

COLORADO RIVER RECOVERY PROGRAM
FY 2012 ANNUAL PROJECT REPORT

RECOVERY PROGRAM
PROJECT NUMBER: 132

I. Project Title: Humpback Chub in Westwater Canyon

II. Bureau of Reclamation Agreement Number(s): #R09AP40848

Project/Grant Period: Start date: 10/1/2008
End date: 09/30/2014
Reporting period end date: 09/30/2012
Is this the final report? Yes _____ No x

III. Principal Investigator(s):

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IV. Abstract:

Westwater Canyon on the Colorado River contains one of the five remaining populations of the endangered humpback chub in the Upper Colorado River Basin. Recovery goals identified by the Recovery Program require maintaining several populations of humpback chub within the Upper Colorado River Basin. Monitoring efforts are essential to evaluate the population of humpback chub in Westwater Canyon and meet the recovery goals. In 2012, trammel nets and electrofishing gear were used to sample humpback chub and roundtail chub in Westwater Canyon. Important metrics of population status including size structure and population size were calculated for humpback and roundtail chub. 2012 was the final year in the monitoring cycle and monitoring will commence again in 2015. A final report will be prepared using data from 2011 and 2012 in the winter of 2013.

V. Study Schedule: Final year of field work. Final Report will be drafted during winter of 2013.

VI. Relationship to RIPRAP:
Colorado River Action Plan: Mainstem
V.C. Estimate humpback chub populations
V.C.2 Westwater

VII. Accomplishment of FY 2012 Tasks and Deliverables, Discussion of Initial Findings and Shortcomings:

In 2012, three sampling trips occurred in Westwater Canyon during September and October as part of continued efforts to monitor humpback chub and roundtail chub populations within the Colorado River. Sampling trip one occurred during September 19–26, sampling trip two occurred during October 4–11, and sampling trip three occurred during October 18–25, 2012. During each trip, sampling sites were surveyed for two consecutive nights at Miners Cabin (RM 123.5), Upper Cougar (RM 122.5) and Little Hole (121.5). The Hades bar site (RM 121) was only sampled for one night per trip. During trip three, Hades bar was not sampled due to inclement weather.

Mean daily discharge and temperature during sampling trips was measured using data collected remotely from the USGS gauge #09163500 (Colorado River near Colorado-Utah State Line). Mean flow for the first trip was 2,492 cubic feet per second (cfs; 2,320–2,900 cfs), and temperature ranged from 16.2–18.7 °C. Mean flow for the second trip was 2,331 cfs (2,331–2,590 cfs), and temperature ranged from 11.7– 6.8 °C. Mean flow for the third trip was 2,627 cfs (2,520–2,900 cfs), and temperature ranged from 11.3–13.2 °C.

During 2012 sampling, humpback chub and roundtail chub were sampled using trammel nets and electrofishing gear. Trammel nets were set each day at 15:00 and checked every two hours until approximately 23:00. The nets were reset the next morning at 5:00 am, checked every two hours and pulled at 11:00 am. Four or five trammel nets were set at each site depending upon habitat availability and our ability to run up riffles with our net boat. Electrofishing was conducted every afternoon at 14:00. All *Gila sp.* were identified to species when possible, measured (total length and standard length; mm), weighed (g), scanned for a PIT tag, PIT tagged (if necessary), and released.

Sampling efforts in 2012 resulted in the capture of 205 adult humpback chub and 860 adult roundtail chub. Additionally, four subadult humpback chub, 256 subadult roundtail chub and 222 subadult *Gila sp.* were collected. Fish identified as *Gila sp.* were either too small to reliably identify in the field or displayed characteristics of both species. Two razorback suckers were also captured.

The average total length of captured humpback chub during 2012 sampling was 287 mm with a range of 170–382 mm (N=209) and the average total length of roundtail chub captured was 282 mm with a range of 165–434 mm (N=915). The mean length of *Gila sp.* caught during electrofishing and trammel net surveys was 82 mm with a range of 56–204 mm. Analysis of length frequencies histograms suggested that there is a broad range of adult humpback and roundtail chub within the Westwater Canyon population (Figure 1). The small modes centered around 200 mm for humpback and roundtail chub indicate that recruitment is occurring. However, when we consider the length frequencies of *Gila*

sp. recruitment appears strong but we are unable to differentiate humpback chub recruits from roundtail chub recruits for these smaller size classes.

