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SUSITNA HYDROELECTRIC PROJECT

FEDERAL ENERGY REGULATORY COMMISSION
PROJECT No. 7114

FURBEARER STUDIES SPRING 1985: BEAVER

PREPARED BY

LGL Alaska Research Associates

UNDER CONTRACT TO

ARZA-EBASCO SUSITNA JOINT VENTURE

FINAL REPORT

OCTOBER 1985
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Alaska Power Authority

HARZA-EBASCO SUSITNA JOINT VENTURE
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December 16, 1985
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Alaska Department of Fish and Game
333 Raspberry Road
Anchorage, Alask 99502

Attention: Mr. Carl M. Yanagawa

Subject: Susitna Hydroelectric Project
Document Transmittal

Dear Mr. Yanagawa:

Enclosed for your use and files is one copy of the LGL final report entitled "Furbearer Studies; Spring 1985: Beaver" (Document No. 2925).

Very truly yours,

Randy

Randy Fairbanks
Terrestrial Group Leader

klk

Enc: as noted

cc w/o Enc:
P. Lambert, HE
J. Thrall, HE

223061/12

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SUSITNA HYDROELECTRIC PROJECT

FURBEARER STUDIES
SPRING 1985: BEAVER

Report by
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ARKANSAS GAME & FISH COMMISSION
Philip S. Gipson

Under Contract to
Harza-Ebasco Susitna Joint Venture

Prepared for
Alaska Power Authority

Final Report
October 1985

NOTICE

ANY QUESTIONS OR COMMENTS CONCERNING
THIS REPORT SHOULD BE DIRECTED TO
THE ALASKA POWER AUTHORITY
SUSITNA PROJECT OFFICE

INTRODUCTION

The beaver (Castor canadensis) was selected as the key furbearer species for study to predict impacts of the Susitna Hydroelectric Project downstream from the proposed impoundments. There were three reasons for selecting beaver:

1. Beaver are tied directly to the aquatic system, and changes in water depths, flow rates, water temperatures, and ice conditions will be reflected in changes in beaver distribution and abundance.

2. Beaver are economically and ecologically important.

3. Reliable and practical techniques exist for censusing beaver populations and monitoring their use of habitats.

This report summarizes surveys conducted for beaver activity during spring 1985 and builds upon three previous reports which present the results of earlier furbearer studies (Gipson et al. 1982, 1984, Woolington et al. 1984). These surveys have focused on determining numbers of beaver occurring along the Susitna River, and determining how beaver use both aquatic and adjacent terrestrial habitats. Monitoring numbers and distribution of beaver and other furbearers on a long-term basis is necessary to help understand the population dynamics and life requirements of these species relative to hydrologic conditions, so that project-related effects on furbearers can be predicted.

The spring 1985 surveys were conducted to determine overwinter survival of beaver colonies located in October 1984 (Woolington et al. 1984). Determination of overwinter survival is essential if the effects on beaver colonies of naturally occurring river flooding and ice-scour during spring breakup are to be ascertained. Information from these and other surveys can then be used to assist in predicting responses of beaver and other furbearers to downstream changes expected to result from the project.

STUDY AREA

The study area is the floodplain of the Susitna River between Devil Canyon and Talkeetna in southcentral Alaska (Fig. 1). The biotic communities, weather and physiography are discussed in Alaska Power Authority (1983). Surveys for signs of beaver activity were restricted to within 0.5 mi. of either side of the Susitna River.

METHODS

The survival of individual colonies of beaver through the winter may be assessed shortly before spring breakup by examining the area around identified lodges and bank dens where food caches were located the previous autumn. During late April and early May, beaver along the Susitna River usually begin foraging above the ice around their colony sites. Emergence holes, where beaver dig out from beneath the ice, and fresh, muddy tracks on the snow or ice near the lodge indicate that at least some beaver of a colony survived the winter (Gipson et al. 1984). However, the identified colonies must be examined again after spring breakup, because conditions at breakup may destroy colonies that have survived through winter up to that point.

