COLORADO RIVER RECOVERY PROGRAM
FY 99 ANNUAL REPORT

RECOVERY PROGRAM
PROJECT NUMBER: CAP-6-LR

I. Project Title: Levee Removal and Floodplain Connectivity Evaluation

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III. Project Summary:

The primary purpose of this work is to restore or enhance natural floodplain functions that support recovery of endangered fishes (especially the razorback sucker) in the Upper Colorado River Basin. To improve access to floodplain wetlands for native fish species levees have been breached at eight floodplain wetland sites along the Green River in Utah. Studies were conducted to evaluate fish species and ecosystem response to levee removal.

This study has been broken into four areas. Native species response, floodplain productivity, vegetational changes and nonnative species response. No work was conducted on vegetational changes in 1999. The Utah Division of Wildlife (UDWR) and U.S. Fish and Wildlife Service (USFWS) collected native and nonnative fish data. Utah State University was responsible for collecting information on productivity and vegetational changes. A report was completed following the 1998 field season

summarizing the findings of the study up to that point. FY 1999 was the last year of field work scheduled for the study. A final report is due in July 2000.

IV. Study Schedule:

a. Initial year: 1996
b. Final year: 2000

V. Relationship to RIPRAP:

General Recovery Program Support
II. Restore habitat
II.A. Restore flooded bottomland habitats
II.A.1. Conduct inventory of flooded bottomland habitat for potential restoration

Green River Action Plan
II. Restore Habitat
II.A. Restore and manage flooded bottomland habitat
II.A.1. Conduct site restoration

VI . Accomplishments of FY 99 Tasks and Deliverables, Discussion of Initial Findings and Shortcomings:

<u>Native and Nonnative Fish Component</u>

The task of field data collection for the 1999 field season was completed as defined in the 1999 SOW. Nonnative species composition within floodplain wetland sites were similar to previous years sampling. Black bullheads, fathead minnows, green sunfish and carp were the dominant nonnative species caught from wetland sites (See attached tables).

Numbers of native fish (excluding stocked razorback suckers) caught in floodplain sites during 1999 increased for most species from numbers caught in 1998. Colorado pikeminnow were caught in 6 of the 12 sites during 1999 compared to only 3 sites in 1998. However, only 34 Colorado pikeminnow were caught in 1999 compared to 48 in 1998. During 1999, 16 razorback suckers (excluding fish stocked in wetland sites) were caught compared to none in 1998. Razorbacks were caught in 8 of the 12 sites sampled. Nine of the 16 razorback suckers caught were from razorback suckers that were stocked at Split Mountain in October 1998 by Ouray National Fish Hatchery. The remaining 7 were wild fish. Numbers of flannelmouth and bluehead suckers caught in 1999 also increased from 1998. Roundtail chub numbers were about the same in 1999 as in 1998.

Prior to 1999 field season the decision was made to stock razorback suckers of various life stages into 3 floodplain sites. In April, prior to connection with the river the 3 sites (The Stirrup, Baeser Bend and Above Brennan) were each stocked with 1,985 juvenile razorback suckers and 10 adult razorback suckers. During connection with the river in May, 56,907 larval razorback suckers were stocked in The Stirrup wetland. The primary purposes of stocking the fish was to determine if they would leave the wetlands voluntarily. If so what cues cause them to leave? And could they survive predation and poor water quality conditions during the late summer and through the winter? During connection with the river traps were set in the breaches of the 3 wetlands to monitor movement of fish from the sites. Problems with these traps occurred at all three sites. Water flowing into The Stirrup eroded holes underneath the traps. The problem was remedied by plugging the holes with sand bags. At Baeser Bend the water current blew the traps out after about 1 week of sampling. Fyke nets were placed in the mouth of the breach to replace the traps. Above Brennan also experienced erosion problems that were fixed with sand bags. However, at Above Brennan water rose above the top of the traps during peak flows. Despite the above problems the traps did function during most of the floodplain-river connection period.

Very little movement of razorback suckers from the wetlands was detected despite a long duration and magnitude of connection with the river during 1999. Only 1 razorback sucker was caught in traps set in levee breaches at the three sites. Answers to questions regarding voluntary movement of these razorback suckers from the sites into the river will hopefully be answered in the future.

To date razorback suckers stocked in floodplain sites appear to be thriving. During an intensive fall sampling effort 797 razorback suckers were caught in Baeser Bend, 158 in Above Brennan and 126 in The Stirrup. Fish in all three sites had tripled in size averaging over 1.3 mm of growth per day since stocked. Only one fish caught in The Stirrup was a suspect YOY. This fish was frozen and will be analyzed to determine its age. There are plenty of razorback suckers in all 3 wetlands to determine if overwinter survival will occur. Water depth in all three floodplain sites should be sufficient to see the fish through the winter. Baeser Bend was the shallowest site at just over 0.50 meters. If overwinter mortality does occur it will most likely be at this site. Utah Division of Wildlife will continue monitoring the stocked fish under a new SOW approved for FY's 2000 - 2001.

River fyke netting and electrofishing data for the 1999 field season is summarized in the attached tables. Seine data is not included because preserved fish have not been counted. Except for one important difference in reaches 1 - 3 fyke netting data, river sampling data looks reasonably similar to data from previous years. In reaches 1 - 3 there is a significant increase from previous years in the number of black bullheads, green sunfish and carp caught. Most of the fish caught for all 3 species were young of year (YOY) fish. It is possible these fish were highly successful reproducing within the river channel during 1999. However, a more likely source for these fish is Stewart Lake (upstream about 10 miles). Stewart Lake was drained (unscreened) in July of 1999. Offspring from fish that reproduced in Stewart Lake probably ended up in the river. The number of fish caught for each of these species tapers off significantly below reach 3 (further from the source) (Table 5). Also, during 1999 YOY seining conducted by UDWR, Northeastern Regional Office, no black bullhead YOY were caught above Stewart Lake drain. This potential problem will be examined closely in upcoming Levee Removal Work Group meetings.

