

COLORADO RIVER RECOVERY PROGRAM
FY 2015 ANNUAL PROJECT REPORT

RECOVERY PROGRAM
PROJECT NUMBER: 130

I. Project Title: **Population monitoring of humpback chub and bonytail chub in Cataract Canyon.**

II. Bureau of Reclamation Agreement Number: R14AP00007

Project/Grant Period: Start date: 05/01/2014
End date: 09/30/2018
Reporting period end date: 09/30/2015
Is this the final report? Yes _____ No X

III. Principal Investigator(s):

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IV. Abstract: U.S. Fish and Wildlife Service recovery goals for the six populations of the endangered humpback chub *Gila cypha* include a criterion of no net loss in the population occurring in the Colorado River in Cataract Canyon, Utah. Trammel net catch rates (catch per unit effort, CPUE) have served as the primary metric of adult humpback chub abundance in Cataract Canyon since 2008.

In 2015, floating debris carried by multiple rain-triggered flash flood events on the Green and Colorado Rivers impaired trammel net function and likely reduced trammel net sampling efficiency. Long-term trammel net CPUE data, however, continue to show no trend. Supplemental sampling with baited hoop nets revealed the presence of juvenile *Gila spp.* at long-term monitoring sites, indicating continued reproductive success among Cataract Canyon chubs.

V. Study Schedule: 2008-ongoing.

VI. Relationship to RIPRAP:

GENERAL RECOVERY PROGRAM 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.

COLORADO RIVER ACTION PLAN: MAINSTEM

- V. Monitor populations and habitat and conduct research to support recovery actions (research, monitoring, and data management).
- V.A. Conduct research to acquire life history information and enhance scientific techniques required to complete recovery actions
- V.C.3. Cataract Canyon

VII. Accomplishment of FY 2015 Tasks and Deliverables, Discussion of Initial Findings and Shortcomings:

Task 1: Complete one sampling trip in Cataract Canyon in fall of 2015:

Biennial sampling occurred from 20-29 October 2015 at three long-term monitoring sites and one additional site (Figure 1). Estimated daily mean flows in the canyon ranged from 8,580 to 11,280 cubic feet per second (from USGS stream gages 09185600 and 09328920 at Potash and Green River, UT, respectively) during the sampling dates, with two distinct spikes in discharge exceeding 13,000 cfs resulting from rain-driven flash flood input (Figure 2). Water temperatures (measured on-site) ranged from 14.0-16.0 degrees Celsius.

Five individual adult humpback chubs were captured during 329 trammel net-hours. These included four unmarked fish and one recapture originally encountered in 2013. Total lengths of adult humpback chubs captured during this trip (Figure 3) are consistent with narrow size distribution described by Badame (2008), with a median total length of 232 mm. One individual was recaptured within the trip. Humpback chubs accounted for 8% of the 75 fish captured via this method.

In 2015, flash flood debris largely precluded the setting of trammel nets. When deployed, net function was continually impaired by debris, particularly at long-term sites during 21-26 October (Photo 1). Of 22 trammel nets samples at the three long-term sampling locations, nine (41%) were ended prematurely due to damage sustained by debris. Thus, the 2015 catch rate may reflect decreased sampling efficiency due to conditions rather than a decrease in humpback chub abundance. Though total trammel net catch rates have dropped since 2003 (Table 1), this decrease appears to fall within the range of normal fluctuations for this metric when viewed in the context of long-term data, which show no trend since 1991 ($R^2=0.04$, Figure 4).

Based on successful capture of adult humpback chubs and juvenile *Gila spp.* in Desolation and Gray Canyons during September and October 2015 (Howard 2015), baited hoop nets were deployed in lieu of electrofishing in Cataract Canyon. At each site, twelve nets were set for a total of 1,683 net-hours. Nets were baited by suspending Purina Aquamax sport fish food within the net. Juvenile *Gila spp.* (n=8) accounted for 4% of the 197 total fish captured by hoop nets in 2015, and 47% of the total juvenile *Gila*

encountered since 2003. Total lengths of juvenile *Gila* ranged from 66 to 108 mm (mean TL= 84 mm), suggesting multiple cohorts and/or differential growth rates within year class (Photos 2a-c). Also captured by hoop nets were one adult bonytail (TL=303mm, stocked August 2014 at RM 120.0 on the Green River) and one adult *Gila* which escaped during retrieval of the net.

