

I. Project Title: Determination of Winter Use and Seasonal Flow Needs of Colorado
Pikeminnow in the Lower Price River

II. Principal Investigator:

J. Michael Hudson
Utah Division of Wildlife Resources
Moab Field Station
1165 S. Highway 191, Suite 4
Moab, UT 84532
435-259-3781 fax: 435-259-3785
email: michaelhudson@utah.gov

III. Project Summary

Historically, large numbers of native fish including Colorado pikeminnow, flannelmouth suckers, bluehead suckers, speckled dace, roundtail chubs, and possibly razorback suckers inhabited the Price River (Quartarone 1993). Impacts resulting from development (i.e., dams, water diversions, water pollution, mineral extraction, highways, railroads, etc.) reduced native fish numbers throughout the Green and Colorado river systems. The native fish community in the Price River experienced all of these impacts.

According to anecdotal accounts and early fish sampling, the native fish community in the Price River appears to have been severely impacted since the early part of the 20th century due to both biotic and physical changes. The extent of these instream habitat and flow alterations is not well understood, nor is the effect on the native fish community, including the endangered Colorado pikeminnow.

Endangered fish were absent from fish surveys in the Price River from the 1950s to the late 1970s. In fact, most biologists familiar with the system believed that endangered fish had been completely extirpated from this river. At the time that the endangered fish of the Colorado and Green rivers were beginning to be studied in earnest in the late 1960s and 1970s, researchers concluded these species to be mainly large river fish that dwelled in the main channels of the Green and Colorado rivers and not within small tributaries. As a result, research and recovery efforts focused on the mainstem systems and tributary communities were largely ignored.

With the proposed construction of the Narrows Dam Project in the headwaters of the Price River, Trout Unlimited sponsored a single, 5-day sampling trip through the lower 20 miles of the Price River to determine the status of the existing fish community. This survey resulted in the capture of one juvenile Colorado pikeminnow 2.2 miles above the confluence of the Green

River in 1995. Although possibly anomalous, the capture of this endangered fish was enough to prompt the Bureau of Reclamation to reinitiate consultation with the U.S. Fish and Wildlife Service (Service) to determine if the Narrows Dam Project was likely to adversely affect Colorado pikeminnow. Because so little was known about the fish community in the Price River in 1995, a 2-year study was initiated through the UCRRIP to determine the status of the fish community and the presence of endangered fish in the lower 50 miles.

The 2-year study, conducted from April through October in 1996 and 1997, unexpectedly found that juvenile and adult Colorado pikeminnow occupy the lower 50 miles of the Price River in densities comparable to other important reaches of the Green and Colorado river. Over 20 Colorado pikeminnow were captured ranging in size from just over 150 mm to nearly 600 mm (Cavalli 1999). In 1998, a Colorado pikeminnow was captured in the Price River 83.5 miles above the confluence with the Green River, and two more Colorado pikeminnow were captured at the base of the Farnham Diversion at RM 88.5 in 1999. The Farnham Diversion appears to be a barrier to further upstream movement.

These findings suggest that the Price River may be biologically important to the Green River populations of Colorado pikeminnow. The purpose of this project is to determine if the Colorado pikeminnow occupy the Price River seasonally or year-round and relate that information to seasonal flows, habitat use, and passage.

Field work for this project began in 2001 and continued in 2002. Price River sampling will be completed in summer 2003. Data was collected on fish community and from established habitat transects within each of the four designated one-mile subreaches in June, late August and early November in 2001. In 2002, data was collected on fish community and from the established habitat transects in late March, late May, and late October/early November. Electrofishing was also conducted in both years outside of the designated one-mile subreaches to gather additional fish community data and in an attempt to locate Colorado pikeminnow in the Price River. One Colorado pikeminnow was captured in June 2001 outside a designated one-mile subreach at RM 52.6. One Colorado pikeminnow was captured in May 2002 within the Reach 1 one-mile subreach. No additional endangered fish were captured or observed in either 2001 or 2002.

IV. Study Schedule:

- a. Initial Year: 2001
- b. Final Year: 2003

V. Relationship to the RIPRAP:

Protection of flows in the Price River will:

- 1) aid recovery of endangered fish species,
- 2) protect Colorado pikeminnow and its habitat within the Price River, and

3) contribute to maintaining flows in the Green and Colorado Rivers.

