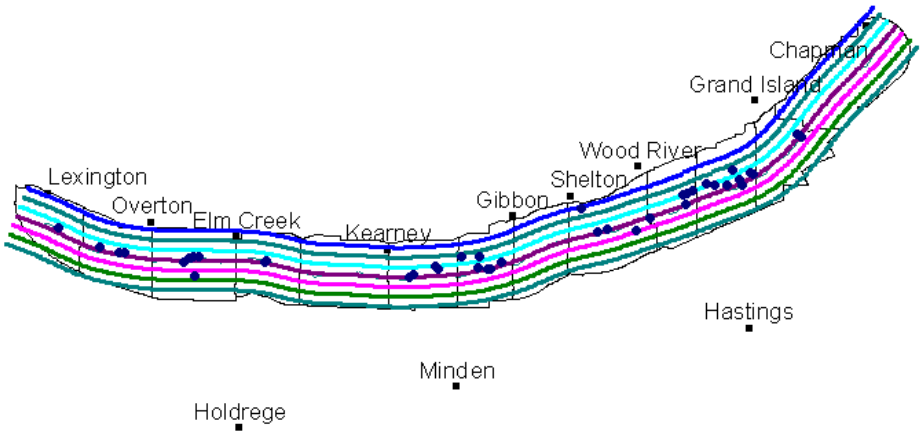


Figure 14. Forty-five decoy points chosen for the searcher efficiency trials with aerial flight lines.



Appendix A. Protocol dated February 23, 2001
Appendix B. Datasheets used for Spring 2001
Appendix C. Monitoring database for Spring 2001
Appendix D. Draft ground survey protocol dated March 12, 2001
Appendix E. Ground routes for Whooper Watch Spring 2001
Appendix F. Searcher efficiency database for Spring 2001