

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:

GENERAL RECOVERY SUPPORT ACTION PLAN

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 2005 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 29 and was completed on October 18, 2005. 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 that contained at least two backwaters. A total of 39 of the possible 42 backwaters were sampled. Main channel temperatures ranged from 10 °C to 14 °C. Backwater temperatures ranged from 10 °C to 16 °C. Green River discharge ranged from 1800 – 2200 cfs during the period of sampling.

Eight YOY Colorado pikeminnow were captured, measured and released during the 2005 field sampling activities for YOY Colorado pikeminnow monitoring. YOY Colorado pikeminnow averaged 49 mm. This is 12 mm longer than the 10-year average for this reach. Lengths ranged from 35 – 60 mm (Table 1). Distribution of captures was four captured at river-mile 248.8 and four at 226.8.

Other YOY native species collected include flannelmouth sucker (n = 17), bluehead sucker (n = 2), *Gila* spp. (n = 10) and one speckled dace. Seine samples continue to be dominated by nonnative cyprinids including red shiner, fathead minnow and sand shiner. There were a total of 9 nonnative species collected in seine samples. These included channel catfish (n = 3), carp (n = 10), fathead minnows (n = 508), green sunfish (n = 16), red shiners (n = 10559), smallmouth bass (n = 6), sand shiners (n = 2574), white suckers (n = 16) and black crappie (n = 37).

Table 1. Total numbers, lengths and mean catch-per-unit-effort (CPUE; fish/100m<sup>2</sup>), by year for Colorado pikeminnow caught during young-of-year monitoring on the middle Green River (Reach 4), 1990-2005.

Year	Colorado Pikeminnow Caught	Mean Length (mm)	Length Range (mm)	Total Area Sampled (m <sup>2</sup> )	CPUE (Fish/100m <sup>2</sup> )
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
2005	8	48.6	35 – 60	4190	0.2

#### Colorado River/ Lower Green River

The annual ISMP sampling for YOY Colorado pikeminnow was completed during September 6-10, 2005. One group of three researchers began seining the Colorado River (reach 1) at the uppermost subreach near river-mile 110 (Cisco Landing) and continued down-river by sampling two backwater habitats within ever 5-mile subreach and concluded near river-mile 16.5 (Indian Creek). Backwaters were sampled in 12 of 19 sub-reaches in the Colorado River. Subreaches within miles 15-0 (below Indian Creek) were not sampled due to time constraints and limited backwater habitats. Another group of three researchers sampled RM 120-0 of the lower Green River (reach 3). Backwaters were sampled in 21 of 24 sub-reaches in the lower Green River. In the Colorado River, water temperatures ranged from 21-26 °C in the main channel and 19-32 °C in backwaters. In the Green River, water temperatures ranged from 20 to 24 °C in the main channel and 18 to 29 °C in backwaters.

Discharge for the first four days of sampling on the Colorado River was between 3280 and 3720 cfs; on the last day of sampling (Potash to Indian Creek) river flows reached 5100 cfs. Very few backwaters that met ISMP protocol standards were present in several subreaches and none were found below RM 29. Due to this limitation, some backwaters that

were below ISMP protocol length , width and depth were sampled. Discharge for the first three days of sampling on the Green River was 2,130 to 2,340 cfs, and on the last day it increased by over 1000 cfs due to heavy rains. As on the Colorado River, researchers found relatively few backwaters and 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, 19 Colorado pikeminnow were captured, measured and released. This number is comparable to what has been found the last four years, but well below the number of YOY pikeminnow captured in 2000 or the years prior to 1996 (Table 2). In the Green River, 64 Colorado pikeminnow were captured, measured and released. One of these fish captured measured over 100mm (137mm) and hence was not included with the YOY sampling data. All fish were sorted, identified and enumerated in the field. The average length of Colorado pikeminnow was 36.1 and 31.2 mm in the Colorado and Green rivers, respectively (Fig. 1). These lengths represent a 10-15 mm decrease in average length from those reported in 2004, and are considerably smaller than averages reported in 2002-2003, but within the range of those reported in earlier years (Table 2). Colorado pikeminnow were distributed throughout the entire 120 miles of the Green River, with nearly half of fish being found in the last 20 miles. In the Colorado River, pikeminnow were not as widely distributed. One seine haul at river mile 44.8 produced nearly half of the total pikeminnow collected in the Colorado River (Fig. 2), and the rest were captured in only two other backwater habitats.

Other YOY native species captured in the Colorado river included Gila spp., flannelmouth suckers and bluehead suckers. Flannelmouth were likewise captured in the Green River; however, no Gila spp. or bluehead suckers were captured in the Green River.

Although non-native fishes were not enumerated in reaches 1 and 3, empirical data suggests that total catches in both reaches were dominated by nonnative cyprinids. In the Colorado River, seven nonnative species were captured. These included red shiners, sand shiners, fathead minnow, black bullhead, common carp, channel catfish, western mosquitofish and smallmouth bass. In the Green River, eight nonnative species were captured and identified. These included red shiners, sand shiners, fathead minnows, common carp, channel catfish, black bullheads, black crappie and green sunfish.

Table 2. Total numbers, lengths and mean catch-per-unit-effort (CPUE; fish/100m<sup>2</sup>), by year, for Colorado pikeminnow caught during young-of-year monitoring on the Colorado and lower Green rivers, 1993-2005.

