

**COLORADO RIVER RECOVERY PROGRAM
FY 2006 ANNUAL PROJECT REPORT**

**RECOVERY PROGRAM
PROJECT NUMBER: 138**

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

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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. Determine size and relative numbers of YOY Colorado pikeminnow at the end of their first growing season to complement larval and juvenile sampling data.
2. Using new and existing data, determine relationship between larval and YOY Colorado pikeminnow CPE abundance estimates with respect to flow and temperature.
3. Using new and existing data, develop predictive model that relates larval and

YOY Colorado pikeminnow abundance.

4. Using new and existing data, determine relationship between YOY and juvenile Colorado pikeminnow CPE abundance estimates with respect to YOY size, flow, and temperature.
5. Using new and existing data, develop predictive model that relates YOY and juvenile Colorado pikeminnow abundance.

IV. Study Schedule: 2006 - 2008

V. Relationship to RIPRAP:

GENERAL RECOVERY SUPPORT ACTION PLAN

V. Monitor populations and habitat and conduct research to support recovery 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 2006 Tasks and Deliverables, Discussion of Initial Findings and Shortcomings

Task Description (FY 2006):

- I. Middle Green River (reach 4) Seine backwaters and low velocity habitats to collect data for endangered, native, and nonnative fish. Collect physical habitat data.
- II. Lower Green River (reach 3) Seine backwaters and low velocity habitats to collect data for endangered, native, and nonnative fish. Collect physical habitat data.
- III. Lower Colorado River (reach 1) Seine backwaters and low velocity habitats to collect data for endangered, native, and nonnative fish. Collect physical habitat data.
- IV. Analyze past and current data to determine relationships between larval and YOY Colorado pikeminnow CPE abundance estimates and YOY and juvenile Colorado pikeminnow abundance estimates.
- V. Develop and refine predictive models.

Task I - *Middle Green River (Reach 4)*

Annual monitoring for YOY Colorado pikeminnow began on September 13 and was completed on October 3, 2006. Seining began at the uppermost sub-reach near river-mile 320 (Split Mountain) and continued down-river by sampling two backwater habitats within every 5-mile sub-reach and concluded near river-mile 215 (Sand Wash). Two backwaters were sampled in each sub-reach unless that sub-reach did not contain two backwaters. A total of 40 of the possible 42 backwaters were sampled. Main channel temperatures ranged from 7°C to 22°C. Backwater temperatures ranged from 9°C to 23°C. Green River discharge began at just under 1100cfs, peaked at 1800cfs, and fell back to 1500cfs by the end of the sampling period. Efforts in 2006 were slightly different than 2005. In comparison, sampling in 2005 began on September 29th and ended on October 18th. Temperatures over this time ranged from 10°C to 14°C in the main channel and 10°C to 16°C in the backwaters. Green River discharge ranged from 1800 – 2200cfs during the period of sampling in 2005.

Five YOY Colorado pikeminnow were captured, measured, and released during the 2006 field sampling activities for YOY Colorado pikeminnow monitoring. YOY Colorado pikeminnow averaged 46 mm. This is only 4 mm longer than the 10-year average for this reach (1995-2005). Lengths ranged from 36 – 50 mm (Table 1, Figure 1). One pikeminnow was captured at river-mile 238.8, one at 220, and three at 216.

Only one other YOY native species was collected: flannelmouth sucker (n = 16). Seine samples continue to be dominated by nonnative cyprinids including red shiner, fathead minnow and sand shiner. There were a total of 12 nonnative species collected in seine samples (in comparison to nine in 2005). These included fathead minnow (n = 3451), carp (n = 147), green sunfish (n = 15), red shiner (n = 64,139), smallmouth bass (n = 2), sand shiner (n = 5705), white sucker (n = 10) black crappie (n = 21), black bullhead (n = 6), bluegill (n = 303) (interestingly, 300 of these were captured in one seine haul in one backwater at river mile 224.9), brown trout (n = 21), gizzard shad (n = 28), and 9173 unidentified shiner. Some of these numbers show an extremely large increase from 2005 numbers; however, the area sampled was also larger. The largest observed increase was for red shiner, which went from 10,559 to 64,139 individuals seined. Taking area sampled into account, this translates to 252 red shiner/100m² in 2005 vs. 856 red shiner/100m² in 2006. From 2005 to 2006, we also saw an overall decrease in the number and diversity of natives, from 38 total natives representing five species in 2005 to 21 total natives representing only two species in 2006.