General Recovery Program Support:

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

Green River Action Plan:

- I.C. Price River
 - I.C.2. Determine winter use and seasonal flow needs for Colorado pikeminnow in the Price River

VI. Accomplishments of FY 2001–2002 Tasks and Deliverables, Discussion of Initial Findings and Shortcomings:

Objective 1: Determine if the lower Price River is used by Colorado pikeminnow from October through March.

Work toward completion of this objective was initially planned to begin in October 2000. Due to the final FY 2001 scope-of-work being approved subsequent to that date and early ice conditions on the Price River in the winter of 2000–2001, it was not possible to complete work toward this objective during the first winter identified in the original scope-of-work. The FY 2002 scope-of-work identified this shortcoming and adjusted the time frame of the project to compensate for the work not conducted in the winter of 2000–2001. Work toward completion of this objective is now occurring during the winters of 2001–2002 and 2002–2003.

2001

Electrofishing was conducted on the Price River during June, late August, and early November. These efforts covered an area of approximately 26 stream miles on the Price River. Most of this area was covered several times during the 31.86 electrofishing hours spanning the three sampling periods.

One Colorado pikeminnow was captured on June 5, 2001, at RM 52.6. This fish was 578 mm TL, 500 mm SL, and weighed 1,364 g. It was not a recapture and received a PIT tag (531213687E) before being released alive. It did not receive a radio tag.

Electrofishing was conducted on over 20 RM (15.48 electrofishing hours) of the Price River in early November in an attempt to locate Colorado pikeminnow to be radio tagged. No additional Colorado pikeminnow were captured or observed through this effort. During this period of sampling, eight beaver dams were encountered (three in RM 88.5– 82.5, two in RM 82.5–78.2, one in RM 54.8–53.8, one in RM 26–20.5, and one at RM 18). All but the two lowermost beaver dams appeared impassable and none of these dams were present during sampling that occurred earlier in the year. It is worth noting that Pete Cavalli (pers. comm.) never encountered a beaver dam previously on the Price River.

Due to a lack of radio-tagged Colorado pikeminnow in the Price River at this time, additional electrofishing efforts will be conducted during the winter of 2001–2002 as conditions allow.

2002

Electrofishing was conducted on the Price River during late March, late May, late October/early November. Work had originally been planned for July/August, but low flows in the Price River prevented electrofishing during this time in 2002. These efforts covered an area of approximately 33.8 stream miles on the Price River. Most of this area was covered several times during the 24.04 electrofishing hours spanning the three sampling periods.

One Colorado pikeminnow (CPM) was captured on May 30, 2002, at RM 19.15. This fish was 571 mm TL, 470 mm SL, and weighed 1,280 g. It was not a recapture and received a PIT tag (530870530C) before being released alive. It did not receive a radio tag due to concerns of excess stress on the fish with regards to surgery and abnormally high temperatures in the river at that time (28°C).

Electrofishing was conducted on over 30 stream miles (19.88 electrofishing hours) of the Price River in late October/early November in an attempt to locate Colorado pikeminnow to be radio tagged. No additional Colorado pikeminnow were captured or observed through this effort. During this period of sampling, five beaver dams were encountered (three in RM 88.5–82.5, one in RM 54.8–53.8, and one at RM 18). All of these beaver dams appeared impassable. In addition, there were several beaver dams that had previously existed and been breached by high flows during the summer monsoon season. Some of these dams were being reconstructed during the late October/early November sampling period. Finally, there was an extremely large rock slide dam located at RM 45.9. This dam is a barrier to migration and has effectively decreased by half the habitat available to upstream migrating Colorado pikeminnow.

Due to a lack of radio-tagged Colorado pikeminnow in the Price River at this time, additional electrofishing efforts will be conducted during the winter of 2002–2003 as conditions allow.

Objective 2: Generally characterize relationships between flow, habitat use and passage and endangered fish in the Price River.

Four geomorphic reaches are present in the Price River below the Farnham diversion dam (RM 88.5). Two of these reaches are alluvial reaches (below Farnham [Reach 4; RM 88.5–78] and the Woodside reach [Reach 2; RM 41–19.5]) and two are canyon (the Mounds [Reach 3; RM 78–41] and below Woodside [Reach 1; RM 19.5–0]). Within each of these geomorphic reaches, a one-mile subreach was designated for the purpose of collecting data on the respective fish communities and from established habitat transects while allowing for comparison within each subreach among sampling periods. The subreaches designated in the two alluvial geomorphic reaches (below Farnham [Reach 4] and the Woodside reach [Reach 2]) and the two canyon geomorphic reaches (the Mounds [Reach 3] and below Woodside [Reach 1]) were RM 88.5–87.5, RM 29.4–28.4, RM 54.8–53.8 and RM 19–18, respectively.

