

I. Project Title: Population estimate of humpback chub in Westwater 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. Recovery goals are based in part on maintaining populations of humpback chub in several locations, among which is the Westwater 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 adult humpback chub (200 mm) in Westwater Canyon
2. to determine mean estimated recruitment of naturally produced subadult humpback chub (150-199 mm) in Westwater Canyon

Three sampling trips were conducted through Westwater Canyon on October 11-18, October 24-30, and November 8-15 to complete the second year of the current three-year population estimate. Daily mean flow during sampling ranged from 4,220-3,400 cubic

feet per second (cfs). Daily mean water temperature during sampling ranged from 13.2-8.3 °C. A total of four sites were sampled throughout the canyon over six or seven nights.

A total of 290 individual adult humpback chub and 817 individual adult roundtail chub were collected in Westwater Canyon by trammel netting, electrofishing, and hoop netting. Trammel nets yielded the highest catch of both species. Average total length of humpback chub caught via all methods was 257.4 mm with a range of 124-394 mm. Average total length of roundtail chub caught via all methods was 255 mm with a range of 112-374 mm. An additional 46 subadult chub were caught using various methods with an average total length of 118.3 mm and a range of 46-200 mm. Eleven humpback chub and fifty-six roundtail chub were caught among passes in 2004. Long-term recaptures (from previous years) were observed for both species in all trips. However, the number of long-term recaptures is down from 2000 and similar to 2003.

IV. Study Schedule:

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

V. Relationship to RIPRAP:

- Colorado River Action Plan: Mainstem
- V.C. Estimate humpback chub populations
- V.C.2. Westwater

VI. Accomplishments of FY 2004 Tasks and Deliverables, Discussion of Initial Findings and Shortcomings:

Three sampling trips were conducted through Westwater Canyon on October 11-18, October 24-30, and November 8-15. Four sites were sampled on the during each pass which included Miners Cabin (RM 124), Upper Cougar (RM 122.5), Lower Cougar (121.5), Hades Bar (RM 120).

Mean daily flows and temperature for each pass were recorded by USGS gage #09163500 (Colorado River near Colorado-Utah State Line) (Figure 1). Mean flow for the first pass was 3,446 cfs (3,530–3,400 cfs). Mean temperature was 13.2 °C (11.8-15.2 °C). Mean flow for the second pass was 3,713 cfs (3,440-4,220 cfs). Mean temperature was 9.7 °C (8.5-10.3 °C). Mean flow for the third pass was 3,531 cfs (3,450–3,590 cfs). Mean temperature was 8.3 °C (6.8-9.6 °C).