Sample processing, data management and data analysis are currently underway. A trip summary report of fish data was written for each sampling trip in 1999 and a field season summary has just been completed. Attached tables are from the field season summary report. Levee Removal Work Group will meet early next year to begin work on the completion report for the levee removal project.

<u>Productivity component</u>

The task of field data collection for the 1999 field season was completed as defined in the 1999 SOW. Results for this aspect of the study are pending due to unprocessed samples. Sample processing currently under way. Data management and data analysis will follow when samples are processed.

VII . Recommendations:

1. Continue stocking razorback suckers into floodplain wetlands to evaluate growth, survival and movement into/out of the floodplain wetlands.

2. Evaluate the reconfiguration of levee removal to maximize larval transport into floodplains.

3. Wetlands that are operated by draining annually or periodically should be screened to minimize nonnative fish escapement into the river.

VIII . Project Status: On track

IX . FY 99 Budget:

	UDWR	USFWS	LFL	USU
A. Funds budgeted:	$106,075	$77,625	$75,900	$96,600
B. Funds expended/obligated:	$106,075	$77,625	$75,900	$96,600
C. Difference:	$ -0-	$ -0-	$ -0-	$ -0-

D. Percent of FY 99 work completed: 100%

E. Recovery Program funds spent for publication charges: $0.00

X. Status of Data Submission: In progress

XI . Signed : Matthew Andersen, December 7, 1999

Table 1. Summary of native fish catch for sites between RM 290.0 and 272.5 during 1999 field season.

1999 LEVEE REMOVAL SAMPLING NATIVE FISH SUMMARY															
	*Bonanza Bridge			*Horseshoe Bend			Baser/Chew			*The Stirrup			*Baeser Bend		
	SP	#	%	SP	#	%	SP	#	%	SP	#	%	SP	#	%
Trip 1	NNF			NNF			NOT SAMPLED			RZ	1		NNF		
Trip 2	FM	1	<1	FM	3	<1	CS	7	4.3	SAMPLED WITH BREECH			SAMPLED WITH BREECH		
				CS	1	<1	FM	5	3.1	TRAPS DURING			TRAPS DURING		
				SD	1	<1	RZ	1	<1	CONNECTION			CONNECTION		
							RT	1	<1						
				TOT	5		TOT	14							
Trip 3	CS	1	1.0	FM	7	1.9	FM	4	6.2	SAMPLED WITH BREECH			SAMPLED WITH BREECH		
	FM	1	1.0	CS	6	1.6	CS	2	3.1	TRAPS DURING			TRAPS DURING		
	RZ	1	1.0	RT	1	<1	RT	1	1.5	CONNECTION			CONNECTION		
	TOT	3		TOT	14		TOT	7							
Trip 4	BH	2		CS	4	<1	CS	2	1.3	SAMPLED WITH BREECH			SAMPLED WITH BREECH		
	FM	1		FM	1	<1	FM	1	<1	TRAPS DURING			TRAPS DURING		
							RT	1	<1	CONNECTION			CONNECTION		
	TOT	3		TOT	5		TOT	4							
Trip 5	FM	4	2.9	FM	6	1.1	FM	15	2.0	SAMPLED WITH BREECH			SAMPLED WITH BREECH		
	RT	1	<1	RZ	2	<1	BH	8	1.0	TRAPS DURING			TRAPS DURING		
							SD	8	1.0	CONNECTION			CONNECTION		
							RT	2	<1						
	TOT	5		TOT	8		TOT	33							
Trip 6	FM	3	<1	FM	20	1.6	FM	21	1.3	SAMPLED WITH BREECH			SAMPLED WITH BREECH		
	SD	1	<1	CS	4	<1	BH	18	1.1	TRAPS DURING			TRAPS DURING		
				BH	2	<1	SD	13	<1	CONNECTION			CONNECTION		
				SD	1	<1	CS	4	<1						
				RT	1	<1	RT	2	<1						
	TOT	4		TOT	28		TOT	58							
Trip 7				FM	20	<1				RZ	4	<1	RZ	5	<1
				BH	15	<1				SD	1	<1	CS	1	<1
	NNF			SD	1	<1	NOT SAMPLED						RT	1	<1
													SD	1	<1
				TOT	36					TOT	5		TOT	8	
Trip 10				FM	1	<1				RZ	127	<1	RZ	797	
	NNF			RZ	1	<1	NNF								
				TOT	2										
Total =	FM	7	<1	FM	58	<1	FM	46	1.6	RZ	131	<1	RZ	802	
	BH	2	<1	BH	17	<1	BH	26	<1	SD	1	<1	CS	1	<1
	CS	1	<1	CS	15	<1	SD	21	<1				RT	1	<1
	RZ	1	<1	RZ	3	<1	CS	15	<1				SD	1	<1
	RT	1	<1	RT	2	<1	RT	7	<1						
	SD	1	<1	SD	3	<1	RZ	1	<1						
	TOT	13		TOT	98		TOT	115		TOT	132		TOT	805	

Table 2. Summary of native fish for sites between RM 268.0 and 249.0 during 1999 field season.