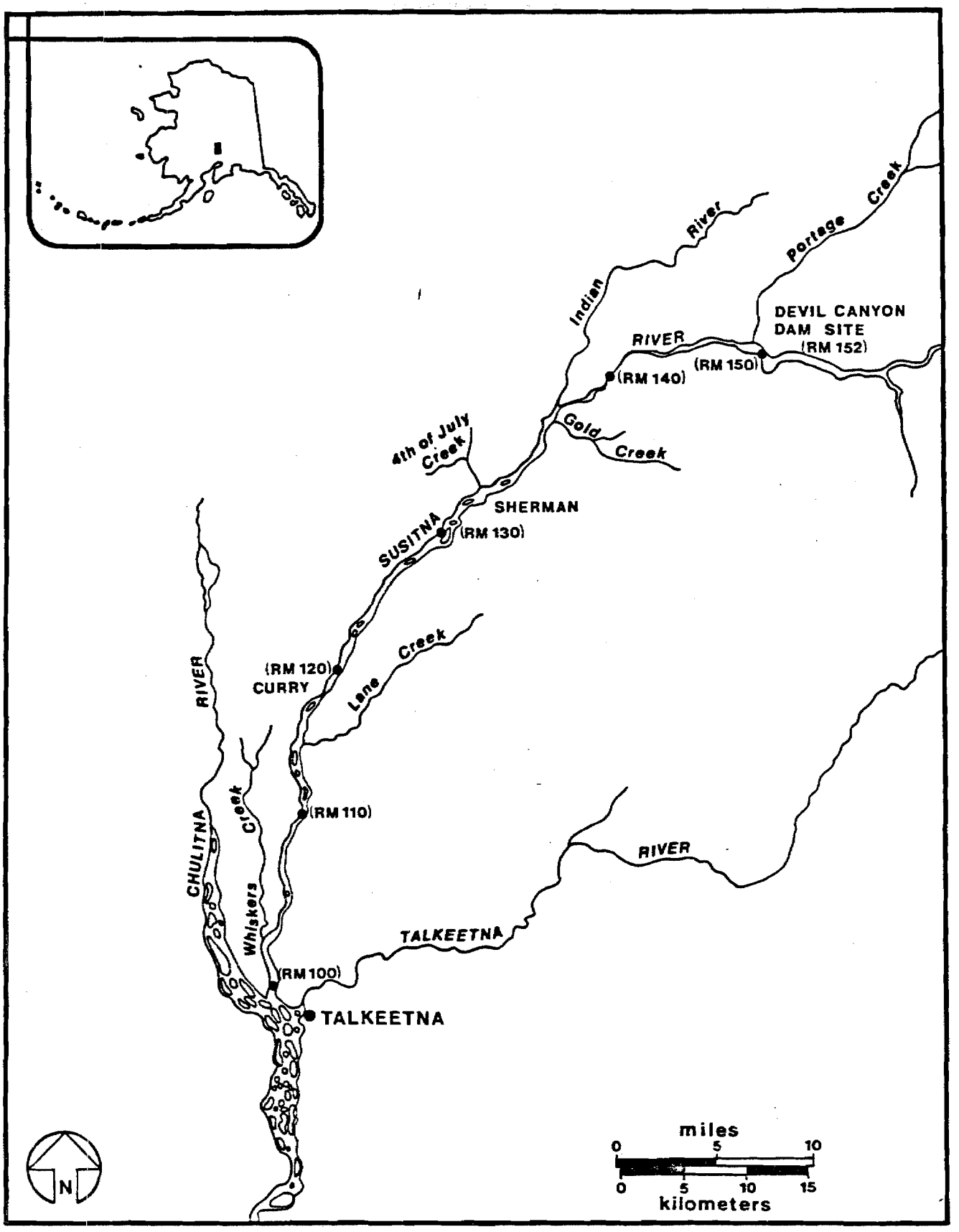

Figure 1. Susitna River between Devil Canyon and Talkeetna.

