

I. Population monitoring of humpback and bonytail chub in Cataract Canyon.

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III. Project Summary:

Achievement of recovery goals for humpback chub requires monitoring the six known self-sustaining populations in the upper and lower Colorado River basins. Sampling in Cataract Canyon began in 1979 under the USFWS Colorado River Fishery Project (Valdez et al. 1982), and then continued under the U.S. Bureau of Reclamation contracted studies with Bio/West (Valdez 1990). Between 1990 and 2000, sampling was conducted intermittently by the Utah Division of Wildlife Resources (UDWR). This sampling included annual monitoring of the fish community in Cataract Canyon which was added to the Interagency Standardized Monitoring Program (ISMP) beginning in 1998. The catch rates observed during these studies were variable and the population size could not be determined from these data.

Between 2003 and 2005, three pass, mark/recapture sampling was conducted to obtain three annual point estimates for adult humpback in the canyon (Badame 2008). The estimates for the Cataract population ranged from 273 - 468 humpbacks within the canyon. Due to the small size of the population and probable violations of modeling assumptions it was determined that this level of monitoring was unnecessary and that in 2008 monitoring would return to assessing annual fall catch rate trends. The monitoring schedule for this population will be an annual single trip occurring in September or October.

IV. Study Schedule:

- a. Initial year: 2008
- b. Final year: ongoing

V. Relationship to RIPRAP:

General Recovery Program Support Action Plan

V.B. Conduct research to acquire needed life history information.

V.B.1. Identify significant deficiencies in life history information and needed research.

Colorado River Action Plan: Mainstem

V.C.3. Monitor humpback chub annual CPUE within Cataract Canyon.

VI. Accomplishments of FY10-11 Tasks and Deliverables, Discussion of Initial Findings and Shortcomings:

Task 1) Conduct one sampling trip in Cataract Canyon in October 2011.

Annual sampling was conducted 4–12 October 2011 at two long-term trend monitoring sites and at rapid 12 (Figure 1). Daily mean flows ranged from 8,730 – 10,950 ft<sup>3</sup>/sec (Figure 2) and water temperatures ranged from 17.5 – 13 °C. No sites were sampled below the “Big Drop” rapids. The higher than average fall flows precluded sampling at the long-term sampling site located between rapids 2 and 3, as all camp sites were submerged. Trammel nets were the only gear deployed during the 2011 sampling period, equipment malfunctions precluded electrofishing. During 2011 we had irreparable failure of four Smith-Root 5.0 generators.

A total of 9 humpback chub were captured in 2011 with trammel nets during 366.8 hours of effort. The resulting catch rate for humpback chub was 0.024 humpback chub/net hr. Humpback chub trammel net catch rates within Cataract Canyon remain stable and have shown no significant trend over the last 20 years; fluctuating between 0.010 and 0.035 fish per hour (Figure 3).

Two humpback chubs were recaptured from 2005 sampling and both were found within the original ½ mile sampling site below rapid 5. The two chubs had grown 13 mm and 18 mm over the six year period.

All humpback chub caught by trammel nets were adults (>150 mm) with a mean total length of 237.2 mm. The lack of juveniles was expected, as 1 inch trammel nets are not effective at capturing *Gila* smaller than 200 mm and electrofishing was not possible. The size structure of adult humpback chubs within Cataract Canyon remains narrowly distributed (Figure 4).

No sites have been sampled below the big drop rapids since 2008 and it is unknown if chubs have expanded their range into this section of river. Due to the high site fidelity often observed in humpback chubs it is likely that re-colonization of this recently created habitat would be slow.

A total of 116 fish consisting of 12 species were captured by trammel nets in Cataract Canyon in 2011. Humpback chub, razorback sucker, and Colorado pikeminnow made up 23.2% of the total sample and all native species combined were 31.9% of the total catch. Razorback sucker and channel catfish was the most common native and nonnative species captured.

Task 2) Data entry:

The 2011 data have been entered and quality checked and will be transferred to the UCRP database manager (USFWS) by 15 January 15 2012.