2001 Fish Community

Subreaches within each geomorphic reach were sampled during 2001 in June, late August, and early November for a total of 8.83 electrofishing hours (Table 1). Efforts resulted in the capture of flannemouth sucker (FM), bluehead sucker (BH), speckled dace (SD), carp (CP), channel catfish (CC), sand shiner (SS), bluehead/mountain sucker hybrids (BHxMS), bluehead/white sucker hybrids (BHxWS), Yellowstone cutthroat trout (YCT) and fathead minnow (FH). Endangered fish were not captured or observed during any of these sampling occasions.

The majority of captures were flannemouth sucker (n=398) and carp (n=373) with the majority of flannemouth sucker concentrated in Reach 3 and the majority of carp concentrated in Reach 4. Total lengths of flannemouth sucker ranged from 82 mm to 545 mm. Total lengths of carp ranged from 96 mm to 606 mm.

Table 1. Total captures in 2001 with respect to species, reach, and sampling occasion.

REACH (RM)	DATE	CPM ^a	SPECIES									
			FM	BH	SD	CP	CC	SS	BHx MS	BHx WS	YCT	FH
Reach 1 (19-18)	6/6/2001		28	6		9	2					
	8/28/2001		26			2						
	11/15/2001		29		1	5						
	Subtotal	-	83	6	1	16	2	-	-	-	-	-
Reach 2 (29.4-28.4)	6/6/2001		27	3	1	6	3	2	1			1
	8/23/2001		1			5						
	11/15/2001		13									
	Subtotal	-	41	3	1	11	3	2	1	-	0	1
Reach 3 (54.8-53.8)	6/4/2001		35	8	3	14	6					
	8/28/2001		73	5	3	13	7					
	11/16/2001		112	1	3	5	1					
	Subtotal	-	220	14	9	32	14	-	-	-	-	-
Reach 4 (88.5-87.5)	6/7/2001		53	16	2	215	23			1	2	
	8/9/2001			2	1	57	1					
	11/14/2001		1		1	42						
	Subtotal	-	54	18	4	314	24	-	-	1	2	-
TOTAL		-	398	41	15	373	43	2	1	1	2	1

^a Colorado pikeminnow (CPM) captured during 2001 sampling was caught outside of designated fish community sampling subreaches.

2002 Fish Community

Subreaches within each geomorphic reach were sampled during 2002 in late March, late May, and late October for a total of 7.31 electrofishing hours (Table 2). Efforts resulted in the capture of Colorado pikeminnow (CPM), flannemouth sucker (FM), bluehead sucker (BH), speckled dace (SD), carp (CP), channel catfish (CC), red shiner (RS) and fathead minnow (FH). One Colorado pikeminnow was captured on May 30, 2002, at RM 19.15 in Reach 1. No additional endangered fish were captured or observed during any of these sampling occasions.

The majority of captures were flannemouth sucker (n=367) and carp (n=192) with the majority of flannemouth sucker concentrated in Reach 3 and the majority of carp concentrated in Reach 4. Total lengths of flannemouth sucker ranged from 90 mm to 545 mm. Total lengths of carp ranged from 51 mm to 661 mm.

Table 2. Total captures in 2002 with respect to species, reach, and sampling occasion.

REACH (RM)	DATE	SPECIES							
		CPM	FM	BH	SD	CP	CC	RS	FH
Reach 1 (19-18)	3/28/2002		34	2		1	1		
	5/30/2002	1	19	2		5		1	1
	10/16/2002		35			2			
	Subtotal	1	88	4	–	8	1	1	1
Reach 2 (29.4–28.4)	3/27/2002		35	1	1	2			
	5/30/2002		44	4		9		4	
	10/17/2002		5						
	Subtotal	–	84	5	1	11	–	4	–
Reach 3 (54.8–53.8)	3/26/2002		89	2	6	9	1		
	10/28/2002		105	2	1	25	1	1	1
	Subtotal	–	194	4	7	34	2	1	1
Reach 4 (88.5–87.5)	3/25/2002			1	1	32			
	5/30/2002		1	3	4	36			
	10/15/2002			4	9	71			
	Subtotal	–	1	8	13	139	–	–	–
TOTAL		1	367	21	21	192	3	2	2

2001 Habitat

Five transects were established within each of the designated subreaches to collect habitat data. Transects represented at least two run and two riffle habitats per subreach. Where possible, a transect was established within each subreach that represented pool habitat. These transects were maintained among sampling occasions. Wetted width was measured at each transect. Water depth and mean column velocity were measured and substrate and cover were described at ten equidistant points along each transect.