In spring 1985, three helicopter surveys were made along the Susitna River between Devil Canyon and Talkeetna to examine known lodge and bank den locations for evidence of recent beaver activity. The colony locations were previously identified during beaver cache surveys made in October 1984 (Woolington et al. 1984). To assess the overwinter survival of colonies prior to spring breakup of the Susitna River, two pre-breakup surveys were made on April 23 and May 3, 1985. During the third survey, flown on June 11, 1985, the colony sites were re-examined to determine which colonies survived breakup and therefore successfully overwintered.

RESULTS

Only 10 of the 45 colony sites originally located in October 1984 showed evidence of beaver activity during the April 23 survey (Tables 1 and 2). Evidence of recent beaver activity was observed at 21 of the 45 colony sites during the May 3 survey. During the June 11 post-breakup survey, evidence of recent beaver activity was observed at 23 colony sites, and no activity was evident at 19 sites. Three colony sites were classified as unknown (activity not determined).

Colony sites where no evidence of beaver activity could be determined during the spring surveys are assumed not to have survived the winter or breakup. It is likely that most beaver in unsuccessful colonies died.

Thirteen beaver colonies were located in mainstem habitat in October 1984. Of these, beaver from at least five colonies successfully overwintered and survived breakup in spring 1985. Seven other colony sites were eroded away during breakup. The status of one colony in mainstem habitat was not determined.

Four colonies were located in side channel habitats in October 1984. At least two successfully overwintered and survived breakup, one colony showed no evidence of activity during the spring surveys, and the site of another colony was eroded away spring breakup.

Fourteen colonies were located in side sloughs in October 1984. Of these, beaver successfully overwintered and survived breakup at eight colonies, four colony sites showed no evidence of activity, and the status of two colonies in side sloughs could not be determined.

Fourteen beaver colonies were located in upland sloughs in October 1984. Beaver successfully overwintered and survived at eight of these colony sites. Four of the colony sites showed no evidence of activity in spring 1985 and apparently did not survive the winter. The status of two colonies could not be determined.

Several colony sites appeared active in either the April 23 or the May 3 surveys, but not during the June 11 survey. Of these, one in mainstem habitat and another in a side slough were eroded away during the floods associated with spring breakup. At one upland slough and one side slough occupied by beaver colonies, the dams were broken open and the ponds partially drained after the initial determination of overwinter survival. The fate of the beaver in these two colonies is unknown.

DISCUSSION

The first survey conducted in spring 1985 (April 23) was too early in the season. Beaver activity was observed at very few of the colony sites. However, as shown by the later surveys, beaver successfully overwintered at more colonies than indicated.

Of the 24 colonies where no evidence of activity was observed during the May 3 survey, 8 appeared to be occupied during the June 11 survey, indicating that pre-breakup surveys show the minimum numbers of colonies that successfully overwinter. Of the 19 colonies with no evidence of activity on the June 11 survey, evidence of activity was noted at three colonies during the May 3 survey, indicating beaver had over-wintered at those sites, but were not present after breakup.

All evidence of caches or lodges at 10 colony sites was removed (by ice scour or erosion) during spring breakup. The likelihood of survival by beaver at those sites is low (Hakala 1952, Gipson et al. 1984). Though colonies established along mainstem river habitat appeared to be the most vulnerable (7 of the 10 that were affected by ice), ice and water diverted by ice jams destroyed lodges of two colonies in side sloughs, and one colony in a side channel.

Results from this survey indicate overwinter survival of beaver colonies cannot be absolutely determined by a single survey occurring either before or after breakup. During the May 3 survey, evidence of activity at several colony sites was not observed, but during the June 11 survey, occupation at those sites was determined. Conversely, several colony sites determined to be occupied during the May 3 survey were destroyed during breakup, and showed no evidence of beaver activity. Determination of beaver activity at colony sites both before and after spring breakup is essential if the effects of river flooding and ice-scour on the beaver colonies are to be accurately ascertained.