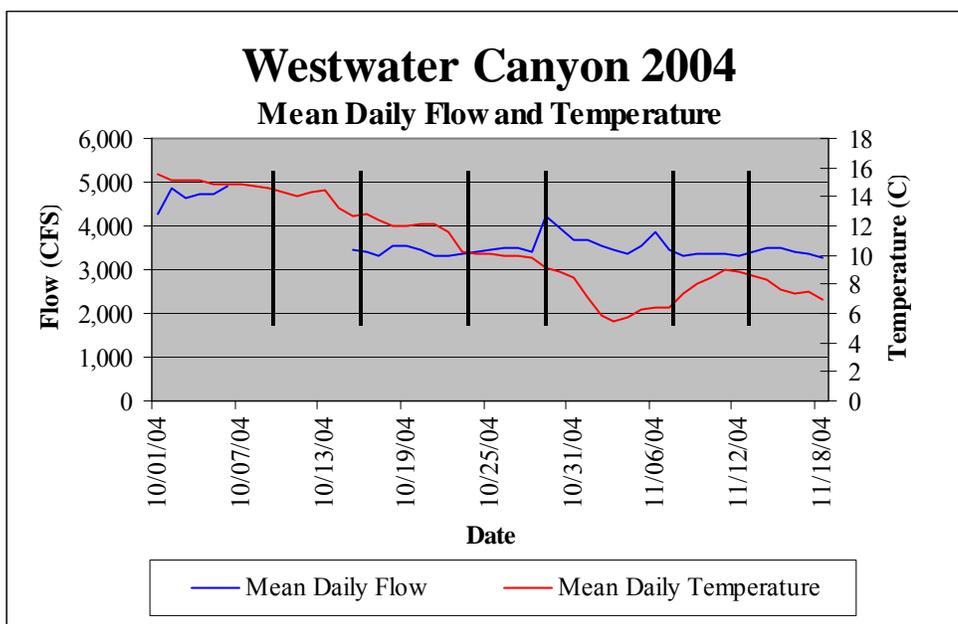


Figure 1. Mean daily flow (cfs) and mean daily temperature (°C) for Westwater Canyon between October 1 and November 18, 2004, as recorded by USGS gage #09163500 (Colorado River near Colorado-Utah State Line; provisional data). Vertical lines within graph demarcate Pass One (October 11-18), Pass Two (October 24-30), and Pass Three (November 8-15).

Sampling was conducted for two nights at each site except during the second pass when the Upper Cougar site was sampled for one night only. Humpback chub and roundtail chub were targeted at these sites using trammel nets, electrofishing, and hoop nets. Trammel nets were set in late afternoon each day, checked approximately every one and a half to two hours, and pulled around midnight. The nets were reset the next morning prior to dawn, checked approximately every two hours and pulled mid-morning until late afternoon. Eight to nine trammel nets were set per site depending upon habitat availability and speed of which fish were removed from the nets. Electrofishing was conducted prior to nets being set in the afternoon and subsequent to trammel nets being pulled each night around midnight. Hoop nets were set each afternoon and pulled the subsequent morning. All chubs were identified to species, scanned for a PIT tag, PIT tagged (if necessary), measured (total length and standard length; mm), weighed (g), principle dorsal and anal fin rays counted and released.

A total of 290 individual adult humpback chub and 817 individual adult roundtail chub were captured using the various methods in 2004. An additional 24 humpback, 99 roundtail, and 46 *Gila* subadults were captured. The 46 *Gila* were identified as such because they were too small to reliably identify or displayed characteristics of both

species. Length-frequency histograms are presented in Figures 2 and 3 for the above information.

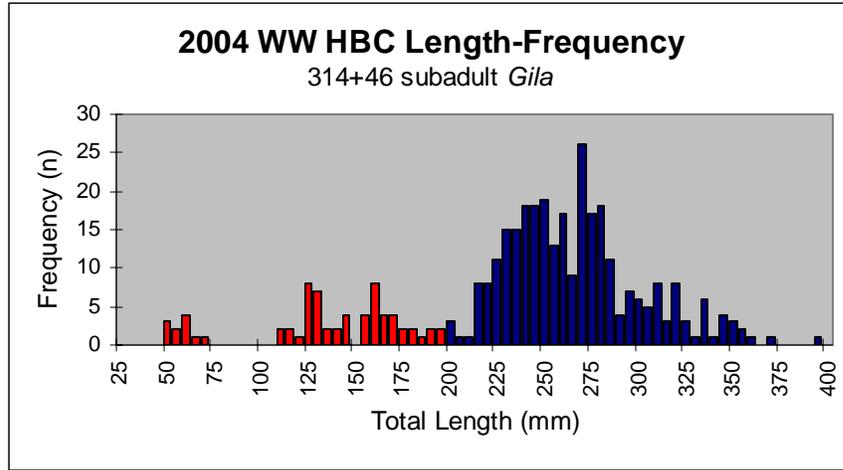


Figure 2. Length-frequency histogram for 2004 humpback chub in Westwater Canyon. Subadults in red were identified as *Gila* and are represented in the humpback chub and roundtail chub histograms.