Initial comparison of hoop net and electrofishing CPUE (Table 1) favors electrofishing. However, assuming a minimum crew of two while operating an electrofishing boat, cumulative electrofishing effort from 2003-2013 yielded 0.18 *Gila*/person-hour while hoop netting in 2015 yielded a comparable 0.22 *Gila*/person-hour based on an estimated 50 person-hours of labor. As historic hoop net use in Cataract Canyon has been minimal, it remains unclear whether 2015 success is a result of strong 2014 and 2015 cohorts or simply increased sampling efficiency. Regardless, this method merits continued exploration considering the history of limited sampling success in Cataract Canyon.

In an attempt to increase encounters with marked humpback chubs, five submersible PIT antennas were paired with baited hoop nets at each site. Of the 14 tags encountered, 12 belong to razorback suckers and two remain unattributed at the time of reporting. All PIT-tag encounters will be included in database submissions.

Sampling below the Big Drops during the final night of the trip was omitted this year due to lack of suitable habitat and camping within reasonable distance of the take-out point.

Task 2: Data entry:

2015 Data have been entered and quality checked and will be submitted to database manager by 15 January 2016.

Task 3: Annual Reporting:

An annual progress report summarizing the 2015 data and comparing it with past monitoring efforts will be submitted by Nov 13, 2015.

VIII. Additional noteworthy observations:

In addition to *Gila spp.*, October 2015 hoop net and trammel net captures included three native species: razorback sucker (n=6), bluehead sucker (n=2) and flannelmouth sucker (n=1). All razorback suckers captured were processed and will be included in database submissions. Eight non-native fish species were captured: channel catfish (n=222), red shiner (n=13), black bullhead (n=3), yellow bullhead (n=3) common carp (n=2), gizzard shad (n=2), sand shiner (n=1) and fathead minnow (n=1).

IX. Recommendations:

- Continue monitoring of humpback chub distribution and relative abundance via a single sampling pass.
- Continue trammel netting as primary sampling method for adult humpback chubs.
- Continue to refine use of baited hoop nets and submersible PIT antennas as supplemental sampling methods.

X. Project Status: On track and ongoing.

XI. FY 2015 Budget Status

A.	Funds Provided:	\$34,521
B.	Funds Expended:	\$34,521
C.	Difference:	\$ 0
D.	Percent of the FY 2015 work completed:	100%
E.	Recovery Program funds spent for publication charges:	\$ 0

XII. Status of Data Submission: Data have been entered and quality checked and will be submitted to database manager by 15 January 2016.

XIII. Signed: Zach Ahrens 13 November 2015
Principal Investigator Date

XIV. Literature cited:

Badame, P.V. 2008. Population estimates for humpback chub (*Gila cypha*) in Cataract Canyon, Colorado River, Utah, 2003-2005. Final report of Utah Division of Wildlife Resources, Moab Field Station to Upper Colorado River Endangered Fish Recovery Program. Denver, CO.

Howard, J.L. 2015. Humpback chub population estimates for Desolation/Gray Canyons, Green River, Utah. Annual report of Utah Division of Wildlife Resources, Moab Field Station to Upper Colorado River Endangered Fish Recovery Program. Denver, CO.