	1999 LEVEE REMOVAL SAMPLING NATIVE FISH SUMMARY																	
	*Above Brennan			*Johnson/J4			*Leota/L7A			Leota/L10			*Old Charlie Diked			Old Charlie Wash		
	SP	#	%	SP	#	%	SP	#	%	SP	#	%	SP	#	%	SP	#	%
Trip 1	NNF			NNF			NNF			NOT SAMPLED			NOT SAMPLED			NOT SAMPLED		
Trip 2	SAMPLED WITH BREECH TRAPS DURING CONNECTION			NNF			RZ	1	<1	NNF			CS FM TOT	1 3 4	<1 <1	FM	2	<1
Trip 3	SAMPLED WITH BREECH TRAPS DURING CONNECTION			NNF			NNF			FM CS TOT	1 1 2	<1 <1	FR FM RZ TOT	3 1 1 5	4.2 1.4 1.4	FM	2	2.5
Trip 4	SAMPLED WITH BREECH TRAPS DURING CONNECTION			BH FM TOT	1 1 2	<1 <1	BH	1	<1	SD	1	<1	RZ FR FM TOT	5 1 1 7	17.9 3.6 3.6	FM	1	<1
Trip 5	SAMPLED WITH BREECH TRAPS DURING CONNECTION			NNF			FM	1	<1	NNF			RZ FR TOT	1 1 2	<1 <1	NNF		
Trip 6	SAMPLED WITH BREECH TRAPS DURING CONNECTION			SD RZ TOT	2 1 3	<1 <1	NNF			NNF			FM FR BH TOT	2 2 1 5	<1 <1 <1	NNF		
Trip 7	RZ SD TOT	2 1 3	<1 <1	NNF			NNF			NOT SAMPLED			NNF			NOT SAMPLED		
Trip 10	RZ	158		NOT SAMPLED			NOT SAMPLED			NOT SAMPLED			NOT SAMPLED			NOT SAMPLED		
Total =	RZ SD TOT	160 1 161	<1 <1	SD RZ BH FM TOT	2 1 1 1 5	<1 <1 <1 <1	FM RZ BH TOT	1 1 1 3	<1 <1 <1	FM CS SD TOT	1 1 1 3	<1 <1 <1	RZ FM FR BH CS TOT	7 7 7 1 1 23	2.6 2.2 1.7 <1 <1	FM	5	<1

Table 3. Summary of nonnative fish catch for sites between RM 290.0 and 272.5 during 1999 field season.

1999 LEVEE REMOVAL SAMPLING NONNATIVE FISH SUMMARY

	*Bonanza Bridge			*Horseshoe Bend			Baser/Chew			*The Stirrup			*Baeser Bend		
	SP	#	%	SP	#	%	SP	#	%	SP	#	%	SP	#	%
Trip 1	FH	414	66.7	BB	346	65.4	NOT SAMPLED			FH	3,571	53.6	FH	3,875	82.3
	BB	167	26.9	FH	127	24.0				BB	2,860	42.9	BB	729	15.5
	RS	24	3.9	RS	28	5.3				GS	111	1.7	RS	75	1.6
	CP	10	1.6	GS	25	4.7				RS	91	1.4	GS	13	<1
	SS	4	<1	BC	2	<1				WS	24	<1	SS	8	<1
	WS	2	<1	WS	1	<1				CP	4	<1	CC	5	<1
													CP	3	<1
													WS	2	<1
	TOT	621		TOT	529					TOT	6,661		TOT	4,710	
Trip 2	BB	417	65.9	BB	792	62.8	BB	38	23.3	NOT SAMPLED WITH FYKE NETS. A TRAP WAS SET IN BREECH TO MONITOR MOVEMENT OF FISH INTO AND OUT OF SITE DURING CONNECTION.			NOT SAMPLED WITH FYKE NETS. A TRAP WAS SET IN BREECH TO MONITOR MOVEMENT OF FISH INTO AND OUT OF SITE DURING CONNECTION.		
	FH	113	17.9	RS	310	24.6	SS	37	22.7						
	CP	49	7.7	FH	76	6.0	RS	29	17.8						
	SS	38	6.0	SS	25	2.0	FH	28	18.8						
	GS	12	1.9	GS	18	1.4	GS	5	3.1						
	WS	2	<1	CP	15	1.2	CC	4	2.5						
	RS	1	<1	WS	10	<1	WS	3	1.8						
				CC	9	<1	CP	3	1.8						
				NP	1	<1	RD	1	<1						
				RD	1	<1	NP	1	<1						
	TOT	632		TOT	1,257		TOT	149							
Trip 3	BB	42	42.0	RS	157	42.4	CP	27	41.5	NOT SAMPLED WITH FYKE NETS. A TRAP WAS SET IN BREECH TO MONITOR MOVEMENT OF FISH INTO AND OUT OF SITE DURING CONNECTION.			NOT SAMPLED WITH FYKE NETS. A TRAP WAS SET IN BREECH TO MONITOR MOVEMENT OF FISH INTO AND OUT OF SITE DURING CONNECTION.		
	CP	31	31.0	BB	96	25.9	BB	15	23.0						
	GS	6	6.0	SS	41	11.1	SS	9	13.8						
	SS	5	5.0	FH	32	8.6	FH	4	6.2						
	WS	5	5.0	CP	23	6.2	RS	2	3.1						
	FH	4	4.0	GS	2	<1	CC	1	1.5						
	RS	4	4.0	CC	2	<1									
				NP	1	<1									
				BC	1	<1									
				RD	1	<1									
	TOT	97		TOT	356		TOT	58							
Trip 4	BB	894	70.9	SS	329	49.9	RS	66	41.3	NOT SAMPLED WITH FYKE NETS. A TRAP WAS SET IN BREECH TO MONITOR MOVEMENT OF FISH INTO AND OUT OF SITE DURING CONNECTION.			NOT SAMPLED WITH FYKE NETS. A TRAP WAS SET IN BREECH TO MONITOR MOVEMENT OF FISH INTO AND OUT OF SITE DURING CONNECTION.		
	SS	149	11.8	RS	205	31.1	SS	53	33.1						
	RS	80	6.3	BB	69	10.5	FH	20	12.5						
	FH	73	5.8	FH	25	3.8	BB	6	3.8						
	GS	29	2.3	CP	15	2.3	WS	6	3.8						
	CP	17	1.3	GS	4	<1	GS	4	2.5						
	WS	12	<1	RD	4	<1	CC	1	<1						
	CC	3	<1	CC	2	<1									
	RD	1	<1	RB	1	<1									
	TOT	1,258		TOT	654		TOT	156							

