I. Project Title: Young-of-the-year Colorado pikeminnow monitoring

II. Principal Investigator(s):

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III. Project Summary:

This project monitors populations of endangered fishes in Utah. The following objectives have been outlined for young-of-the-year (YOY) Colorado pikeminnow:

1. Develop annual indices of relative abundance of YOY Colorado pikeminnow.

2. Determine trend(s) in these indices.

3. Determine relationships between these indices and stream flow, water temperature, abundance of sympatric fishes, and physical characteristics of backwaters.

Annual monitoring of young-of-the-year Colorado pikeminnow for the 2004 field season included fall seining of backwater habitats in the middle and lower Green River and the Colorado River.

IV. Study Schedule:

a. Initial year: 1986
b. Final year: ongoing

V. Relationship to RIPRAP:

V. Monitor populations and habitat and conduct research to support recover actions (research, monitoring, and data management).

V.A. Measure and document population and habitat parameters to determine status and biological response to recovery actions.

VI. Accomplishment of FY 2004 Tasks and Deliverables, Discussion of Initial Findings and Shortcomings

Task 1 Field sampling by seining backwater habitats to monitor young-of-the-year Colorado pikeminnow and other sympatric fish species.

Middle Green River

Annual monitoring for YOY Colorado pikeminnow began on September 27 and was completed on October 6, 2004. Seining began at the uppermost subreach near river-mile 320 (Split Mountain) and continued down-river by sampling two backwater habitats within ever 5-mile subreach and concluded near river-mile 215 (Sand Wash). Two backwaters were sampled in each subreach for a total of 42 backwaters sampled. Main channel temperatures ranged from 15 ^{o}C to 19 ^{o}C. Backwater temperatures ranged from 15 ^{o}C to 22 ^{o}C.

Sixty YOY Colorado pikeminnow were captured, measured and released during the 2004 field sampling activities. YOY Colorado pikeminnow captured during 2004 averaged 44 mm. This is 8 mm longer than the 10-year average for this reach. Lengths ranged from 31 – 63 mm (Table 1). Distribution of captures was from river-mile 300 to 224 and included the capture of 19 YOY Colorado pikeminnow near river-mile 224 (Figure 1).

Other YOY native species collected include flannelmouth sucker (n = 43), bluehead sucker (n = 3), *Gila* spp. (n = 15) and two flannelmouth/white sucker hybrids. Seine samples continue to be dominated by nonnative cyprinids including red shiner, fathead minnow and sand shiner. There were a total of 11 nonnative species collected in seine samples. These included channel catfish (n = 4), carp (n = 1), fathead minnows (n = 337), green sunfish (n = 8), red shiners (n = 5524), speckled dace (n = 2), smallmouth bass (n = 2), sand shiners (n = 1207), white suckers (n = 5), red side shiner (n = 1) and one yellow bullhead.

Table 1. Total numbers, lengths and mean catch-per-unit-effort (CPUE; fish/100m^2), by

year, for Colorado pikeminnow caught during young-of-year monitoring on the middle Green River (Reach 4), 1990-2004.

	Colorado Pikeminnow Caught	Mean Length (mm)	Length Range (mm)	Total Area Sampled (m^2)	CPUE (Fish/100m^2)
Year					
1990	341	45.4	28 – 80	5093	5.5
1991	524	38.2	21 – 65	5077	10.3
1992	183	43.1	26 – 133	4697	3.9
1993	305	36.4	21 – 59	3960	7.7
1994	15	67.2	60 – 80	4356	0.3
1995	75	34.5	21 – 48	3792	2.0
1996	79	39.4	25 – 60	3912	2.0
1997	22	36.0	28 – 49	3734	0.6
1998	73	38.5	22 – 61	4986	0.9
1999	12	33.7	25 – 45	3897	0.3
2000	31	50.9	37 – 76	3798	0.8
2001	8	46.9	36 – 67	4496	0.2
2002	0	N/A	N/A	5202	0
2003	2	52	52 – 52	4696	0.04
2004	60	43.8	31 – 63	4686	1.28