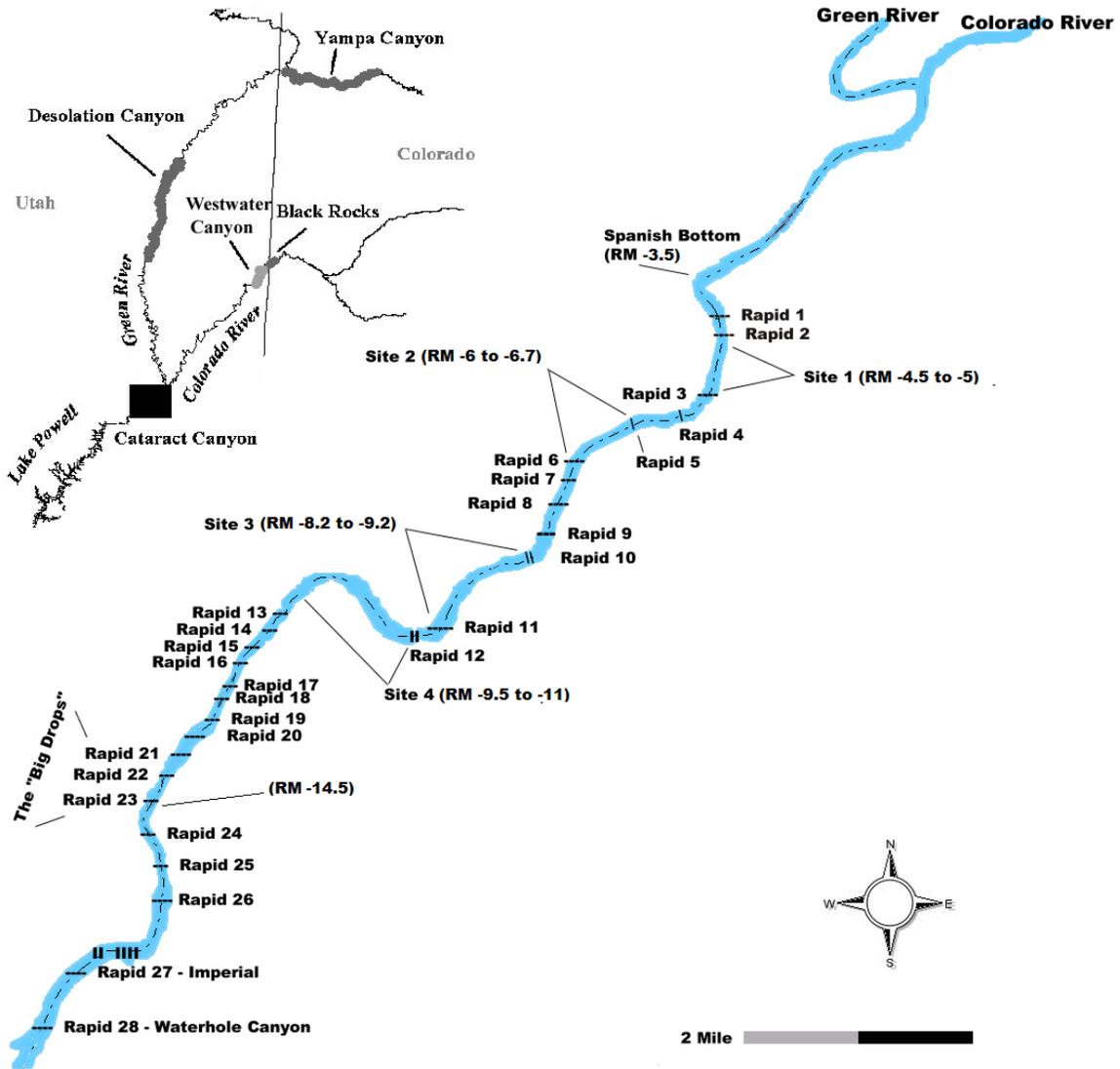


Figure 1. Cataract Canyon map detailing 2015 sampling locations.

Photo 1. Flash flood debris collects in a typical trammel net site below Rapid 2 in Cataract Canyon, 21 October 2015.