1999 LEVEE REMOVAL SAMPLING NONNATIVE FISH SUMMARY

	*Bonanza Bridge			*Horseshoe Bend			Baser/Chew			*The Stirrup			*Baeser Bend		
	SP	#	%	SP	#	%	SP	#	%	SP	#	%	SP	#	%
Trip 5	SS	46	33.8	RS	378	66.9	RS	419	54.7	NOT SAMPLED WITH FYKE NETS A TRAP WAS SET IN BREECH TO MONITOR MOVEMENT OF FISH INTO AND OUT OF SITE DURING CONNECTION.			NOT SAMPLED WITH FYKE NETS A TRAP WAS SET IN BREECH TO MONITOR MOVEMENT OF FISH INTO AND OUT OF SITE DURING CONNECTION.		
	BB	29	21.3	FH	96	17.0	SS	225	29.4						
	RS	26	19.1	SS	57	10.1	FH	66	8.6						
	FH	13	9.6	BB	10	1.8	WS	16	2.1						
	CP	7	5.1	GS	7	1.2	BB	5	<1						
	WS	5	3.7	CP	4	<1	GS	2	<1						
	GS	3	2.2	WS	2	<1									
	CC	2	1.5	RD	2	<1									
				RB	1										
	TOT	131		TOT	557		TOT	733							
Trip 6	SS	501	49.3	SS	810	65.0	SS	943	56.6	NOT SAMPLED WITH FYKE NETS A TRAP WAS SET IN BREECH TO MONITOR MOVEMENT OF FISH INTO AND OUT OF SITE DURING CONNECTION.			NOT SAMPLED WITH FYKE NETS A TRAP WAS SET IN BREECH TO MONITOR MOVEMENT OF FISH INTO AND OUT OF SITE DURING CONNECTION.		
	BB	360	35.4	RS	256	21.0	RS	443	26.6						
	RS	97	9.5	BB	72	5.9	FH	158	9.5						
	FH	26	2.6	FH	60	4.8	WS	37	2.2						
	GS	15	1.5	GS	14	1.1	BB	13	<1						
	CP	9	<1	CC	2	<1	GS	12	<1						
	WS	6	<1	RD	2	<1	CP	2	<1						
	RD	3	<1	WS	1	<1	RD	1	<1						
				WE	1	<1									
				KS	1	<1									
	TOT	1,017		TOT	1,219		TOT	1,609							
Trip 7	BB	253	62.0	BB	2,172	44.7	NOT SAMPLED			FH	2,650	56.0	RS	1,552	45.3
	RS	85	20.8	RS	1,138	23.4				CP	630	13.3	BB	788	23.0
	CP	34	8.3	FH	680	14.0				BB	626	13.2	FH	347	10.1
	GS	17	4.2	GS	588	12.1				GS	474	10.0	SS	319	9.3
	FH	9	2.2	SS	115	2.4				RS	343	7.3	GS	316	9.2
	WS	6	1.5	WS	104	2.1				WS	7	<1	CP	94	2.7
	SS	4	<1	CP	25	<1							CC	2	<1
				CC	1										
	TOT	408		TOT	4,823					TOT	4,730		TOT	3,418	
Trip 10	BB	884	72.6	BB	5,319	60.9	NOT SAMPLED			FH	23,285	48.4	BB	4,053	66.8
	FH	268	22.0	FH	2,906	33.3				BB	19,252	40.1	FH	1,585	26.1
	GS	47	3.9	RS	312	3.6				GS	3,238	6.7	RS	225	3.7
	RS	9	<1	GS	83	<1				RS	1,684	3.5	CP	127	2.1
	CP	8	<1	SS	82	<1				CP	600	1.2	GS	73	1.2
	WS	2	<1	WS	15	<1				WS	10	<1	WS	5	<1
				CP	12	<1				CC	1	<1	SS	1	<1
				BC	6	<1									
				CC	3	<1									
	TOT	1,218		TOT	8,738					TOT	48,070		TOT	6,069	

1999 LEVEE REMOVAL SAMPLING NONNATIVE FISH SUMMARY

	*Bonanza Bridge			*Horseshoe Bend			Baser/Chew			*The Stirrup			*Baeser Bend		
	SP	#	%	SP	#	%	SP	#	%	SP	#	%	SP	#	%
Total =	BB	3,046	56.6	BB	8,876	48.9	SS	1,267	44.9	FH	29,506	49.6	FH	5,807	40.9
	FH	920	17.1	FH	4,002	22.1	RS	959	34.0	BB	22,738	38.2	BB	5,570	39.2
	SS	747	13.9	RS	2,784	15.4	FH	276	9.8	GS	3,823	6.4	RS	1,852	13.0
	RS	326	6.1	SS	1,459	8.0	BB	77	2.7	RS	2,118	3.7	GS	402	2.8
	CP	165	3.1	GS	741	4.1	WS	62	2.2	CP	1,234	2.1	SS	328	2.3
	GS	129	2.4	WS	133	<1	CP	32	1.1	WS	41	<1	CP	224	1.6
	WS	40	<1	CP	94	<1	GS	23	<1	CC	1	<1	CC	7	<1
	CC	5	<1	CC	19	<1	CC	6	<1				WS	7	<1
	RD	4	<1	RD	10	<1	RD	2	<1						
				BC	9	<1	NP	1	<1						
				NP	2	<1									
				RB	2	<1									
				WE	1	<1									
				KS	1	<1									
	TOT	5,382		TOT	18,133		TOT	2,705		TOT	59,461		TOT	14,197	

Table 4. Summary of nonnative fish catch for sites between RM 268.0 and 249.0 during 1999 field season.