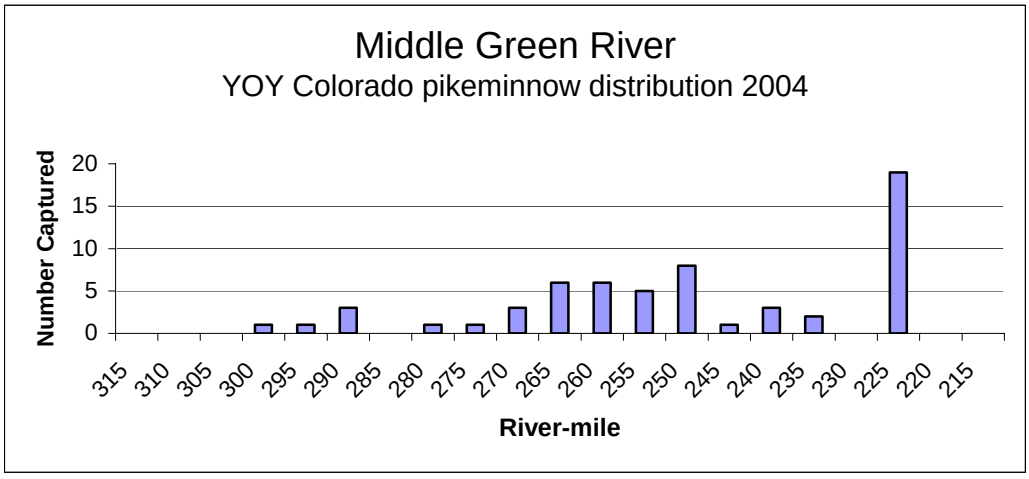


Figure 1. Distribution of YOY Colorado pikeminnow captured in the middle Green River during annual monitoring: 2004.

Lower Green River/ Colorado River

The annual ISMP sampling for YOY Colorado pikeminnow was completed

during September 7-20, 2004. One group of three researchers sampled RM 110-0 of the Colorado River (reach 1) and RM 120-0 of the lower Green River (reach 3). Backwaters were sampled in 16 of 24 sub-reaches in the lower Green River and 15 of 22 sub-reaches in the Colorado River. In the Colorado River, water temperatures ranged from 18-21 ^{o}C in the main channel and 16-25 ^{o}C in backwaters. In the Green River, water temperatures ranged from 19 to 22 ^{o}C in the main channel and 17 to 22 ^{o}C in backwaters.

Discharge at the time of sampling on the Colorado River was 2,700 to 3,800 cfs. Very few backwaters were present and some that were below ISMP protocol length, width and depth were sampled. Discharge at the time of sampling on the Green River was 1,320 to 1,500 cfs. As on the Colorado River, researchers found relatively few backwaters. Many subreaches did not contain any backwaters. Backwaters that fell below the ISMP protocol were sampled on the Green River as well.

In the Colorado River, 16 Colorado pikeminnow were captured, measured and released. Seven habitats that did not meet standards of ISMP protocol were sampled. Three of the 16 Colorado pikeminnow were collected in these habitats. In the Green River, 80 Colorado pikeminnow were captured, measured and released. Six habitats that did not meet the standards of the ISMP protocol were sampled in the Green River. Twenty of the 80 Colorado pikeminnow were collected in these habitats. All fish were sorted, identified and enumerated in the field. The average length of Colorado pikeminnow was 46 and 47 mm in the Green and Colorado rivers, respectively (Fig. 2). These lengths represent a 10-20 mm decrease in average length from those reported in 2002 and 2003, and are similar to those reported in 2001 (Table 2). Colorado pikeminnow were primarily distributed in the lower 60 miles of the Green River. In the Colorado River, pikeminnow were more widely distributed however in very low numbers. One seine haul at river mile 53 produced half of the total pikeminnow collected in the Colorado River (Fig. 3).