All habitat data in 2001 was collected within a week of fish community sampling at approximately the same flows. Flows averaged 45.4, 26.5, and 41.8 cfs for the June, late August and early November sampling periods, respectively (Figure 1). Temperatures averaged 17.6, 21.3, and 5.8 °C for the June, late August and early November sampling periods, respectively (Figure 1).

GPS coordinates were recorded in 2001 at the approximate point of change between habitat types to assess channel characterization and describe percent habitat composition of subreaches at different flow regimes. A more comprehensive analysis of the habitat data collected is not available at this time.

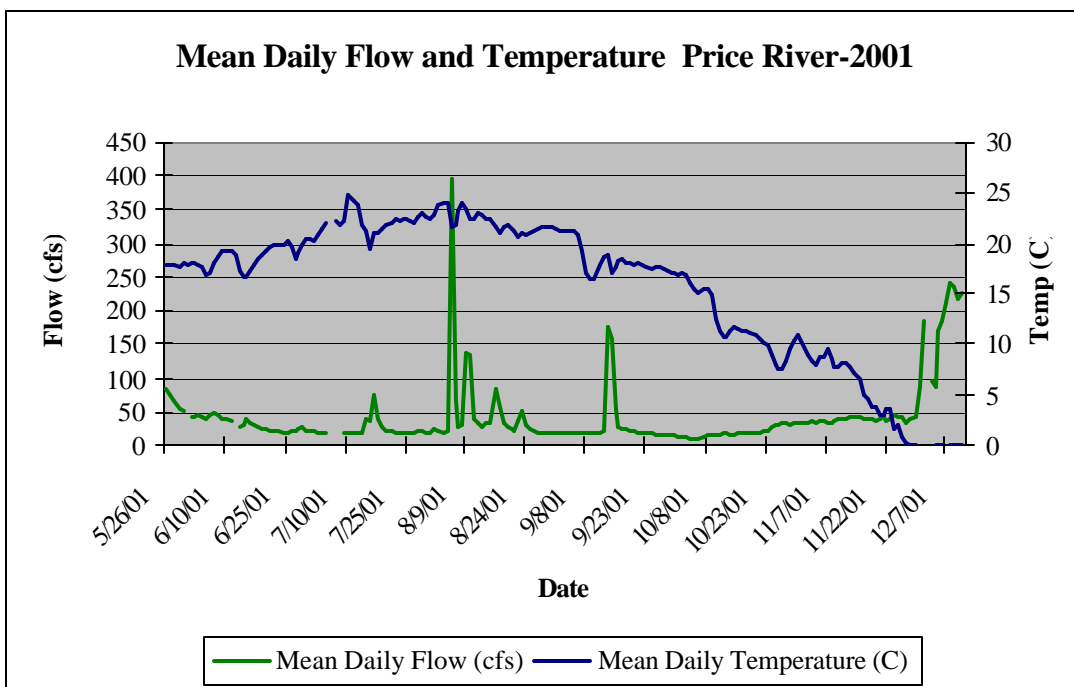


Figure 1. Mean daily flow and temperature on the Price River, late May to late December 2001. Provisional data provided by USGS gage #09314500 (Price River at Woodside).

2002 Habitat

The transects established in 2001 were maintained to collect habitat data throughout 2002 within each of the designated subreaches.

All habitat data was collected within a day of fish community sampling at approximately the same flows. Flows averaged 33, 29, and 26 cfs for the late March, late May and late October sampling periods, respectively (Figure 2). Temperature averaged 9.6, 23.5, and 9.0 °C for late March, late May and late October sampling periods, respectively. Fish community was not sampled in July/August due to low summer flows on the Price River. However, habitat sampling occurred for one riffle transect and one run transect within each subreach on July 22. Mean flow for that day was 9.6 cfs (Figure 2). During intensive electrofishing efforts to capture Colorado pikeminnow in early November, flows averaged 25.2 cfs (Figure 2) and temperature averaged 4.0 °C. Temperature is not included in Figure 2 because this data is not currently available from USGS gage #09314500 (Price River at Woodside).