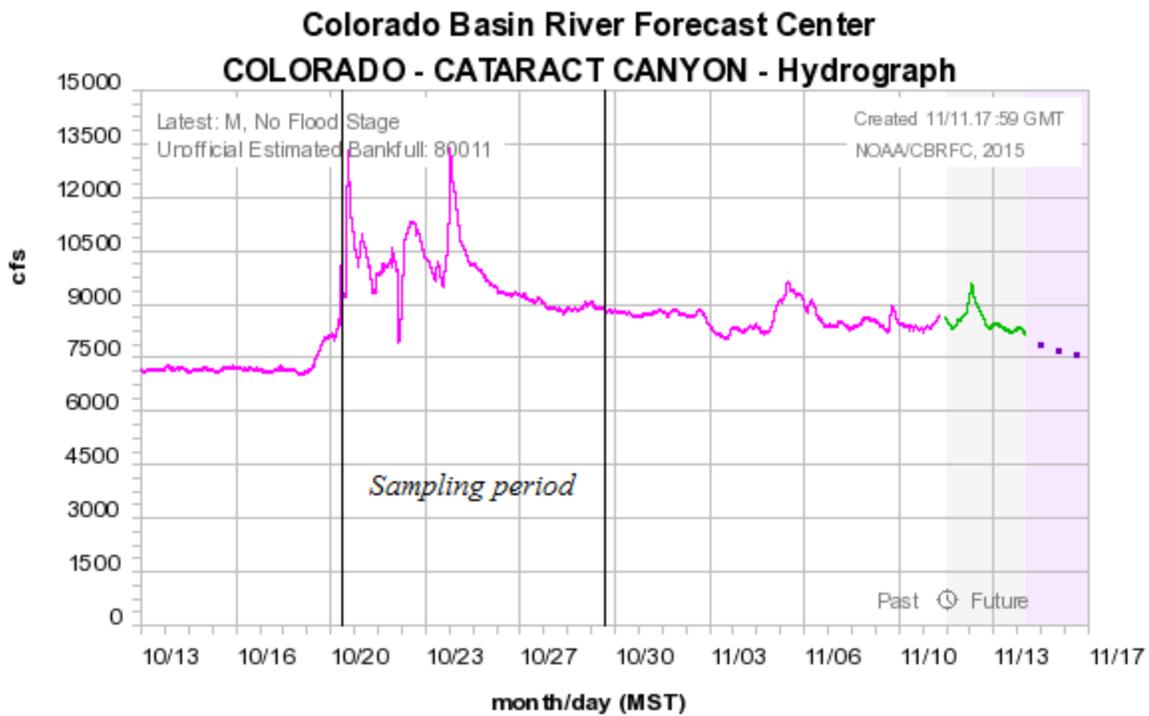


Figure 2. Simulated discharge in Cataract Canyon, late October and early November 2015. Note two distinct increases during sampling period 20-29 October 2015. Figure courtesy of N.O.A.A. Colorado Basin River Forecast Center.

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Table 1. Comparison of methods, years sampled, effort, and catch rates for adult humpback chub (*Gila cypha*, total length ≥ 200 mm), bonytail, and juvenile chubs (all *Gila spp.*, total length < 200 mm) for all sites combined, Cataract Canyon, 2003-2015. Total fish caught and effort reported and average calculated for CPUE.

Method	Year	<i>Gila spp.</i>			Effort (hrs or m ²)	CPUE (fish/hr)		
		# HB	# BT	juvenile <i>Gila spp.</i>		# HB	# BT	juvenile <i>Gila spp.</i>
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
	2013	11	0	0	508.3	0.022	0.000	0.000
	2015	6	0	0	329.2	0.018	0.000	0.000
Total/Average		179	29	0	6797	0.026	0.004	0.000
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
	2013	0	0	0	3.5	0.000	0.000	0.000
	2015	0	0	0	0	0.000	0.000	0.000
Total/Average		4	2	8	39.2	0.102	0.051	0.204
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
	2013	0	0	0	0	0.000	0.000	0.000
	2015	0	0	0	0	0.000	0.000	0.000
Total/Average		0	0	0	240	0.000	0.000	0.000
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
	2013	0	0	0	30.0	0.000	0.000	0.000
	2015	0	1	8	1683	0.000	0.001	0.005
Total/Average		0	1	9	1800	0.000	0.001	0.005

* One juvenile (TL 195mm) identified as HB and retained in adult trammel net CPUE.