Task 3) Annual reporting:

An annual progress report summarizing the 2011 data and comparing it with past monitoring efforts will be submitted by 13 November 2011.

VII Recommendations:

- Persistent occurrence of humpback chub warrants continued monitoring of distribution and relative abundance via a single sampling pass.
- Continue to employ trammel nets as the primary sampling tool.
- Future monitoring should include electroshocking to allow collection of YOY and juvenile chub.
- Future sampling should include humpback chub suitable habitat below the Big Drop rapids.

VIII. Project Status: On track and ongoing.

IX. FY11 Budget:

A. Funds budgeted:	\$ \$30,607
B. Funds expended/obligated:	\$ \$30,607
C. Difference:	\$ 0
D. Percent FY2011 work completed:	100%
E. Recovery Program funds spent for publication charges:	\$ 0

X. Signed: Paul Badame Date: November 10, 2011

Table 1. Comparison of methods, years sampled, effort, and catch rates for adult humpback chub (HB, >150 mm TL), bonytail, and juvenile chub (all *Gila spp.*, <150 mm) for all sites combined, Cataract Canyon, 2003-2011.

Method	Year	<i>Gila spp.</i>			Effort (hrs or m <sup>2</sup> )	CPUE (fish/hr)		
		# HB	# BT	# Juv.		HB	BT	Juv. Gila
Trammel netting	2003	44	20	0	1375	0.032	0.008	0.000
	2004	43	1	0	1245	0.035	0.001	0.000
	2005	31	5	0	1375	0.022	0.003	0.000
	2008	6	0	0	409	0.015	0.000	0.000
	2009	18	1	0	623	0.029	0.002	0.000
	2010	11	2	0	566.2	0.019	0.004	0.000
	2011	9	0	0	366.8	0.024	0.000	0.000
	<b>Total</b>	<b>142</b>	<b>27</b>	<b>0</b>	<b>5027</b>	<b>0.028</b>	<b>0.005</b>	<b>0.000</b>
Electrofishing	2003	2	2	0	8.9	0.225	0.225	0.000
	2004	0	0	0	7.5	0.000	0.000	0.000
	2005	0	0	0	8.2	0.000	0.000	0.000
	2008	0	0	0	1.5	0.000	0.000	0.000
	2009	2	0	5	5.5	0.364	0.000	0.909
	2010	0	0	3	4.1	0.000	0.000	0.730
	2011	0	0	0	0	0.000	0.000	0.000
	<b>Total</b>	<b>4</b>	<b>2</b>	<b>8</b>	<b>35.7</b>	<b>0.112</b>	<b>0.056</b>	<b>0.224</b>
Seine netting	2003	0	0	0	0	0.000	0.000	0.000
	2004	0	0	0	0	0.000	0.000	0.000
	2005	0	0	0	0	0.000	0.000	0.000
	2008	0	0	0	184	0.000	0.000	0.000
	2009	0	0	0	56	0.000	0.000	0.000
	2010	0	0	0	0	0.000	0.000	0.000
	2011	0	0	0	0	0.000	0.000	0.000
	<b>Total</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>240</b>	<b>0.000</b>	<b>0.000</b>	<b>0.000</b>
Minnow trap & Hoop Netting	2003	0	0	0	9.9	0.000	0.000	0.000
	2004	0	0	0	0	0.000	0.000	0.000
	2005	0	0	0	0	0.000	0.000	0.000
	2008	0	0	0	0	0.000	0.000	0.000
	2009	0	0	1	76.5	0.000	0.000	0.013
	2010	0	0	0	0	0.000	0.000	0.000
	2011	0	0	0	0	0.000	0.000	0.000
	<b>Total</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>86.4</b>	<b>0.000</b>	<b>0.000</b>	<b>0.011</b>