GPS coordinates were recorded in 2002 at the approximate point of change between habitat types to assess channel characterization and describe percent habitat composition of subreaches at different flow regimes. A more comprehensive analysis of the habitat data collected is not available at this time.

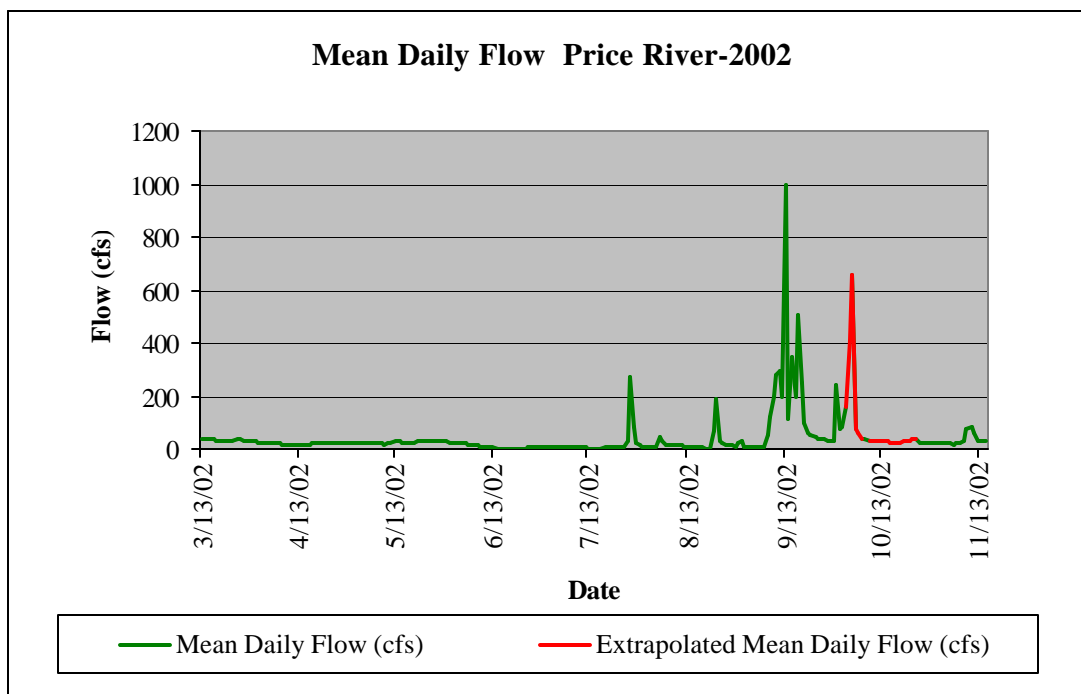


Figure 1. Mean daily flow on the Price River late May to mid-November 2002 (Provisional data provided by USGS gage #09314500 (Price River at Woodside). Missing data in

September/October was extrapolated from known data points.

VII. Recommendations:

- Efforts should continue toward determining seasonal use of the Price River by Colorado pikeminnow.
- Due to a lack of radio tagged fish during the winter of 2001–2002 and 2002–2003, winter electrofishing surveys will be conducted as conditions allow.
- A greater effort will be conducted to radio tag Colorado pikeminnow in late spring/ early summer to allow radiotelemetry to be conducted in 2003 to help determine the timing of Colorado pikeminnow movement in and out of the Price River.

VIII. Project Status: Ongoing; field work is approximately six months behind schedule as indicated in the most recent scope of work.

IX. FY2002 Budget

- A. Funds budgeted: \$51,300
- B. Funds expended/obligated: \$10,000
- C. Difference: \$41,300
- D. Percent FY2002 work completed: 20%
Projected costs to complete: covered by remaining funds*
- E. Recovery Program funds spent for publication charges: \$ 0

* *FY2002 funds were not completely expended because of the late start date on this project. FY2001 funds were completely expended prior to FY2002 funds being used. The remaining \$41,300 will be needed to complete field work through late spring 2003 and to complete the final report for this project.*

X. Status of Data Submission: Data will be submitted with the final report. A draft final report is due in May 2003.

XI. Signed: J. Michael Hudson Date: 12/10/2002