Task II. & III : Lower Green River (Reach 3), Colorado River (Reach 1)

The annual ISMP sampling for YOY Colorado pikeminnow was completed during September 11-14, 2006. One group of three researchers began seining the Colorado River (reach 1) at the uppermost sub-reach near river-mile 110 (Cisco Landing) and continued down-river by sampling two backwater habitats within every 5-mile sub-reach, as available, concluding near river-mile 16.5 (Indian Creek). Backwaters were sampled in 13 of 19 sub-reaches in the Colorado River. Sub-reaches 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 16.5 to 21 °C in the main channel and 14 to 25.5 °C in backwaters. In the Green River, water temperatures ranged from 21 to 24 °C in the main channel and 24 to 29 °C in backwaters. Temperature data, however, was not taken on the Green River stretch after September 11 due to the loss of the necessary equipment. Discharge for the sampling on the Colorado River began at 5000 cfs on September 11 and steadily dropped an average of 150 cfs per day ending at 4550 cfs the last day of sampling (9/14/2006). Due to the higher flows some backwaters sampled were below ISMP protocol length, width and depth. Discharge for the sampling on the Green River was fluctuated between 1550 cfs and 1300 cfs.

In the Colorado River, 4 Colorado pikeminnow were captured, measured and released. All fish were sorted, identified and enumerated in the field, and all non-natives encountered were removed from the system. The number of Colorado pikeminnow captured is significantly lower than every previous year except 2003 when no fish were captured (Table 2, Figure 1). The average length of the four Colorado pikeminnow was 42 mm, which is comparable to the ten-year average length (1996-2006) from this reach at 38.8 mm (Table 2, Figure 1). Colorado pikeminnow were only found in the last sub-reach, two fish per backwater (river-miles 19.1 and 17.3). In the Green River, 331 Colorado pikeminnow were captured, measured and released. All fish were sorted, identified and enumerated in the field, and all nonnative fishes encountered were removed from the system. The number of Colorado pikeminnow captured was much higher than the past few years, with the exception of 619 fish having been captured in 2000 (Table 3, Figure 1). The average length of Colorado pikeminnow was 40.3 mm which is slightly below the ten-year average length (1996-2006) of 41.5 (Table 3, Figure 1). The Colorado pikeminnow were distributed throughout the entire 120 miles of the Green River, with 78% of the fish found in the last 55 miles and half the fish being found in the last 30 miles.

Other YOY native species captured in the Colorado River included flannelmouth suckers, bluehead suckers, and speckled dace. Six *Gila* spp were captured in the Green River as well as flannelmouth suckers and a razorback sucker. No speckled dace or bluehead suckers were captured in the Green River.

Nonnative captures were enumerated during the first seine haul in each primary habitat. Total catches in both reaches were dominated by nonnative cyprinids. In the Colorado River, twelve nonnative species were captured. These included sand shiners (215), red shiners (4,466), fathead minnows (292), common carp (3), black bullheads (2), yellow bullhead (2), plains killifish (1), largemouth bass (5), channel catfish (5), black crappie (2), green sunfish (10), and gambusia (110).

In the lower Green river, nine nonnative species were also captured. These included red shiners (8,623), fathead minnows (1,187), common carp (3), green sunfish (4), channel

catfish (6), black bullhead (2), largemouth bass (1), white sucker (1), and black crappie (1).