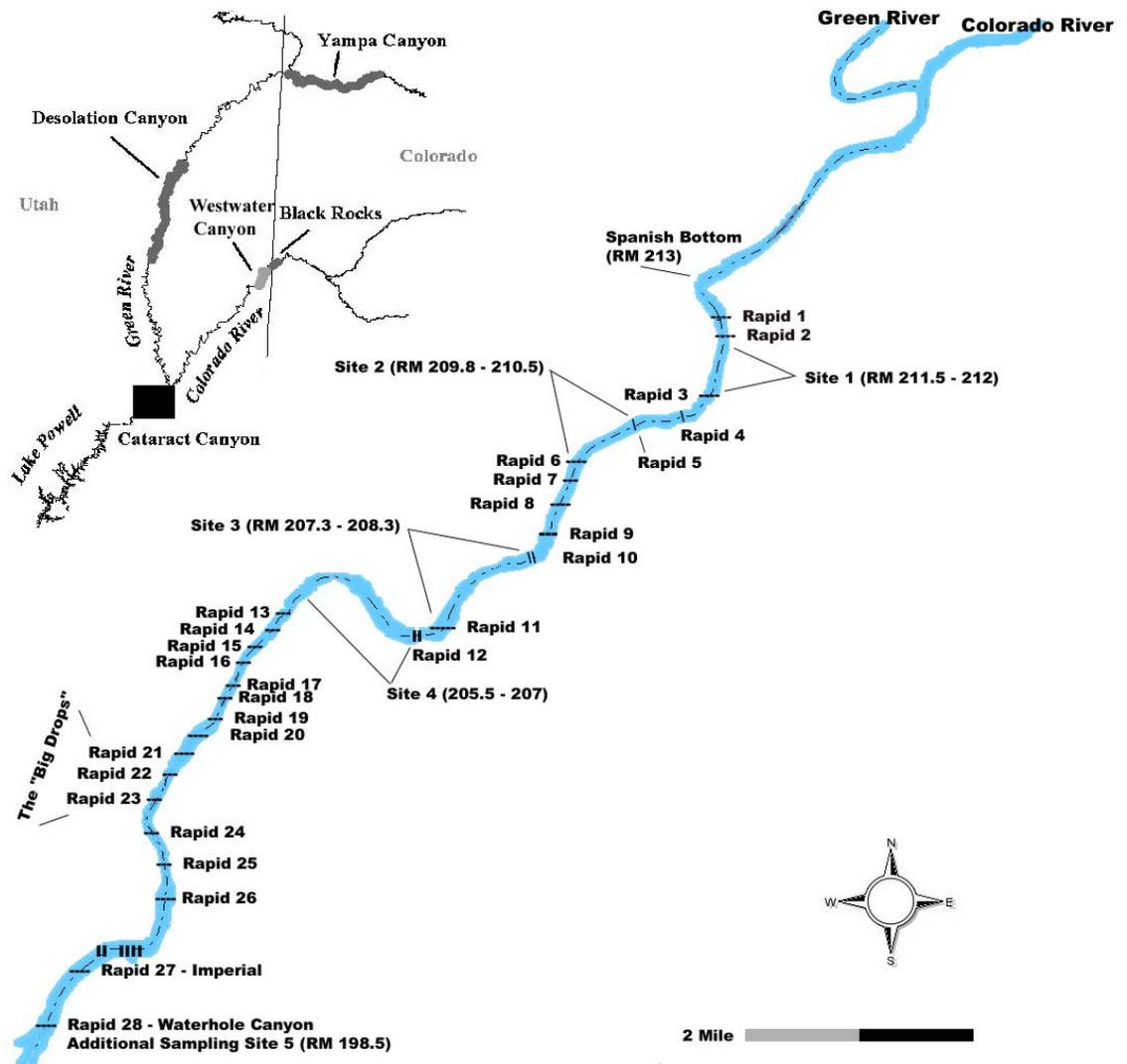


Figure 1. Cataract Canyon map detailing sampling locations during 2003–2011.

