

I. Project Title: **Humpback chub population estimate in Cataract Canyon, Colorado River, Utah.**

II. Principal Investigators:

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III. Project Summary:

The RIP recently identified recovery goals for the endangered humpback chub (*Gila cypha*). Recovery goals are based in part on maintaining populations of humpback chub in several locations, among which is the Cataract canyon population on the Colorado River. Identifying, maintaining, and monitoring a population necessitates obtaining accurate population estimates.

Objectives:

1. To obtain a population estimate of late juvenile/adult humpback chub in Cataract Canyon.
2. To identify if a relationship exists between ISMP catch rates and population size.

This project was initially scheduled to begin in 2002. However, due to record low flows

that year, the beginning was delayed until fall 2003. In 2004 three sampling trips were conducted within Cataract Canyon between October and mid-November. Sampling occurred in three primary sites which were identified as trend sites for long-term monitoring (RM 212-211, RM 208-207, RM 207-205). Due to low flows, the trend site at RM 207-205 was moved to RM 210 in both 2003 and 2004. No additional sites below the “big drops” (RM 202.7) were sampled in 2004.

A total of 28 individual humpback chub and 1 individual bonytail chub (*Gila elegans*) were collected in Cataract Canyon by trammel netting and electrofishing. All chubs were captured using trammel nets. Four humpback chub were recaptured between trips and two marked in 2003 were recaptured. The bonytail captured was hatchery-reared and previously marked with a coded wire tag. These data will be used to obtain an abundance estimate for humpback chub and bonytail within Cataract Canyon.

IV. Study Schedule:

- a. Initial year: 2003
- b. Final year: 2005

V. Relationship to RIPRAP:

General Recovery Program Support Action Plan
V.A.1. Conduct standardized monitoring program.

VI. Accomplishments of FY04 Tasks and Deliverables, Discussion of Initial Findings and Shortcomings:

Goal:

1. Estimate the Cataract Canyon humpback chub population with confidence intervals as tight as possible.
2. Transport presumed wild bonytail to a hatchery.

Three sampling trips were conducted in Cataract canyon on October 10–17, October 23–30, and November 7–14. Flows during sampling ranged from approximately 8,000 to 5,500 cfs. Daily mean water temperature ranged from 13° C to 9° C. Sampling occurred in three primary sites which were identified as trend sites for long-term monitoring (RM 212-211, RM 210, RM 208-207).

Humpbacks: A total of 43 humpback chub captures were recorded during 1,246 net hours of trammel netting, yielding a total catch rate of 0.035 fish/net hr (Table 1). No humpback chub were collected during 7.5 hours of electrofishing. Overall, 28 unique individuals were captured with a mean total length of 233.8 mm (range 200-298 mm TL, Figure 1). None of

the humpback chub captured were sub-adults (<200 mm TL).

A population estimate was calculated for humpback chub using program CAPTURE within the program MARK. The model selection procedure within CAPTURE was used to select an appropriate estimator. The null model (M_0) was selected by the program, this selection is supported by lack of any significant difference in catch rates between trips (Table 1). The estimate was calculated using 28 individuals and four recaptures between trips. The provisional population estimate for humpback chub in Cataract Canyon is 72 individuals ($\hat{p} = 0.151$, C.V. = 0.37) with a profile of likely hood of 39 - 160 individuals.

Bonytails: Only one bonytail chub was captured in 2004, this is a large reduction from the 20 captures and 16 individuals encountered in 2003. The bonytail captured was hatchery-reared and previously marked with a coded wire tag. The individual was healthy and measured 342 mm (total length).

Overall Catch: a total of 332 fish, consisting of Eleven species were captured in Cataract Canyon (Table 2). All four main-stem endangered species and three other native species were present and combined represented 28 % of the total catch. Humpback chub were the most common native fish present in our samples. Channel catfish were the most abundant species overall.