Other YOY native species captured included *Gila* spp., flannelmouth suckers, bluehead suckers, and speckled dace. Four *Gila* spp. captured in the Colorado River represented a decrease from the 35 captured in 2002, yet an increase from zero captured in 2003. No *Gila* spp. were captured in the Green River. Ray counts were recorded for *Gila* spp. captured if they were large enough to allow for accurate counts. Although there was potential for capturing wild bonytail (reproduction from hatchery-reared fish) to appear in these samples, all chubs were identified as *Gila* spp., as species identification of chubs this size in the field is difficult. Total catches in both reaches were dominated by nonnative cyprinids. In the Colorado River, eight nonnative species were captured. These included red shiners, sand shiners, fathead minnow, common carp, channel catfish, plains killifish, western mosquitofish and smallmouth bass. In the Green River, six nonnative species were captured. These included red shiners, sand shiners, fathead minnows, channel catfish, black bullheads, and green sunfish. The number of nonnative cyprinids captured in 2004 was similar to numbers captured in 2003, and much lower than 2002.

Table 2. Total numbers, lengths and mean catch-per-unit-effort (CPUE; fish/100m^2), by year,

for Colorado pikeminnow caught during young-of-year monitoring on the Colorado and lower Green Rivers, 1993-2004.

	Colorado Pikeminnow Caught	Mean Length (mm)	Length Range (mm)	Total Area Sampled (m^2)	CPUE (Fish/100m^2)
Year					
1993					
Total	1355	36.83	14-74	7479	18.11
Reach 3	1211	37.36	14-74	4574	26.47
Reach 1	142	32.28	22-47	2905	4.88
1994					
Total	453	54.26	23-99	7030	6.44
Reach 3	315	49.98	23-99	3844	8.19
Reach 1	138	64.07	32-96	3186	4.33
1995					
Total	141	22.11	11-45	5612	2.51
Reach 3	57	24.94	13-45	2722	2.09
Reach 1	84	20.46	11-35	2890	2.90
1996					
Total	1276	42.7	19-75	7269	17.55
Reach 3	410	41.4	19-75	2981	13.75
Reach 1	866	39.6	20-81	4160	20.81
1997					
Total	52	29.8	13-40	5581	0.93
Reach 3	40	33.1	19-40	2821	1.41
Reach 1	12	18.3	13-34	2760	0.43
1998					
Total	340	32.4	18-68	7945	4.28
Reach 3	250	32.1	18-68	3235	7.79
Reach 1	88	34.5	20-60	4710	1.87
1999					
Total	312	26.7	15-43	8892	3.51
Reach 3	304	26.8	15-38	4102	7.41
Reach 1	8	25.0	19-43	4790	0.17
2000					
Total	789	39.7	21-88	10421	7.57
Reach 3	619	37.9	21-88	3704	16.71
Reach 1	170	45.7	25-82	6717	2.53

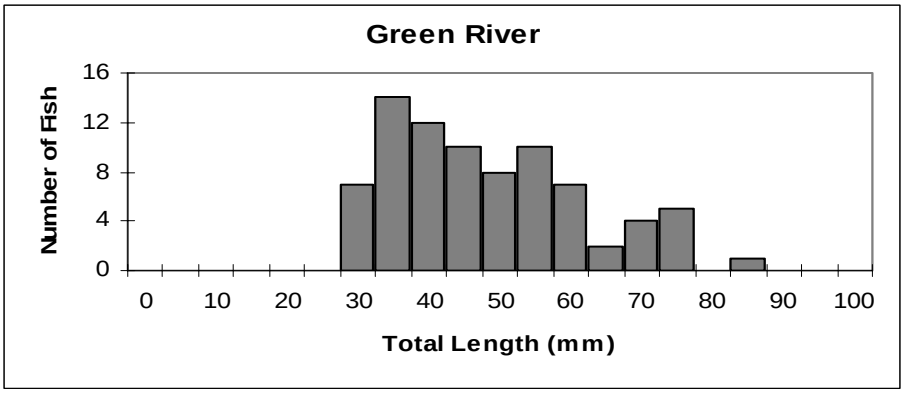
Table 2. cont.