1999 LEVEE REMOVAL SAMPLING NONNATIVE FISH SUMMARY.

	*Above Brennan			*Johnson/J4			*Leota/L7A			Leota/L10			*Old Charlie Diked			Old Charlie Wash		
	SP	#	%	SP	#	%	SP	#	%	SP	#	%	SP	#	%	SP	#	%
Trip 1	BB	428	51.4	FH	5,669	91.3	FH	188	59.3	NOT SAMPLED			NOT SAMPLED			NOT SAMPLED		
	FH	269	32.3	BB	369	5.9	RS	71	22.4									
	RS	81	9.7	RS	125	2.0	GS	56	17.7									
	WS	41	4.9	GS	37	<1	BB	2	<1									
	CC	10	1.2	CP	7	<1												
	SS	2	<1	WS	2	<1												
	CP	1	<1															
	TOT	832		TOT	6,209		TOT	317										
Trip 2	NOT SAMPLED WITH FYKE NETS A TRAP WAS SET IN BREECH TO MONITOR MOVEMENT OF FISH INTO AND OUT OF SITE DURING CONNECTION.			FH	38	50.6	BB	1,381	68.9	RS	36	37.1	CP	74	58.7	RS	251	69.1
				CP	23	30.6	GS	254	12.7	SS	24	24.7	BB	17	13.5	FH	29	8.0
				CC	7	9.3	RS	223	11.1	FH	12	12.4	GS	14	11.1	CP	29	8.0
				BB	6	8.0	CP	95	4.7	CP	11	11.3	CC	8	6.3	SS	22	6.1
				RS	1	1.3	FH	51	2.5	BB	6	6.2	RS	8	6.3	CC	15	4.1
							CC	1	<1	GS	6	6.2	FH	4	3.2	BB	11	3.0
										CC	2	2.1	SS	1	<1	GS	6	1.7
				TOT	75		TOT	2,005		TOT	97		TOT	126		TOT	363	
Trip 3	NOT SAMPLED WITH FYKE NETS A TRAP WAS SET IN BREECH TO MONITOR MOVEMENT OF FISH INTO AND OUT OF SITE DURING CONNECTION.			BB	117	37.4	FH	56	30.1	RS	88	49.7	FH	20	28.2	CP	47	58.0
				FH	111	35.5	BB	55	29.6	BB	24	13.6	BB	19	28.8	BB	10	12.3
				RS	43	13.7	RS	27	14.5	CC	16	9.0	RS	11	15.5	RS	8	9.9
				CP	17	5.4	GS	26	14.0	FH	13	7.3	SS	6	8.5	CC	4	4.9
				SS	10	3.2	CP	13	7.0	SS	13	7.3	CP	4	5.6	SS	4	4.9
				CC	8	2.6	CC	5	2.7	CP	12	6.8	GS	4	5.6	FH	4	4.9
				GS	6	1.9	SS	4	2.2	GS	9	5.1	CC	2	2.8	GS	2	1.2
				WS	1	<1												
				TOT	313		TOT	186		TOT	175		TOT	66		TOT	79	
Trip 4	NOT SAMPLED WITH FYKE NETS A TRAP WAS SET IN BREECH TO MONITOR MOVEMENT OF FISH INTO AND OUT OF SITE DURING CONNECTION.			RS	328	30.0	BB	208	51.1	RS	118	42.6	CP	12	42.8	CP	117	90.7
				FH	309	28.3	GS	131	32.3	FH	66	23.8	CC	3	10.7	BB	4	3.1
				BB	259	23.7	FH	26	6.4	GS	65	23.5	GS	3	10.7	GS	4	3.1
				SS	148	13.6	RS	17	4.2	CP	10	3.6	BB	2	7.1	CC	2	1.6
				GS	28	2.6	SS	15	3.9	BB	9	3.2	RS	1	3.6	NP	2	1.6
				CC	11	1.0	CC	5	1.2	SS	5	1.8						
				CP	7	<1	CP	3	<1	CC	2	<1						
							NP	1	<1	WS	1	<1						
				TOT	1,090		TOT	406		TOT	276		TOT	21		TOT	129	
Trip 5	NOT SAMPLED WITH FYKE NETS A TRAP WAS SET IN BREECH TO MONITOR MOVEMENT OF FISH INTO AND OUT OF SITE DURING CONNECTION.			BB	191	44.2	BB	1,214	67.1	RS	284	59.3	CP	369	97.8	CP	77	92.8
				RS	85	19.7	FH	402	22.2	GS	88	18.4	RS	5	1.3	GS	3	3.6
				SS	54	12.5	GS	95	5.3	CP	44	9.2	CC	1	<1	RS	2	2.4
				FH	47	10.9	RS	43	2.4	FH	30	6.3				SS	1	1.2
				GS	43	10.0	SS	33	1.8	BB	20	4.2						
				CP	9	2.1	CC	14	<1	CC	7	1.5						
				CC	3	<1	CP	8	<1	SS	6	1.3						
				TOT	432		TOT	1,809		TOT	479		TOT	375		TOT	83	