Summary

Based on the number of active colony sites found during the June 11 survey, at least 23 of the 45 beaver colonies located in October 1984 successfully overwintered and survived spring 1985 breakup along the Susitna River between Devil Canyon and Talkeetna. Ten colony sites were eroded away during spring breakup and nine other colony sites did not show evidence of beaver activity in the spring. The survival rate of beaver colonies was greatest in side sloughs and upland sloughs (each with 8 of 14), followed by side channels (2 of 4) and mainstem (5 of 13).

TABLE 1. Results of spring 1985 surveys of beaver colony sites on the Susitna River, between Devil Canyon and Talkeetna. A = Evidence of recent beaver activity, N = No evidence of recent beaver activity, E = Site eroded away, U = Unable to determine.

Colony No.[1]	River Habitat[2]	April 23	May 3	June 11
84-1	mainstem	A	A	A
84-2	side slough	A	A	A
84-3	side slough	A	A	A
84-4	upland slough	N	A	A
84-5	side slough	N	N	N
84-6	upland slough	N	A	N[3]
84-7	upland slough	N	N	N
84-8	side slough	N	N[4]	N[5]
84-9	mainstem	N	N	N/E
84-10	upland slough	N	A	A
84-11	side slough	N	N	A
84-12	side slough	N	A	A
84-13	mainstem	N	N	N/E
84-14	side channel	N	N	A
84-15	mainstem	A	A	A
84-16	side slough	N	A	A
84-17	mainstem	N	N	N/E
84-18	side slough	A	N[3]	N/E
84-19	side slough	N	N	A
84-20	side channel	N	N	N[6]
84-21	side slough	N	A	A

Table 1 (cont.)

Colony No.[1]	River Habitat[2]	April 23	May 3	June 11
84-22	side slough	N	A	A
84-23	mainstem	N	A	U
84-24	upland slough	N	A	A
84-25	upland slough	N	A	U
84-26	upland slough	N	A	A
84-27	mainstem	N	N	A
84-28	side slough	N	N	N
84-29	mainstem	N	N	N/E
84-30	mainstem	N	N	A
84-31	mainstem	N	A	A
84-32	side channel	N	A	A
84-33	upland slough	A	A	U
84-34	upland slough	A	A	A
84-35	upland slough	N	N	A
84-36	upland slough	N	N	N[3]
84-37	upland slough	N	N	N
84-38	upland slough	A	N	A
84-39	mainstem	N	N	N/E
84-40	upland slough	A	A	A
84-41	mainstem	N	N	N/E
84-42	side channel	N	N	N/E
84-43	mainstem	A	A	N/E

Table 1 (cont.)

Colony No.[1]	River Habitat[2]	April 23	May 3	June 11
84-44	side slough	N	A	N/E
84-45	side slough	N	N	N[5]
		A = 10 N = 35	A = 21 N = 24	A = 23 N = 19 U = 3 E = 10

1 Colony numbers from Woolington et al. (1984).

2 River habitat classification by Alaska Department of Fish and Game Aquatic Study Team (ADF&G 1983).

3 Dam broken open and slough partially drained.

4 Slough frozen to bottom.

5 Food cache intact. No evidence of beaver feeding on cache through winter.

6 Bank exposed because of low water.

TABLE 2. Results of spring 1985 surveys of beaver colony sites on the Susitna River, between Devil Canyon and Talkeetna. A = Evidence of recent beaver activity, N = No evidence of recent beaver activity, E = Site eroded away, U = Unable to determine.