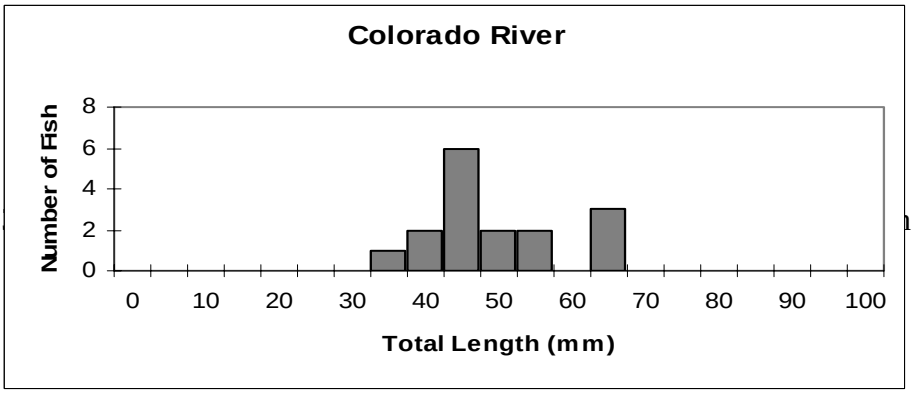
	Colorado	Mean Length	Length Range	Total Area	CPUE

	Pikeminnow Caught	(mm)	(mm)	Sampled (m^2)	(Fish/100m^2)
2001					
Total	29	42.7	23-68	9842	0.29
Reach 3	14	43.2	30-68	6015	0.23
Reach 1	15	42.3	23-65	3832	0.39
2002					
Total	47	60.8	22-90	7732	0.61
Reach 3	22	64.9	22-90	4662	0.47
Reach 1	25	57.2	32-87	3070	0.81
2003					
Total	121	60.1	30-96	6936	1.74
Reach 3	121	60.1	30-96	4052	2.98
Reach 1	0	na	na	2884	0
2004					
Total	96	46	26-84	3590	2.67
Reach 3	80	46	26-84	1974	4.05
Reach 1	16	47	33-63	1616	0.99

Reach 3: Green River, RM 120 to RM 0 (Confluence with the Colorado River)
Reach 1: Colorado River, RM 110 to RM 0 (Confluence with the Green River)
*Does not include fish over 100 mm. (Or 1@92 mm in 1999)

Figure2. Length frequency distribution of YOY Colorado pikeminnow in the Colorado and lower Green Rivers during ISMP sampling 2004.