Year		Colorado Pikeminnow Caught	Mean Length (mm)	Length Range (mm)	Total Area Sampled (m <sup>2</sup> )	CPUE (Fish/100m <sup>2</sup> )
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	Nov-45	5612	2.51
	Reach 3	57	24.94	13-45	2722	2.09
	Reach 1	84	20.46	Nov-35	2890	2.9
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	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

2001	Reach 1	170	45.7	25-82	6717	2.53
	Total	29	42.7	23-68	9842	0.29
	Reach 3	14	43.2	30-68	6015	0.23
2002	Reach 1	15	42.3	23-65	3832	0.39
	Total	47	60.8	22-90	7732	0.61
	Reach 3	22	64.9	22-90	4662	0.47
2003	Reach 1	25	57.2	32-87	3070	0.81
	Total	121	60.1	30-96	6936	1.74
	Reach 3	121	60.1	30-96	4052	2.98
	Reach 1	0	N/A	N/A	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
2005	Total	82	33.7	23-48	4659	1.62
	Reach 3	63	31.2	23-41	2937	2.14
	Reach 1	19	36.1	28-48	1722	1.10

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)

Figure 1. Length frequency distribution of YOY Colorado pikeminnow in the Colorado and lower Green rivers during 2005 ISMP sampling.

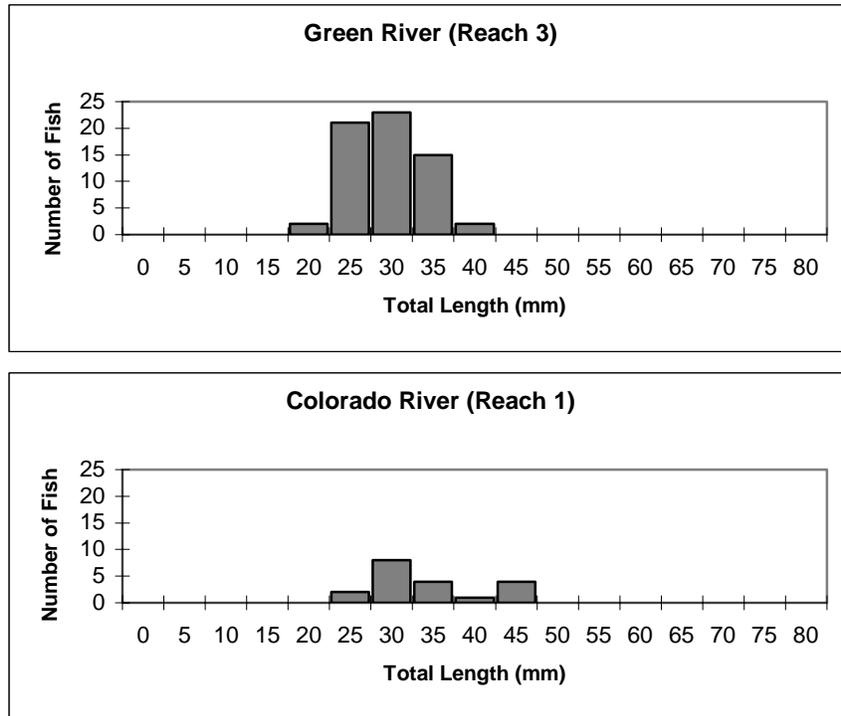
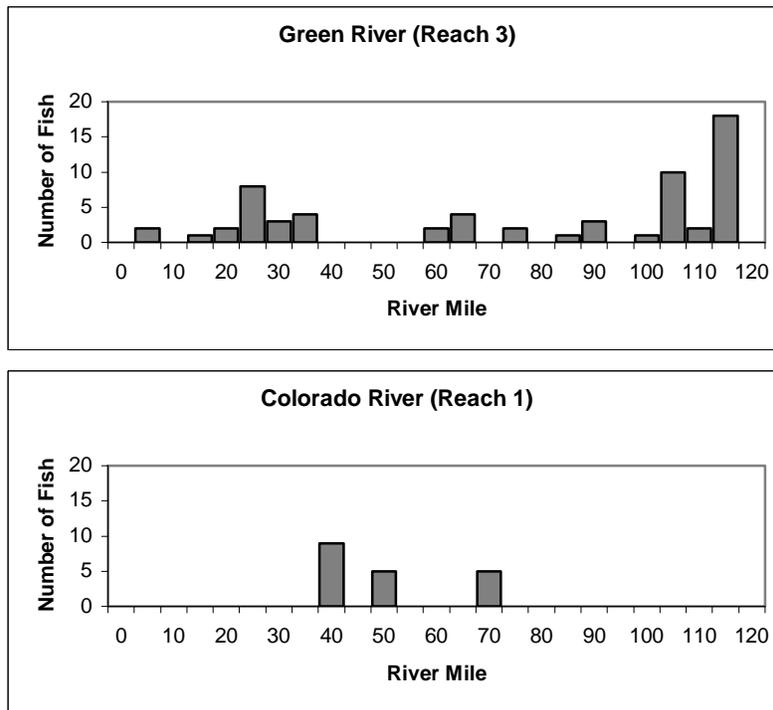


Figure 2. Reach wide distribution of Colorado pikeminnow on the Green and Colorado rivers during 2005 ISMP sampling.



VII. Recommendations:

- a. Continue to monitor annual relative abundance of post-larval Colorado pikeminnow in the middle Green River, lower Green River and lower Colorado 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. Currently, the back and mouth of backwaters along with backwaters of maximum depth of less than .3 meters and lengths less than 30 meters are not included in the ISMP protocol. In many instances, it has been observed and reported 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 2005 Budget Status

- A. Funds Provided: \$52,045
- B. Funds Expended: \$52,045
- C. Difference: \$0
- D. Percent of the FY 2005 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, 2006.

XI. Signed: Patrick L. Goddard November 10, 2005  
Investigator Date