1999 LEVEE REMOVAL SAMPLING NONNATIVE FISH SUMMARY.

	*Above Brennan			*Johnson/J4			*Leota/L7A			Leota/L10			*Old Charlie Diked			Old Charlie Wash		
	SP	#	%	SP	#	%	SP	#	%	SP	#	%	SP	#	%	SP	#	%
Trip 6	NOT SAMPLED			RS	562	49.2	BB	1,272	60.4	GS	50	50.5	CP	3,538	85.7	CP	730	96.1
	WITH FYKE NETS			FH	265	23.2	GS	548	26.0	FH	14	14.1	RS	456	11.1	RS	11	1.4
				SS	194	17.0	FH	95	4.5	CP	13	13.1	CC	50	1.2	GS	9	1.2
	A TRAP WAS SET IN			BB	69	6.1	RS	84	4.0	BB	12	12.1	SS	37	<1	BB	5	<1
	BREECH TO MONITOR			GS	27	2.4	SS	69	3.3	RS	6	6.1	FH	18	<1	CC	2	<1
	MOVEMENT OF FISH INTO			CP	11	<1	CP	24	1.1	SS	4	4.0	BB	11	<1	FH	1	<1
	AND OUT OF SITE DURING			CC	10	<1	CC	14	<1				GS	11	<1	SS	1	<1
	CONNECTION.			WS	1	<1	NP	1	<1							NP	1	<1
				TOT	1,139		TOT	2,107		TOT	99		TOT	4,121		TOT	760	
Trip 7	RS	1,490	59.2	BB	483	41.2	BB	176	37.2				CP	306	81.4			
	BB	531	21.1	CP	407	34.8	RS	122	25.8				GS	54	14.4			
	GS	199	7.9	RS	145	12.4	FH	85	18.0				FH	7	1.9			
	FH	192	7.6	FH	89	7.6	CP	47	9.9				RS	6	1.6			
	SS	59	2.3	GS	25	2.1	GS	32	6.8	NOT SAMPLED			BB	3	<1	NOT SAMPLED		
	BC	19	<1	CC	17	1.5	SS	11	2.3									
	CP	17	<1	SS	4	<1												
	CC	8	<1	BC	1	<1												
	WS	3	<1															
	TOT	2,518		TOT	1,171		TOT	473					TOT	376				
Trip 10	FH	1,857	61.8															
	BB	837	27.8															
	BC	171	5.7															
	RS	82	2.7															
	GS	31	1.0	NOT SAMPLED			NOT SAMPLED			NOT SAMPLED			NOT SAMPLED			NOT SAMPLED		
	WS	14	<1															
	CP	10	<1															
	CC	5	<1															
	TOT	3,007																
Total =	FH	2,318	36.5	FH	6,528	62.6	BB	4,308	59.0	RS	532	47.1	CP	4,303	84.5	CP	1,000	70.5
	BB	1,796	28.3	BB	1,494	14.3	GS	1,142	15.6	GS	218	19.3	RS	487	10.2	RS	272	19.2
	RS	1,653	26.0	RS	1,289	12.4	FH	903	12.4	FH	135	12.0	GS	86	1.4	FH	34	2.4
	GS	230	3.6	CP	481	4.6	RS	587	8.0	CP	90	8.0	CC	64	1.0	BB	30	2.1
	BC	190	3.0	SS	410	3.9	CP	190	2.6	BB	71	6.3	BB	52	<1	SS	28	2.0
	SS	61	<1	GS	166	1.6	SS	132	1.8	SS	52	4.6	FH	49	<1	GS	24	1.7
	WS	58	<1	CC	56	<1	CC	39	<1	CC	27	2.4	SS	44	<1	CC	23	1.6
	CP	28	<1	WS	4	<1	NP	2	<1	WS	1	<1				NP	3	<1
	CC	23	<1	BC	1													
	TOT	6,357		TOT	10,429		TOT	7,303		TOT	1,126		TOT	5,085		TOT	1,414	

Table 5. Summary of total fish catch for fyke netting in 6 river reaches during the 1999 field season.

1999 LEVEE REMOVAL RIVER REACH SAMPLING (FYKE NETS)

	REACH 1 (290.0 - 283.0)			REACH 2 (283.0 - 276.0)			REACH 3 (276.0 - 269.0)			REACH 4 (269.0 - 262.00			REACH 5 (262.0 - 255.0)			REACH 6 (255.0 - 248.0)		
	SP	#	%	SP	#	%	SP	#	%	SP	#	%	SP	#	%	SP	#	%
Trip 1	RS	40	56.3	RS	146	42.9	RS	137	34.0	RS	173	53.2	RS	30	50.8	RS	169	72.5
	SS	16	22.5	FH	124	36.5	SS	112	27.8	FH	69	21.2	FH	27	45.8	FH	39	16.7
	FH	9	12.7	SS	50	14.7	FH	92	22.8	SS	53	16.3	GS	1	1.7	BB	6	2.6
	GS	2	2.8	GS	8	2.4	GS	50	12.4	FM	16	4.9	SD	1	1.7	GS	5	2.1
	WS	1	1.4	BB	4	1.2	CS	5	1.2	BB	3	<1				SS	4	1.7
	NP	1	1.4	CS	2	<1	FM	3	<1	GS	3	<1				CC	3	1.3
	CS	1	1.4	SD	2	<1	CP	2	<1	BH	2	<1				RD	2	<1
	FM	1	1.4	FM	1	<1	BB	1	<1	CP	1	<1				NP	2	<1
				CC	1	<1	WS	1	<1	WS	1	<1				CS	1	<1
				WS	1	<1				RD	1	<1				FM	1	<1
				BN	1	<1				RT	1	<1				RZ	1	<1
										NP	1	<1						
										CC	1	<1						
	TOT	71		TOT	340		TOT	403		TOT	325		TOT	59		TOT	233	
Trip 8	BB	160	36.9	RS	788	65.0	RS	1041	70.2	RS	726	63.5	RS	180	53.6	RS	379	67.7
	RS	159	36.6	BB	150	12.4	SS	267	18.0	CP	218	19.1	BB	71	21.1	SS	64	11.4
	GS	35	8.1	GS	96	7.9	BB	101	6.8	SS	72	6.3	GS	31	9.2	CP	37	6.6
	SS	32	7.4	SS	90	7.4	CP	23	1.6	FH	56	4.9	CC	17	5.1	BB	35	6.3
	CC	17	3.9	CP	33	2.7	GS	19	1.3	BB	24	2.1	CP	16	4.8	GS	16	2.9
	CP	17	3.9	FH	31	2.6	CC	18	1.2	GS	21	1.8	SS	15	4.5	FH	10	1.8
	FH	8	1.8	CC	8	<1	FH	8	<1	CC	14	1.2	FH	2	<1	FM	6	1.1
	SD	3	<1	SD	6	<1	FM	2	<1	BH	4	<1	WS	2	<1	CC	5	<1
	WS	1	<1	RT	5	<1	WS	1	<1	SD	4	<1	BC	2	<1	WS	3	<1
	RZ	1	<1	BH	2	<1	BC	1	<1	WS	1	<1				KS	2	<1
	RT	1	<1	WS	2	<1	SD	1	<1	CS	1	<1				BC	1	<1
				CS	1	<1	RT	1	<1	FM	1	<1				NP	1	<1
										RT	1	<1				SD	1	<1
	TOT	434		TOT	1,212		TOT	1,483		TOT	1,143		TOT	336		TOT	560	
Trip 9	BB	1953	68.4	BB	2540	71.3	BB	1238	40.3	RS	278	39.9	RS	179	34.7	RS	204	46.3
	GS	352	12.3	RS	377	10.6	RS	1216	39.6	BB	206	29.6	BB	110	21.3	BB	78	17.7
	RS	259	9.1	GS	229	6.4	CP	280	9.1	GS	125	18.0	GS	90	17.4	CC	37	8.4
	CP	156	5.5	CP	212	6.0	GS	230	7.5	CP	60	8.6	FH	60	11.6	CP	37	8.4
	SS	99	3.5	SS	104	2.9	FH	69	2.2	FH	14	2.0	CP	43	8.3	FH	34	7.7
	FH	9	<1	FH	39	1.1	CC	19	<1	SS	7	1.0	SS	18	3.5	GS	33	7.5
	SD	8	<1	CC	37	1.0	SS	11	<1	CC	4	<1	CC	11	2.1	SS	12	2.7
	CC	7	<1	WS	17	<1	SD	3	<1	FM	2	<1	FM	2	<1	FM	3	<1
	FM	3	<1	CS	4	<1	WS	2	<1				BC	1	<1	SD	2	<1
	RT	2	<1	BC	1	<1	CS	1	<1				NP	1	<1	CS	1	<1
	WS	2	<1	NP	1	<1	FM	1	<1				CS	1	<1			
	BC	1	<1	BH	1	<1												
	NP	1	<1	SD	1	<1												
	BH	1	<1															
	CS	1	<1															
	RD	1	<1															
	TOT	2,855		TOT	3,563		TOT	3,070		TOT	696		TOT	516		TOT	441	