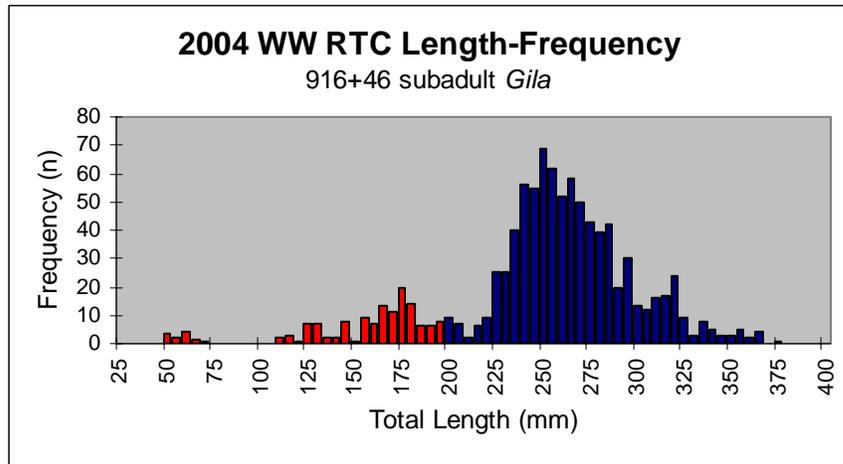


Figure 3. Length-frequency histogram for 2004 roundtail chub in Westwater Canyon. Subadults in red were identified as *Gila* and are represented in the humpback chub and roundtail chub histograms.

Trammel netting resulted in 1,823.66 hours of effort and electrofishing was conducted for 4 hours total. Hoop netting was conducted for approximately 178 hours. Catch per unit effort (CPUE) is presented for each species by sampling

approach in Table 1. CPUE values for 2004 are similar to those recorded in 2003, with the exception that the 2004 value for *Gila* captured is lower between years. The electrofishing catch rates for 2003 and 2004 are some of the highest ever recorded by the Utah Division of Wildlife Resources since monitoring began in Westwater Canyon for humpback and roundtail chub.

Table 1. Catch per unit effort (CPUE) for humpback chub, roundtail chub, and *Gila* by sampling approach for Westwater Canyon in 2003 and 2004.

2003	<i>Trammel Nets</i>	<i>Electrofishing</i>	<i>Hoop Nets</i>
<i>Humpback Chub</i>	0.168	8.824	0.000
<i>Roundtail Chub</i>	0.468	34.804	0.020
<i>Gila</i>	0.004	40.196	0.070
2004	<i>Trammel Nets</i>	<i>Electrofishing</i>	<i>Hoop Nets</i>
<i>Humpback Chub</i>	0.164	7.901	0.012
<i>Roundtail Chub</i>	0.496	27.901	0.045
<i>Gila</i>	0.013	9.382	0.000

Long-term recapture rates during 2004 for humpback chub and roundtail chub were similar to the period from 1998 to 2003 (Table 2). Within-year recaptures during 2004 for humpback chub were similar to the 1998-2003 period, and roundtail chub within-in year recaptures were higher than the 1998-2003 period. Of 290 total adult humpback chub captured, 41 of those had been PIT tagged in previous years. Eleven of those 290 individuals were recaptured within 2004. Of 817 total adult roundtail chub captured, 48 of those had been PIT tagged in previous years. Fifty-six of those 817 individuals were recaptured within 2004.

Table 2. Adult humpback chub and roundtail chub captures, long-term recaptures, and within-year recaptures for Westwater Canyon 1998-2000, 2003, and 2004.

<i>Year</i>	<i>HB</i>	<i>Long-term Recaps</i>	<i>Within-year</i>	<i>RT</i>	<i>Long-term Recaps</i>	<i>Within-year</i>
1998	488	54	14	389	42	9
1999	281	65	10	486	70	13
2000	279	76	6	527	73	18
2003	298	50	12	636	43	9
2004	290	41	11	817	48	56
Total	<i>1636</i>	<i>286</i>	<i>50</i>	<i>2855</i>	<i>276</i>	<i>110</i>

Electrofishing was conducted during the first pass only during 2004 sampling. Electrofishing was conducted in the afternoon and the evening and proved to be extremely productive during the afternoon in collecting juvenile chub.

An interesting finding is the increase in the percentage of within-year recaptures of roundtail chub, the highest seen in the last five years of sampling, and approximately double those seen for humpback chub. Roundtail chub numbers appear to be increasing while humpback chub numbers have remained steady since 1999.

VII. Recommendations

1. Electrofishing should be conducted during the first two passes of 2005.
2. Electrofishing should be conducted in the afternoon before nets are set as well as in the evening after nets are pulled.
3. Radiotelemetry tracking of humpback chub and roundtail chub may help explain movement patterns that have not been documented.

VIII. Project Status: Ongoing

Second year of three for project completed.

IX. FY04 Budget:

A. Funds budgeted:	\$ 67,775
B. Funds expended/obligated:	\$ 54,220
C. Difference:	\$ 13,555
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, 2004.

XI. Signed: Julie A. Jackson Date: 11/19/2004