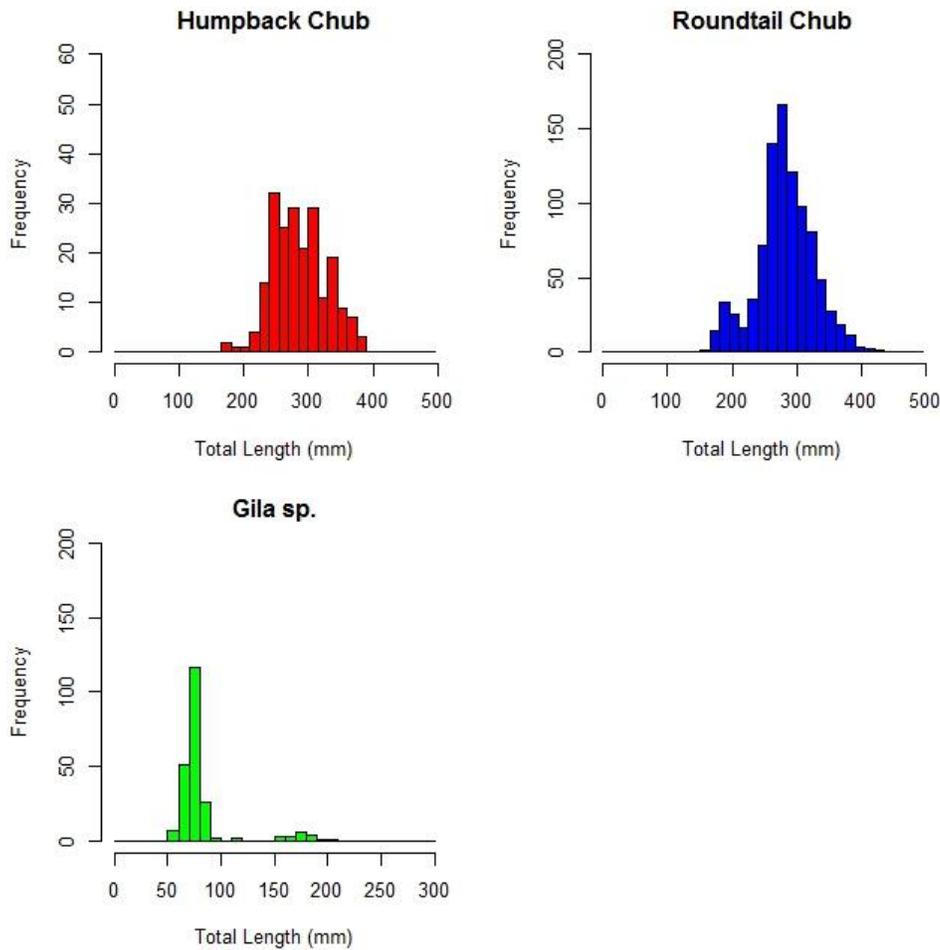


Figure 1. Length-frequency histograms for humpback chub, roundtail chub and *Gila sp.* during Westwater Canyon sampling in 2012.

Trammel net surveys resulted in 1151 hours of total effort during fall of 2012 sampling. During 2012 sampling in Westwater Canyon, humpback chub trammel net catch per unit was 0.17 fish per hour (SE=0.01). Catch per unit effort (CPUE) was relatively consistent among passes with a slight non-significant decline during pass three (Figure 2). Catch rates for humpback chub were highest at the Little Hole and Hades camp (Figure 2). Roundtail chub CPUE in 2012 was 0.67 fish per hour (SE=0.04). Roundtail chub catch rates increased from pass one to two and were statistically similar between passes two and three (Figure 2). Catch rates were highest at Little Hole for roundtail chub during all passes. A depletion effect was observed in catch rates which may account for why the catch rate at Hades is larger than Miner's or Little Hole. Thus, because the Hades received the least effort it did not have time to exhibit a reduction in catch rate with increased effort.