Results of Survey	River Habitat			
	Mainstem	Side Channel	Side Slough	Upland Slough
A	5	2	8	8
N		1	4	4
N/E	7	1	2	
U	1	—	—	2
	13	4	14	14

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Appendix A. Locations and habitat designation of beaver food caches along the Susitna River, between Devil Canyon and Talkeetna. October 4, 1984 (From: Woolington et al. 1984).

Site No.	Characteristics	
84-1	Location	- T31N, R2W, Sec. 10, NW¼ of SW¼ north side of river
	River mile	- 139.5
	Habitat	- mainstem
84-2	Location	- T31N, R2W, Sec. 9, NE¼ of SE¼ north side of river
	River mile	- 139.4, Slough 18
	Habitat	- side slough
84-3	Location	- T31N, R2W, Sec. 9, NE¼ of SE¼ north side of river
	River mile	- 139.4, Slough 18
	Habitat	- side slough
84-4	Location	- T31N, R2W, Sec. 8, SE¼ of SE¼ north side of river
	River mile	- 139.0
	Habitat	- upland slough
84-5	Location	- T31N, R2W, Sec. 17, NW¼ of NE¼ northwest side of river
	River mile	- 137.4, Slough 15
	Habitat	- side slough
84-6	Location	- T31N, R2W, Sec. 17, SE¼ of NW¼ northwest side of river
	River mile	- 137.2, Slough 15
	Habitat	- upland slough
84-7	Location	- T31N, R2W, Sec. 19, NW¼ of NE¼ northwest side of river
	River mile	- 136.4, Slough 14
	Habitat	- upland slough
84-8	Location	- T31N, R2W, Sec. 19, SE¼ of SE¼ east side of river
	River mile	- 135.7, Slough 11
	Habitat	- side slough
84-9	Location	- T31N, R2W, Sec. 19, SW¼ of SE¼ west side of river
	River mile	- 135.5
	Habitat	- mainstem

Site No.	Characteristics	
84-10	Location	- T31N, R2W, Sec. 25, SE¼ of NE¼ west side of river
	River mile	- 134.0, Slough 10
	Habitat	- upland slough
84-11	Location	- T31N, R3W, Sec. 36, NW¼ of NE¼ southeast of river
	River mile	- 133.3, Slough 9A
	Habitat	- side slough
84-12	Location	- T31N, R3W, Sec. 36, NW¼ of SE¼ east side of river
	River mile	- 133.4, Slough 9A
	Habitat	- side slough
84-13	Location	- T31N, R3W, Sec. 36, SW¼ of SW¼ northwest side of river
	River mile	- 132.8
	Habitat	- mainstem
84-14	Location	- T30N, R3W, Sec. 2, SW¼ of NE¼ northwest side of island, on northwest side of river
	River mile	- 132.0
	Habitat	- side channel
84-15	Location	- T30N, R3W, Sec. 9, SW¼ of NE¼ downstream end of island
	River mile	- 129.8
	Habitat	- mainstem
84-16	Location	- T30N, R3W, Sec. 9, NW¼ of SW¼ east side of river
	River mile	- 129.3, Slough 9B
	Habitat	- side slough
84-17	Location	- T30N, R3W, Sec. 20, NW¼ of NE¼ mainstem side of island, on west side of river
	River mile	- 127.4
	Habitat	- mainstem
84-18	Location	- T30N, R3W, Sec. 30, NE¼ of NE¼ southeast of river
	River mile	- 126.0, Slough 8A
	Habitat	- side slough
84-19	Location	- T30N, R3W, Sec. 30, SE¼ of NW¼ southeast of river
	River mile	- 125.7
	Habitat	- side slough