Discussion:

Although the point population estimate for 2004 is half the estimate for 2003, this is a result of only one more recapture and four fewer individuals caught. A relatively constant CPUE for humpbacks over the last two years would suggest that the population size has not changed much since 2003. The option of examining the estimates as sectional densities within large-scale habitats (ie. a large eddy complex) was discussed in the 2003 annual report. The basis for this idea was that humpbacks were not moving during the sample period and thus the assumption of mixing within the canyon was not met. This idea was further supported by our limited recapture data, in both 2003 and 2004 all recaptures occurred within the same large-scale habitat units. In addition, the two humpbacks recaptured from 2003 sampling had not moved from their original large-scale habitats. If the 2003 and 2004 point estimates were viewed as sectional densities (40-85 fish/mile) and then extrapolated over the available habitat above the “big drops” (approx. 7 river miles) the population estimate for the canyon would be 280-595 humpbacks within Cataract Canyon. This is a rough approximation for discussion sake. The point being that if we find no movement of recaptures over a 3 year time frame it should be clear that mixing within the entire canyon is not occurring during our sampling periods and the population estimates would only relate to the actual sections sampled.

An ongoing concern for this population is the lack of juvenile humpbacks in our samples. It is unclear if we are ineffective in sampling them or if they are the portion of the life history cycle which is suffering in this canyon. Seeing that the population has apparently persisted

at or near current levels it is probable that our methods are not effective for collecting juveniles. Given the potential effects of a 5+ year drought and the presence of adult bonytail chub, we believe that completion of the three year estimate will provide a much needed insight into the biological value of Cataract Canyon.

Table 1. Trammel net effort and catch rates for humpback and bonytail for all sites combined, Cataract canyon 2004.

Trip #	Effort (net hrs)	# HB Captures	HB CPUE (fish/net hr)	# BT Captures	BT CPUE (fish/net hr)
1	468.38	15	0.032	1	0.002
2	403.63	15	0.037	0	0.000
3	373.65	13	0.035	0	0.000
Total	1245.67	43	0.035	1	0.001

Table 2. Total trammel net captures for all species in Cataract Canyon 2004.

Trip #	BH	BT	CC	CP	CS	FM	HB	LM	RT	RZ	YB
1	4	1	80	28	4	11	15	1	0	0	4
2	5	0	57	11	1	11	15	0	0	0	1
3	1	0	42	15	2	5	13	0	1	3	1
Total	10	1	179	54	7	27	43	1	1	3	6

Cataract 2004 Humpback chub

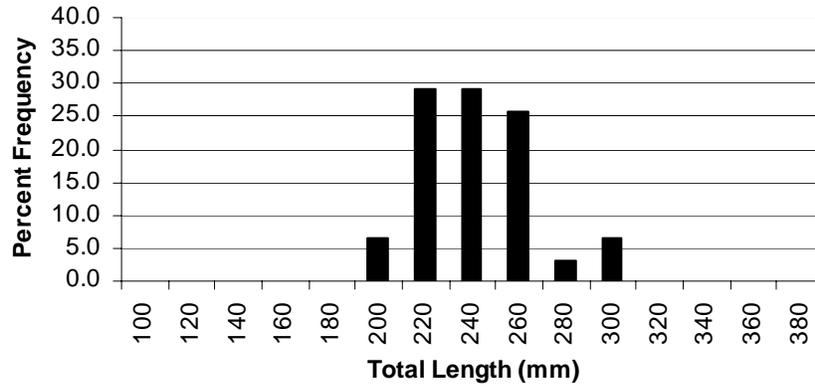


Figure 1. Percent total length frequency for humpback chub and bonytail captured via trammel netting and electrofishing within Cataract Canyon

VII. Recommendations:

- Continue with current 3 pass mark/recapture methods. Although catch rates (trammel net CPUE) were low, they were not much lower than observed in Desolation/Gray canyons. In addition the presence of adult bonytail should be closely monitored.
- Continue sampling in fall months to maintain consistency with past sampling and to reduce handling stress.
- Continue to focus adult chub sampling areas above the “big drops” section of the canyon.
- Consider viewing population estimates as sectional density estimates.

III. Project Status: Ongoing

Second year of three for project completed.

IX. FY04 Budget:

A. Funds budgeted:	\$ 84,000
B. Funds expended/obligated:	\$ 67,200
C. Difference:	\$ 16,800
D. Percent FY2004 work completed:	80%
E. Recovery Program funds spent for publication charges:	\$ 0

X. Status of data submission:

Data will be entered on the computer and transferred to USFWS by January 15, 2005.

XI. Signed: *Paul Badame* Date: 11/29/2004