

I. Project Title: Cumulative Effects of Flaming Gorge Dam Releases, since 1996, on the Fish Community in Lodore and Whirlpool canyons, Green River.

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III. Project Summary: The primary purpose of this proposed study is to determine the cumulative effect that flow and temperature regimes have had on the fish community in Lodore and Whirlpool canyons of the Green River and recommend how to monitor effects into the future. A secondary purpose is to determine the distribution of the humpback chub population in Whirlpool Canyon to serve as the basis for future monitoring efforts. Future monitoring (i.e. population estimation), if deemed necessary, will be needed to evaluate the contribution of the Whirlpool Canyon population of humpback chub to the overall recovery of the species. Information gathered will be used to evaluate whether flow and temperature regimes from Flaming Gorge Dam are benefitting endangered fishes in the Green River without causing

adverse changes in abundance of non-native fishes.

IV. Study Schedule: 2002–2004.

V. Relationship to RIPRAP:

Green River Action Plan: Mainstem.

II.D. Evaluate and revise as needed flow regimes to benefit endangered fish populations.

VI. Accomplishment of FY 2002 Tasks and Deliverables, Discussion of Initial Findings and Shortcomings:

Task 1: Set and maintain thermographs.

Thermographs were set in the upper portion of Browns Park and just above Lodore canyon. This data will supplement that being gathered by George Smith, U.S. Fish and Wildlife Service, Denver, and by Dr. Mark Vinson, Utah State University, at up to 10 other localities in the Green River. The Green River upstream of the Yampa River likely experienced one of the warmest thermal regimes since Flaming Gorge Reservoir was filled. Mid-day water temperatures in mid-July were 25°C or higher and were nearly as warm as the unregulated Yampa River. This was due in large part to low flows from Flaming Gorge Dam, and extremely warm air temperatures.

Task 2: Sample main channel fish community (large-bodied fishes).

We completed two electrofishing trips through the study area, as prescribed in the study proposal. Very low flows and clear water prevailed through most sampling occasions but electrofishing efficiency was relatively low. A tentative list of the fishes captured by electrofishing, trammel netting, and seining is presented (Table 1). The fish community appeared qualitatively similar to that documented in 1994-1996. Number of fish captures seemed qualitatively lower than what was observed in sampling efforts from 1994 to 1996, but we have not yet analyzed that data.

We captured a total of four Colorado pikeminnow (*Ptychocheilus lucius*) during July electrofishing sampling and an additional six during September electrofishing (Table 2). An additional eight fish were observed but not netted during those two sampling efforts. Additional sampling (mostly angling) in Lodore Canyon in summer 2002 by C. Kitcheyan revealed presence of a relatively large group of adult pikeminnow. Four of ten fish were newly captured fish and were PIT-tagged. Three of the Colorado pikeminnow captured in July were ripe, tuberculate males, including one in Lodore Canyon.

Table 1.—Tentative list of fishes captured in the Green River, from Browns Park downstream to Rainbow Park with electrofishing, trammel nets, and seining, 2002.. N = native, I = introduced.

	Status	Electrofishing	Trammel netting	Seining
Mountain whitefish	N	X		X
Humpback chub	N		X	
Bonytail	N			X ¹
Roundtail chub	N	X	X	X
Colorado pikeminnow	N	X	X	X
Speckled dace	N	X		X
Bluehead sucker (BH)	N	X	X	X
Flannelmouth sucker (FM)	N	X	X	X
Razorback sucker (RBS)	N	X		
Mottled sculpin	N	X		X
Cutthroat trout	I	X		
Rainbow trout	I	X	X	
Brown trout	I	X	X	
Northern pike	I	X		
Red shiner	I			X
Common carp	I	X	X	X
Fathead minnow	I			X
Sand shiner	I			X
Redside shiner	I	X		X
White sucker (WS)		I	X	X
WS x FM		X		
FM x BH		X		
WS x BH		X		
RBS x FM		X		X
Channel catfish	I	X	X	X
Green sunfish	I	X		X
Smallmouth bass	I	X		X
Walleye	I	X		

We also captured a razorback sucker during September sampling that appeared to be a hybrid with flannelmouth sucker (*Catostomus latipinnis*). The hybrid assessment was made based on intermediacy of lateral series scale counts and mouth morphology between the two putative parental species, and the nearly non-existent dorsal keel. The fish had a PIT tag in it at capture. A scan of the PIT tag database suggested that it had been captured twice previously but no mention was made that the fish was potentially a hybrid.