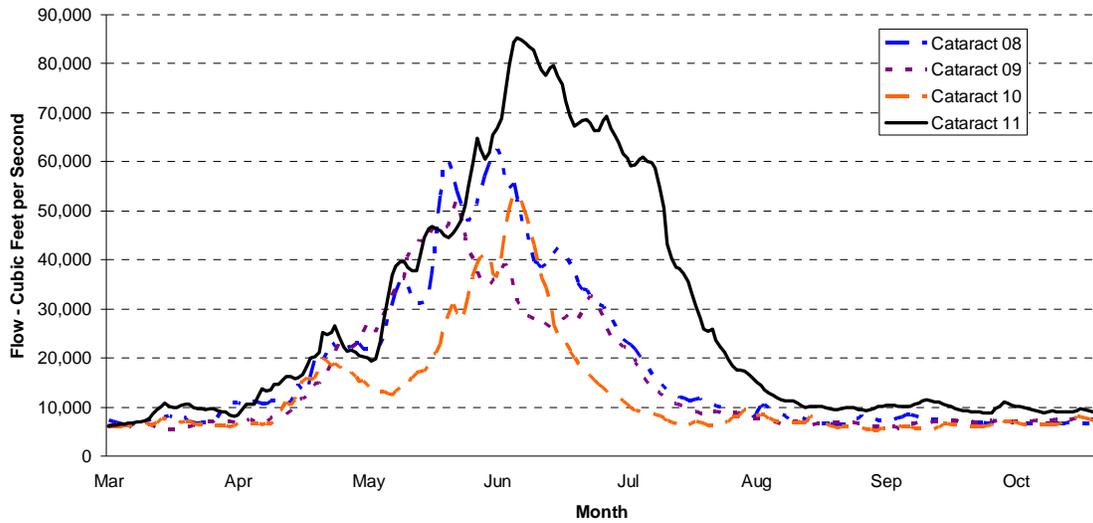


Figure 2. Hydrograph of daily discharge (ft<sup>3</sup>/sec) for Cataract Canyon 2008–2011. Data compiled from USGS gauge numbers 09315000 and 09180500 on the Green and Colorado respectively.

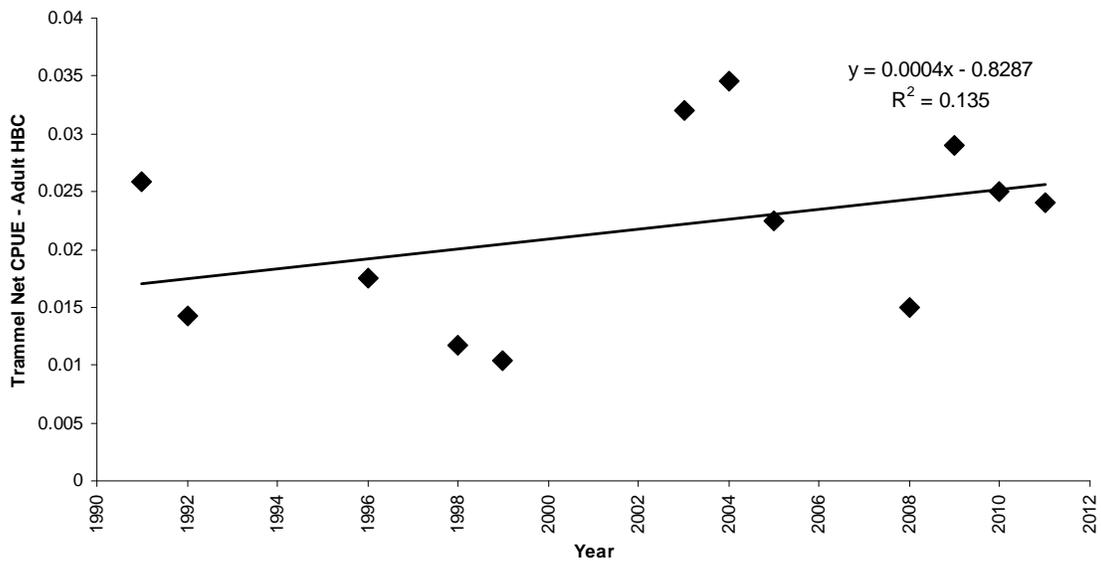


Figure 3. Total catch per unit effort (CPUE) for humpback chub in Cataract Canyon fall collections for all captures between 1991 and 2011. P-value indicates statistical significance of trend line.