1999 LEVEE REMOVAL RIVER REACH SAMPLING (FYKE NETS)

	REACH 1 (290.0 - 283.0)		
	SP	#	%
Trip 10	BB	1593	73.5
	RS	276	12.7
	GS	140	6.5
	CC	77	3.6
	SS	32	1.5
	FH	19	<1
	CP	17	<1
	FM	7	<1
	BC	4	<1
	SD	1	<1
	TOT	2,166	
Total =	BB	3706	67.1
	RS	734	13.3
	GS	529	9.6
	CP	190	3.4
	SS	179	3.2
	CC	101	1.8
	FH	45	<1
	SD	12	<1
	FM	11	<1
	BC	5	<1
	WS	4	<1
	RT	3	<1
	NP	2	<1
	CS	2	<1
	RZ	1	<1
	BH	1	<1
	RD	1	<1
	TOT	5,526	

	REACH 2 (283.0 - 276.0)		
	SP	#	%
Trip 10	BB	2179	84.5
	RS	148	5.7
	GS	140	5.4
	CP	59	2.3
	SS	22	<1
	FH	12	<1
	FM	10	<1
	CC	5	<1
	WS	1	<1
	BC	1	<1
	BH	1	<1
	SD	1	<1
	TOT	2,579	
Total =	BB	4873	63.3
	RS	1459	19.0
	GS	473	6.1
	CP	304	4.0
	SS	266	3.5
	FH	206	2.7
	CC	51	<1
	WS	21	<1
	FM	11	<1
	SD	10	<1
	CS	7	<1
	RT	5	<1
	BH	4	<1
	BC	2	<1
	NP	1	<1
	BN	1	<1
	TOT	7,694	

	REACH 3 (276.0 - 269.0)		
	SP	#	%
Trip 10	BB	1368	63.5
	RS	268	12.4
	FH	182	8.5
	GS	174	8.1
	CP	121	5.6
	SS	14	<1
	WS	12	<1
	CC	8	<1
	FM	5	<1
	BH	1	<1
	TOT	2,153	
Total =	BB	2708	38.1
	RS	2662	37.4
	GS	473	6.7
	CP	426	6.0
	SS	404	5.7
	FH	351	4.9
	CC	45	<1
	WS	16	<1
	FM	11	<1
	CS	6	<1
	SD	4	<1
	BC	1	<1
	RT	1	<1
	BH	1	<1
	TOT	7,109	

	REACH 4 (269.0 - 262.00		
	SP	#	%
Trip 10	RS	71	28.7
	BB	56	22.7
	CC	47	19.2
	GS	28	11.3
	SS	18	7.3
	CP	17	6.9
	FH	7	2.8
	NP	2	<1
	FM	1	<1
	TOT	247	
Total =	RS	1248	51.8
	CP	296	12.3
	BB	289	12.0
	GS	177	7.3
	SS	150	6.2
	FH	146	6.1
	CC	66	2.7
	FM	20	<1
	BH	6	<1
	SD	4	<1
	NP	3	<1
	RT	2	<1
	WS	2	<1
	RD	1	<1
	CS	1	<1
	TOT	2,411	

	REACH 5 (262.0 - 255.0)		
	SP	#	%
Trip 10	BB	213	32.9
	CC	128	19.8
	RS	110	17.0
	FH	103	15.9
	GS	76	11.7
	CP	8	1.2
	WS	5	<1
	SS	3	<1
	FM	2	<1
	TOT	648	
Total =	RS	499	32.0
	BB	394	25.3
	GS	198	12.7
	FH	192	12.3
	CC	156	10.0
	CP	67	4.3
	SS	36	2.3
	WS	7	<1
	FM	4	<1
	BC	3	<1
	SD	1	<1
	NP	1	<1
	CS	1	<1
	TOT	1,559	

	REACH 6 (255.0 - 248.0)		
	SP	#	%
Trip 10	CC	120	30.5
	RS	108	27.4
	FH	66	16.8
	CP	34	8.6
	GS	20	5.1
	SS	12	3.0
	WS	12	3.0
	FM	11	2.8
	BB	8	2.0
	BH	2	<1
	SM	1	<1
	TOT	394	
Total =	RS	860	52.8
	CC	165	10.1
	FH	149	9.2
	BB	127	7.8
	CP	108	6.6
	SS	92	5.7
	GS	74	4.5
	FM	21	1.3
	WS	15	<1
	NP	3	<1
	SD	3	<1
	RD	2	<1
	CS	2	<1
	BH	2	<1
	KS	2	<1
	RZ	1	<1
	BC	1	<1
	SM	1	<1
	TOT	1,628	

Table 6. Summary of electrofishing results from 6 river reaches during the 1999 field season.