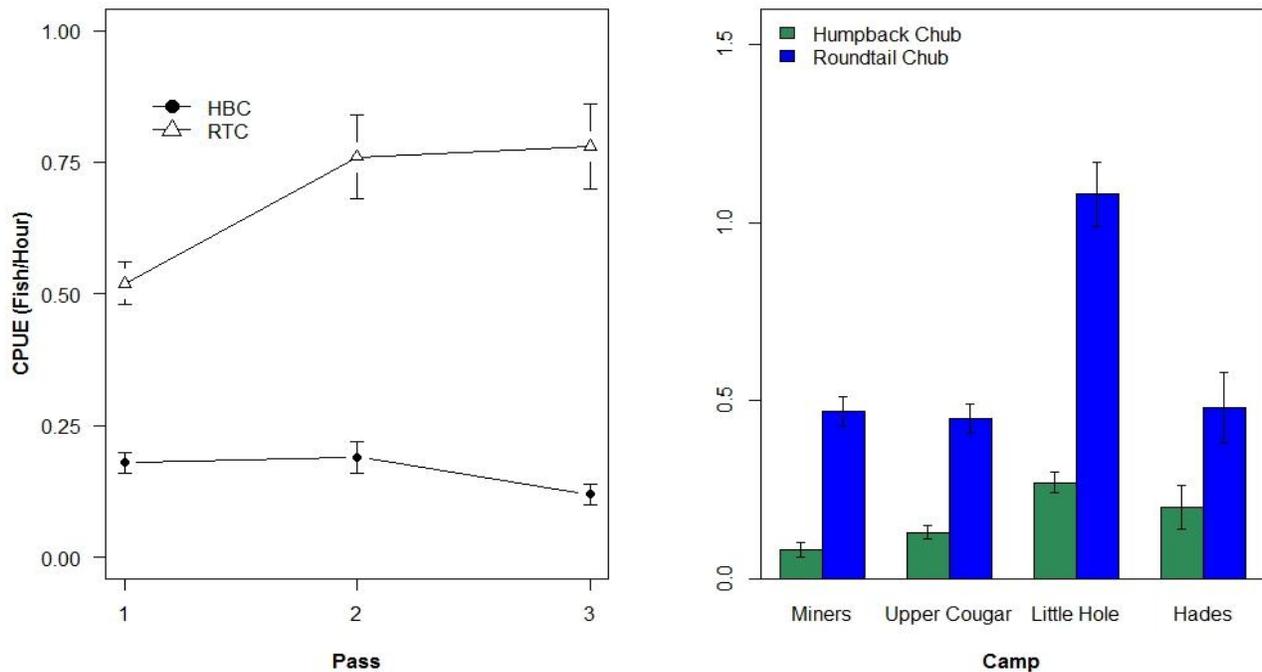


Figure 2. Catch per unit effort (fish/hour) by sampling pass and camp for humpback chub and roundtail chub captured in trammel nets during fall of 2012 Westwater Canyon sampling trips.

Closed capture population models were fit in Program Mark to estimate population size and capture probability for humpback chub and roundtail chub captured within Westwater Canyon in the fall of 2012. The best fit model, based on Akaike information criterion (AIC) support, estimated 1,507 humpback chub within the Westwater Canyon population (95% likelihood interval of 830 to 2899 individuals). This is a decline of 500 fish from the 2011 estimate but still within the confidence limits of the 2011 estimate. The best fit model also estimated capture probability as a function of time. Estimates of capture probability for humpback chub were 0.05, 0.05 and 0.025. For roundtail chub, the best fit model estimated 3,673 individuals within the Westwater Canyon population (95% likelihood interval of 2,965 to 4,609). Similar to humpback chub, estimates of roundtail chub capture probability were time dependent. Roundtail chub capture probability estimates were 0.07, 0.09 and 0.07 for passes one to three.

VIII. Recommendations:

- Monitoring efforts should remain as currently specified in the Westwater scope of work.
- A retrospective analysis using the last 15 years of mark-recapture data should be used to determine overall population trends and trajectories. In particular, a robust design mark-recapture analysis maybe helpful in informing population size

through time and estimating survival between periods in which sampling does not occur.

- Consideration should also be given to conducting genetic research to determine the proportion of age-0 and age-1 recruits that are either humpback chub or roundtail chub. This would be useful in allowing us to make informed decisions on recruitment dynamics of *Gila sp.* within the Colorado River.

IX. Project Status: The closure of the 2012 field sampling in Westwater marks the end of the two years on, two years off monitoring cycle. Pending funding, monitoring for humpback and roundtail chub in Westwater Canyon will commence again in 2015. During the winter of 2013 a final report will be drafted summarizing research and monitoring findings from 2011 and 2012 sampling efforts and use past data collections to inform population trends and recovery trajectories for humpback and roundtail chub in Westwater Canyon.

X. FY 2012 Budget Status

- A. Funds Provided: \$ 87,698
- B. Funds Expended: \$ 87,698
- C. Difference: \$ 0
- D. Percent of the FY 2012 work completed, and projected costs to complete: 100%
- E. Recovery Program funds spent for publication charges: \$ 0

XI. Status of Data Submission (Where applicable): Data will be transferred to USFWS by December 15, 2012

XII. Signed: Brandon Gerig Date: 10/31/2012
Principal Investigator