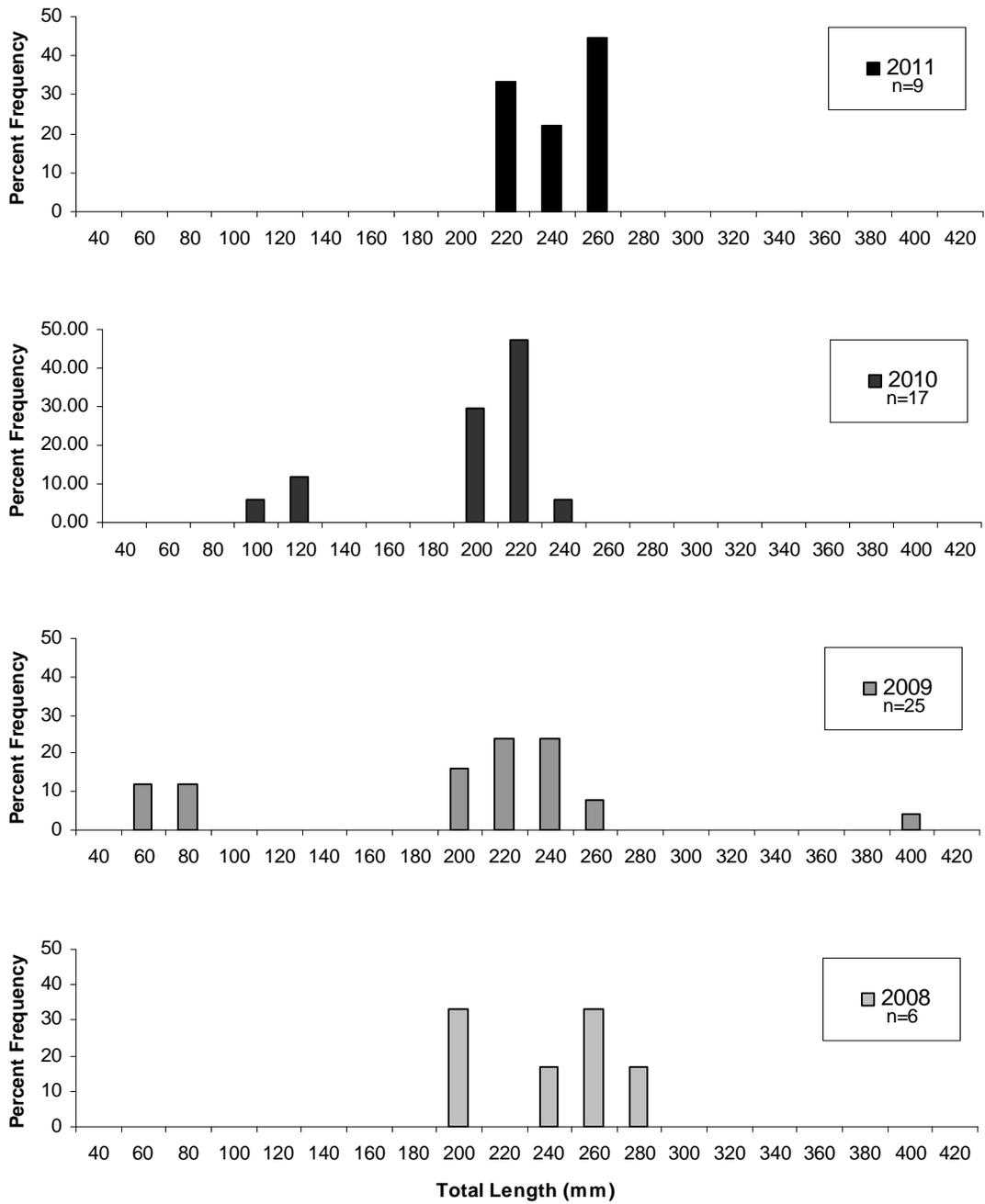


Figure 4. Annual total length frequency distributions for adult humpback chub (>150mm TL) and juvenile *Gila* (<150mm TL) in Cataract Canyon caught by all sampling methods for all captures 2008–2011.