Task IV: *Analyze past and current data to determine relationships between larval and YOY Colorado pikeminnow CPE abundance estimates and YOY and juvenile Colorado pikeminnow abundance estimates.* Database development and management began in November 2006. Data analysis specific to relationships between larval, YOY, and juvenile abundance will begin in the winter of 2006.

Task V: *Develop and refine predictive models.* Development of predictive models will begin in the winter of 2006.

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. 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.
- c. Abundance of nonnative cyprinid species appears to be increasing in backwaters sampled. This possible trend should be confirmed or refuted through analysis of past data and addressed in a new removal scope of work if deemed necessary.

VIII. Project Status:

On track and ongoing

IX. FY 2006 Budget Status

- A. Funds Provided: \$56,508
- B. Funds Expended: \$45,206
- C. Difference: \$11,302
- D. Percent of the FY 2006 work completed: 80%
- E. Recovery Program funds spent for publication charges: \$0

X. Status of Data Submission: Task 1-3 data has been submitted to Paul Badame. Data will also be submitted to the program data manager before January 2007.

XI. Signed: Paul Badame November 17, 2006

Investigator

Date

Table 1. Total numbers, lengths and mean catch-per-unit-effort (CPUE; fish/100m²), by year for Colorado pikeminnow caught during young-of-year monitoring on the middle Green River (Reach 4), 1990-2006.

Year	Colorado Pikeminnow Caught	Mean Length (mm)	Length Range (mm)	Total Area Sampled (m ²)	CPUE (Fish/100m ²)
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
2006	5	45.8	36 - 50	7490	0.07

Table 2. Total numbers, lengths and mean catch-per-unit-effort (CPUE; fish/100m²), by year for Colorado pikeminnow caught during young-of-year monitoring on the lower Colorado River (Reach 1), 1993-2006.

Year	Colorado Pikeminnow Caught	Mean Length (mm)	Length Range (mm)	Total Area Sampled (m ²)	CPUE (Fish/100m ²)
1993	142	32.28	22-47	2905	4.88
1994	138	64.07	32-96	3186	4.33
1995	84	20.46	11-35	2890	2.9
1996	866	39.6	20-81	4160	20.81
1997	12	18.3	13-34	2760	0.43
1998	88	34.5	20-60	4710	1.87
1999	8	25	19-43	4790	0.17
2000	170	45.7	25-82	6717	2.53
2001	15	42.3	23-65	3832	0.39
2002	25	57.2	32-87	3070	0.81
2003	0	N/A	N/A	2884	0
2004	16	47	33-63	1616	0.99
2005	19	36.1	28-48	1722	1.1
2006	4	42	27-53	1646.4	0.24

Table 3. Total numbers, lengths and mean catch-per-unit-effort (CPUE; fish/100m²), by year for Colorado pikeminnow caught during young-of-year monitoring on the lower Green River (Reach 3), 1993-2006.

Year	Colorado Pikeminnow Caught	Mean Length (mm)	Length Range (mm)	Total Area Sampled (m ²)	CPUE (Fish/100m ²)
1993	1211	37.36	14-74	4574	26.47
1994	315	49.98	23-99	3844	8.19
1995	57	24.94	13-45	2722	2.09
1996	410	41.4	19-75	2981	13.75
1997	40	33.1	19-40	2821	1.41
1998	250	32.1	18-68	3235	7.79
1999	304	26.8	15-38	4102	7.41
2000	619	37.9	21-88	3704	16.71
2001	14	43.2	30-68	6015	0.23
2002	22	64.9	22-90	4662	0.47
2003	121	60.1	30-96	4052	2.98
2004	80	46	26-84	1974	4.05
2005	63	31.2	23-41	2937	2.14
2006	331	40.3	23-80	4936	6.71