Table 2. Captures of Colorado pikeminnow adults during July and September 2002 electrofishing sampling in the Green River in Lodore and Whirlpool canyons and Echo Park.

Date (dd/mm/yyyy)	Rivermile		R/L	TL (mm)	weight (g)	recapture	PIT tag #
	start	end					
09/07/2002	351.3	349.7	R	595	1576	yes	7F7D224D6B
09/07/2002	348.6	347.1	R	590	1645	yes	5318301332
11/07/2002	335.8	334.9	L	562	1323	no	4242351C2E
11/07/2002	333.6	333.6	L	544	1182	yes	5326687A03
09/09/2002	362.0	360.9	L	695	2581	no	4242425557
09/09/2002	358.3	358.2	L	598	1540	yes	7F7B134306
11/09/2002	344.1	342.4	L	525	988	yes	42424A6D3B
12/09/2002	339.0	338.5	R	536	1274	yes	42424E3358
12/09/2002	338.2	336.9	R	665	2305	no	53261D6534
12/09/2002	335.3	334.4	L	583	1566	no	5316014258

Unusual fish behavior noted during the July sampling trip prompted us to use one electrofishing raft from U. S. Fish and Wildlife Service, Grand Junction on the September trip, which replaced one of the Vernal, USFWS rafts. The Grand Junction boat sampling efficiency was much higher and it was later discovered that the Vernal boats had wiring problems. This situation has been rectified.

Trammel-netting in 2002 was conducted on two different sampling trips. One of those trips was an additional trip beyond that called for in the proposal to focus on Whirlpool Canyon sampling because the amount of trammel-netting conducted on earlier trips was limited. Trammel-netting yielded two Colorado pikeminnow, one humpback chub (*Gila cypha*, Fig. 1), and several other chubs that had morphological characteristics intermediate between *Gila robusta* and *G. cypha*.



Fig. 1. Putative humpback chub captured in the Green River, Whirlpool Canyon, September 2002.

Task 3: Sample small bodied fish community.

Over 200 seine samples were collected in the study area from middle Browns Park downstream to the lower end of Rainbow Park during spring, summer, and autumn. We are in the process of identifying those samples. Relatively few fish were collected in samples from Lodore Canyon compared to Whirlpool Canyon. Small-bodied smallmouth bass (*Micropterus dolomieu*) were found in backwaters throughout Whirlpool Canyon.

Task 4: Sample larval drift and process samples.

Drift samples were collected in the Green River just upstream of the Yampa River from 18 June 2002 until 4 August 2002. A total of 163 samples was collected, which included several diel samples at occasions throughout the summer. In general, fish were few in samples compared to drift net samples collected in the nearby Yampa River. We are beginning to identify those drift net samples.

Task 5: Process preserved samples of small-bodied fish (seine hauls).

We have completed preliminary identification of about 20% of seine samples. We have noted the presence of several small chubs as well as a few small Colorado pikeminnow from backwaters in Island and Rainbow parks.

Task 6: Prepare and submit annual report.

This report.

Task 7: Prepare final report (includes incorporation of peer review comments).

Not applicable.

Task 8: submit draft final report to Biology Committee.

Not applicable.

VII. Recommendations: This project should continue as planned in 2003. We will place additional emphasis on trammel net sampling in 2003, including making at least one additional trip over that planned for in the proposal if the budget allows.

VIII. Project Status: Ongoing and on track.

IX. FY 2002 Budget Status

- A. Funds Provided: \$65,695
- B. Funds Expended: \$54,615
- C. Difference: \$11,080 these funds are needed to finish identification of nearly 400 samples collected in 2002.
- D. Percent of the FY 2002 work completed, and projected costs to complete: 83% completed, remaining budget should cover costs.
- E. Recovery Program funds spent for publication charges: \$0

X. Status of Data Submission: Copy of data will be sent to the database manager in January.

XI. Signed: Kevin R. Bestgen 7 December 2002
Principal Investigator Date