Site No.	Characteristics	
84-20	Location	- T30N, R3W, Sec. 25, SE¼ of NE¼ downstream end of island
	River mile	- 125.0
	Habitat	- side channel
84-21	Location	- T30N, R3W, Sec. 30, NW¼ of NW¼ island on east side of river
	River mile	- 125.8
	Habitat	- side slough
84-22	Location	- T26N, R5W, Sec. 13, SW¼ of SW¼ west of river
	River mile	- 98.0, Billion slough
	Habitat	- side slough
84-23	Location	- T26N, R5W, Sec. 24, NE¼ of SW¼ east side of river
	River mile	- 98.0
	Habitat	- mainstem
84-24	Location	- T26N, R5W, Sec. 23, NE¼ of NE¼ east of river
	River mile	- 98.0
	Habitat	- upland slough
84-25	Location	- T26N, R5W, Sec. 13, SW¼ of SW¼ east of river
	River mile	- 98.0
	Habitat	- upland slough
84-26	Location	- T26N, R5W, Sec. 14, SE¼ of NE¼ east side of river
	River mile	- 99.4
	Habitat	- upland slough
84-27	Location	- T26N, R5W, Sec. 14, SW¼ of SE¼ east side of river
	River mile	- 98.5
	Habitat	- mainstem
84-28	Location	- T26N, R5W, Sec. 14, NE¼ of NW¼ west side of river
	River mile	- 99.0
	Habitat	- side slough
84-29	Location	- T26N, R5W, Sec. 11, NE¼ of NW¼ mainstem side of island on east side of river
	River mile	- 100.4
	Habitat	- mainstem

Site No.	Characteristics	
84-30	Location	- T26N, R5W, Sec. 11, SE¼ of SE¼ island on east side of river
	River mile	- 99.8
	Habitat	- mainstem
84-31	Location	- T26N, R5W, Sec. 11, SE¼ of SE¼ island on east side of river
	River mile	- 99.8
	Habitat	- mainstem
84-32	Location	- T26N, R5W, Sec. 2, SE¼ of SW¼ east side of river
	River mile	- 100.6, Slough 2
	Habitat	- side channel
84-33	Location	- T27N, R5W, Sec. 35, NW¼ of SW¼ west of river
	River mile	- 102, Slough 3A
	Habitat	- upland slough
84-34	Location	- T26N, R5W, Sec. 25, SE¼ of SE¼ east of river
	River mile	- 102.9
	Habitat	- upland slough
84-35	Location	- T27N, R5W, Sec. 25, SE¼ of SE¼ east of river
	River mile	- 102.9
	Habitat	- upland slough
84-36	Location	- T27N, R5W, Sec. 13, SW¼ of NW¼ east of river
	River mile	- 105.6
	Habitat	- upland slough
84-37	Location	- T27N, R5W, Sec. 12, SE¼ of SW¼ east of river
	River mile	- 106.2
	Habitat	- upland slough
84-38	Location	- T28N, R5W, Sec. 36, SW¼ of NE¼ west of river
	River mile	- 109.3
	Habitat	- upland slough
84-39	Location	- T28N, R4W Sec. 30, NW¼ of NW¼ east of river
	River mile	- 110.5
	Habitat	- mainstem

Site No.	Characteristics		
84-40	Location	-	T28N, R4W, Sec. 6, SE¼ of SW¼ east of river
	River mile	-	114.2, Slough 8
	Habitat	-	upland slough
84-41	Location	-	T28N, R4W, Sec. 6, NW¼ of SW¼ downstream and of island in mid-channel
	River mile	-	114.7
	Habitat	-	mainstem
84-42	Location	-	T29N, R4W, Sec. 21, NW¼ of NE¼ east side of island
	River mile	-	119.0
	Habitat	-	side channel
84-43	Location	-	T29N, R4W, Sec. 16, NE¼ of NE¼ main channel side of large island on west side of river
	River mile	-	120.1
	Habitat	-	mainstem
84-44	Location	-	T30N, R4W, Sec. 35, SW¼ of SE¼ east of river
	River mile	-	122.6
	Habitat	-	side slough
84-45	Location	-	T30N, R4W, Sec. 35, NE¼ of SE¼ east of river
	River mile	-	123.2
	Habitat	-	side slough