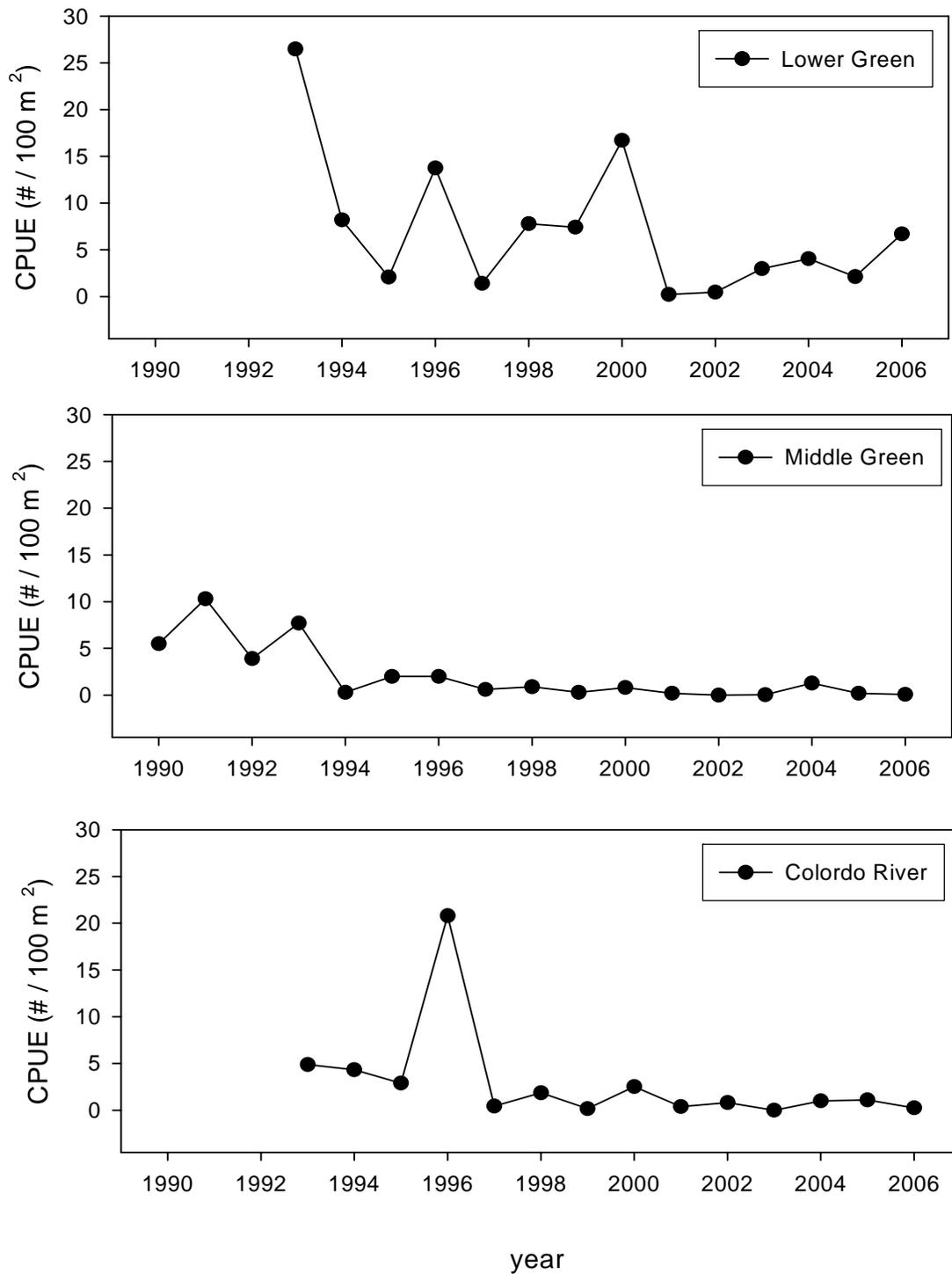


Figure 1 Annual catch rates for young of year Colorado pikeminnow fall seine sampling in the Green and Colorado Rivers. Points represent the total CPUE for each year.