	1999 LEVEE REMOVAL RIVER REACH SAMPLING (ELECTROFISHING)																	
	REACH 1 (289.8 - 288.6)			REACH 2 (281.0 - 280.6)			REACH 3 (276.5 - 275.5)			REACH 4 (268.8 - 267.7)			REACH 5 (256.2 - 255.0)			REACH 6 (250.4 - 249.4)		
	SP	# Caught	# Observed	SP	# Caught	# Observed	SP	# Caught	# Observed	SP	# Caught	# Observed	SP	# Caught	# Observed	SP	# Caught	# Observed
Trip 1	CP	7	6	CP	7	4	FM	9	7	CP	5	0	CP	5	0	CP	37	0
	FM	3	6	FM	6	0	BH	5	1	FM	5	0	CS	2	0	CS	2	0
	CS	1	0	CS	5	3	CP	3	2	CS	2	0	FM	1	0			
	CC	1	0	BH	1	0	CC	3	0	BH	1	0	SM	1	0			
	BH	1	0	CC	1	0	CS	2	3	CC	1	0						
	WS	1	0				NP	1	0									
	WE	1	0															
	TOT	15	12	TOT	20	7	TOT	23	13	TOT	14	0	TOT	9	0	TOT	39	0
Trip 4	CP	12	9	CP	2	6	CP	3	15	FM	1	1	CP	2	0	CP	5	0
	FM	3	5	FM	3	1	FM	3	3	CS	0	2	CC	1	0	FM	3	0
	BH	4	0	CS	3	0	CS	2	1	CC	0	2	CS	1	0	CS	1	0
	CS	1	2	CC	1	0	CC	0	1	CP	0	1	FM	1	0			
	TOT	20	16	BH	0	1												
				TOT	9	8	TOT	8	20	TOT	1	6	TOT	5	0	TOT	9	0
Trip 6	CP	1	4	FM	2	5	CP	7	4	CP	1	5	CP	12	22	CP	7	9
	FM	1	1	CP	1	1	FM	5	2				FM	5	2	FM	3	1
	BH	1	0	CS	1	0	CS	1	2				BH	2	0	CS	2	1
					4	6	BH	1	0				CS	0	0			
	TOT	3	5	TOT			TOT	14	8	TOT			TOT	19	24	TOT	12	11
Trip 8	CP	0	2	CP	3	4	CP	4	8									
		0	2	RZ	0	1	CC	0	1									
				BB	1	0	FM	0	1	NOT SAMPLED			NOT SAMPLED			NOT SAMPLED		
					4	5	RT	1	0									
	TOT			TOT			TOT	5	10									
Trip 9	CP	4	4	CP	1	8	CP	4	4	CP	8	0	CP	8	9	CP	14	10
	CC	1	0	CC	1	2	FM	2	1	CC	3	0	CC	7	1	FM	8	0
	WS	1	0	CS	0	1	CC	1	0	FM	3	0	FM	4	1	CC	2	2
	CS	1	0	FM	0	2				SM	1	0	SM	1	0	CS	0	1
	FM	1	0							BB	1	0	CS	0	1			
	TOT	8	4	TOT	2	13	TOT	7	5	TOT	16	0	TOT	20	12	TOT	24	13

1999 LEVEE REMOVAL RIVER REACH SAMPLING (ELECTROFISHING)																		
	REACH 1 (289.8 - 288.6)			REACH 2 (281.0 - 280.6)			REACH 3 (276.5 - 275.5)			REACH 4 (268.8 - 267.7)			REACH 5 (256.2 - 255.0)			REACH 6 (250.4 - 249.4)		
	SP	# Caught	# Observed	SP	# Caught	# Observed	SP	# Caught	# Observed	SP	# Caught	# Observed	SP	# Caught	# Observed	SP	# Caught	# Observed
Trip 10	CP	4	6	CP	8	16	FM	3	2	BH	3	0	CP	10	20	CC	17	4
	CC	0	2	FM	6	2	CP	1	5	CP	1	3	CC	4	0	CP	10	17
	SM	1	0	CS	1	3	CC	2	1	CC	2	0	FM	4	0	FM	3	2
	FM	0	1	CC	3	1	BH	1	0	FM	1	0	SM	1	0	SM	2	0
				RT	2	0										CS	0	2
				BH	1	0												
				GS	1	0												
				NP	0	1												
	TOT	5	9	TOT	22	23	TOT	7	8	TOT	7	3	TOT	19	20	TOT	32	25
Total =	CP	28	31	CP	22	39	FM	22	16	CP	15	9	CP	37	51	CP	73	36
	FM	8	13	FM	17	10	CP	22	42	FM	10	1	FM	15	3	CC	20	6
	BH	6	0	CS	10	7	BH	7	1	CC	6	0	CC	12	1	FM	17	3
	CS	3	2	CC	6	3	CC	6	3	BH	4	2	CS	3	1	CS	5	4
	CC	2	2	BH	2	1	CS	5	6	CS	2	2	SM	3	0	SM	2	0
	WS	2	0	RT	2	0	NP	1	0	SM	1		BH	2	0			
	SM	1	0	BB	1	0	RT	1	0	BB	1							
	WE	1	0	GS	1	0												
				NP	0	1												
				RZ	0	1												
	TOT	51	48	TOT	61	62	TOT	64	68	TOT	39	14	TOT	72	56	TOT	117	49