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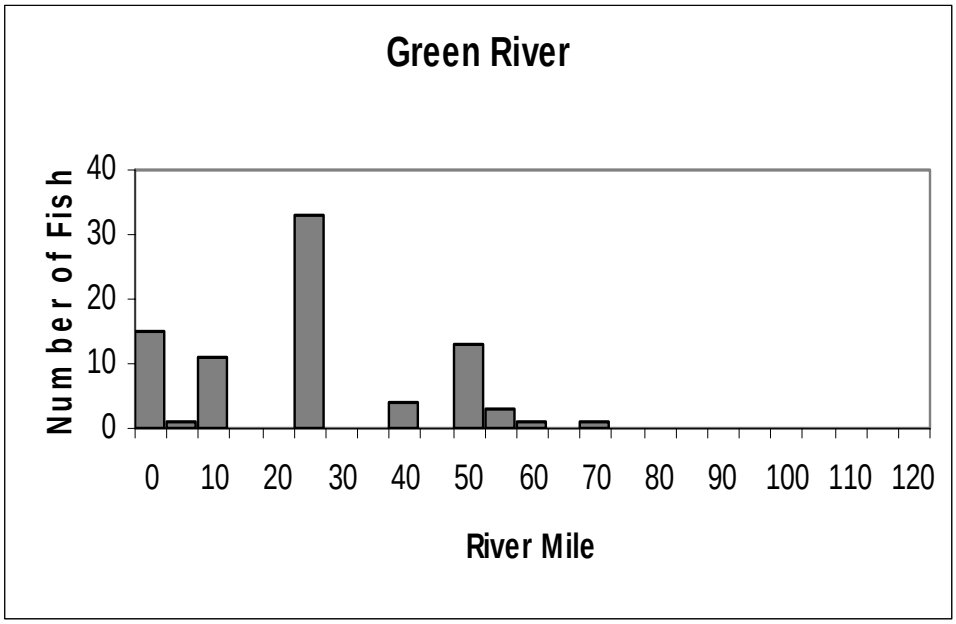
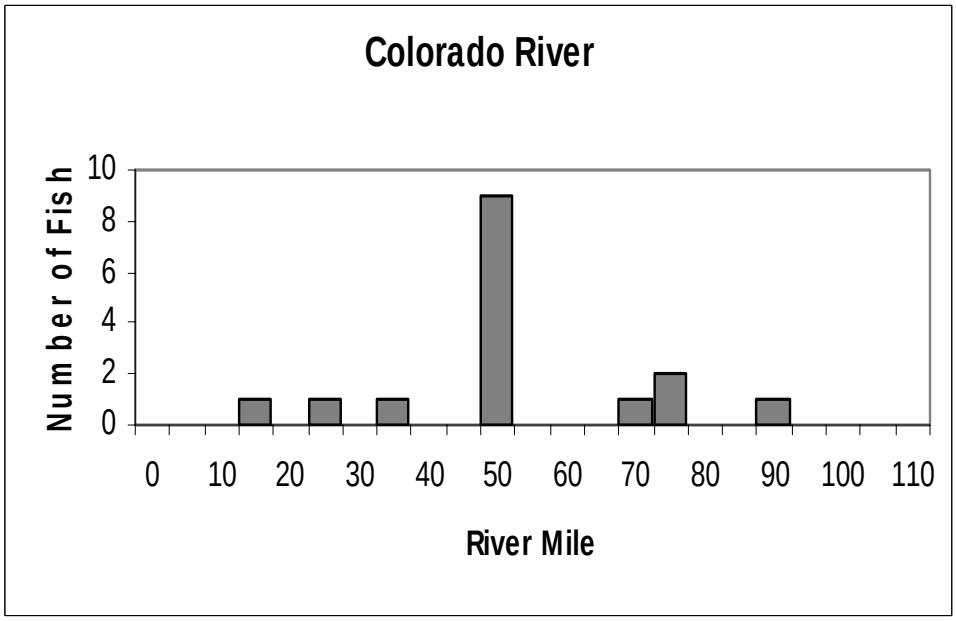

Green River
Number of Fish
40
30
20
10
0
0 10 20 30 40 50 60 70 80 90 100 110 120
River Mile


Colorado River
Number of Fish
10
8
6
4
2
0
0 10 20 30 40 50 60 70 80 90 100 110
River Mile

VII. Recommendations:

A. Continue to monitor annual relative abundance of post-larval Colorado pikeminnow in the middle Green River to develop indices and determine the relationships between these indices and stream flow, water temperature, abundance of sympatric fishes, and physical characteristics of backwaters.

B. Results of fall seining illustrate the continued effects of our ongoing drought conditions. Currently, the back and mouth of backwaters along with backwaters of maximum depth of less than .3 meters are not sampled. In many instances, it has been observed that these habitats contain many pikeminnow. Including these areas and shallow habitats would increase the detection of pikeminnow.

C. With the adult portion of ISMP eliminated, there is a need for improved monitoring of YOY Colorado pikeminnow. An increase in effort involving a more thorough sampling of available backwaters could improve the validity of the data collected.

D. Protocols for species identification of captured YOY *Gila* spp. need to be developed in order to detect successful reproduction by hatchery-reared stocked bonytail. This may include preserving a sub-sample of captured YOY *Gila* spp. for laboratory identification.

VIII. Project Status:

On track and ongoing

IX. FY 2004 Budget Status

A. Funds Provided: $50,100
B. Funds Expended: $50,100
C. Difference: $0
D. Percent of the FY 2004 work completed, and projected costs to complete: 100%
E. Recovery Program funds spent for publication charges: $0

X. Status of Data Submission (Where applicable): Data will be submitted to database manager January, 2005.

XI. Signed: Ronald Brunson 11/16/04
Investigator Date