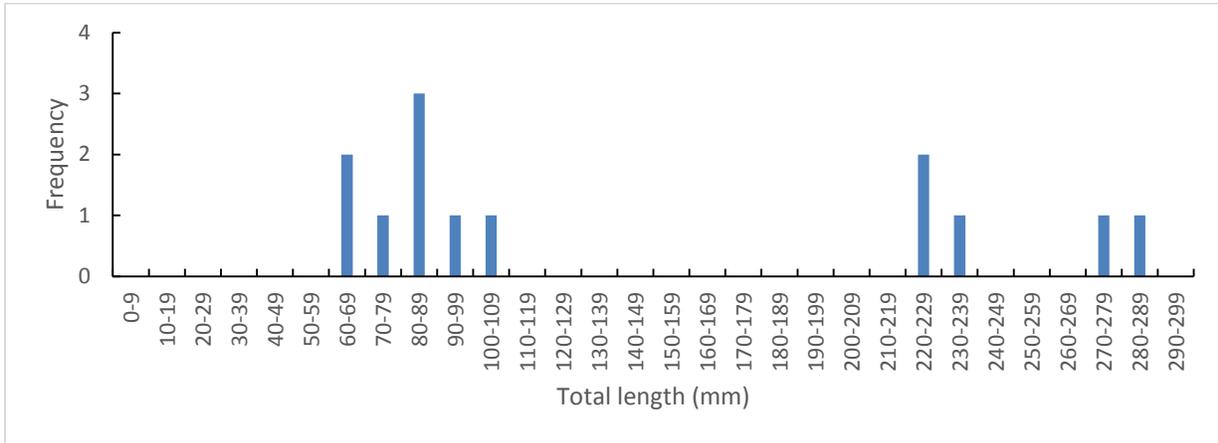


Figure 3. Length frequency distribution of juvenile *Gila spp.* (TL < 200mm) and adult humpback chubs (TL ≥ 200mm) captured in Cataract Canyon, October 2015.

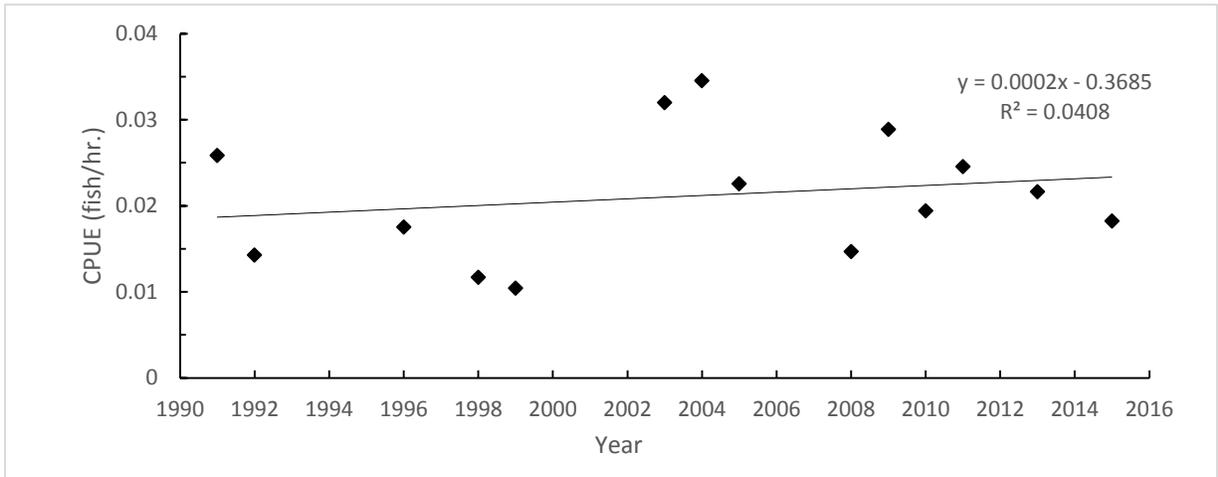


Figure 4. Annual trammel net catch per unit effort (CPUE) for adult humpback chubs in Cataract Canyon, 1991 – 2015.

Photos 2a-c. Examples of *Gila spp.* captured by baited hoop net at each of three long-term monitoring sites in Cataract Canyon, October 2015.



