

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 (September 26- October 3, October 10-17, and October 22-29) to complete the third year of the current three-year population estimate. Daily mean flow during sampling ranged from 3,740-6,400 cubic

feet per second (cfs). Daily mean water temperature during sampling ranged from 12.5-18 °C. A total of four sites were sampled throughout the canyon over seven nights. The Westwater chub populations were sampled using trammel nets and electrofishing. Hoop nets were not utilized this year due to poor catch rates observed in the past. Electrofishing was conducted during all three passes in 2005, an increase from one pass in 2003 and 2004. Furthermore, during the first pass of 2005 electrofishing was the sole sampling method for two days while the river was debris laden and trammel netting was impossible.

Trammel nets yielded the highest catch of all chub species. A total of 292 individual adult humpback chub, 763 individual adult roundtail chub, 12 adult *Gila* with intermediate characteristics, and eight bonytail were collected in Westwater Canyon during 2005. Eight subadult humpback chub, 138 subadult roundtail chub, and 55 subadult *Gila* were collected as well. An additional 203 *Gila* less than 150 mm TL were collected. Twenty-four humpback chub and 44 roundtail chub were caught among passes (recaptured) in 2005. Long-term recaptures (from previous years) were observed for both species during all trips. Long-term recaptures for both species have decreased slightly since 2000 but are similar to those observed in 1998.

#### 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 2005 Tasks and Deliverables, Discussion of Initial Findings and Shortcomings:

Three sampling trips were conducted through Westwater Canyon on September 26-October 3, October 10-17, and October 22-29. Four sites were sampled during each pass: Miners Cabin (RM 124), Upper Cougar (RM 122.5), Little Hole (121.5), and 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). Mean flow for the first pass was 5,136 cfs (3,740-6,400 cfs). Mean temperature was 17 °C (16-18 °C). Mean flow for the second pass was 4,743 cfs (4,280-5,300 cfs). Mean temperature was 13 °C (12.5-14 °C). Mean flow for the third pass was 4,461 cfs (4,220-4,900 cfs). Mean temperature was 12 °C (13-15 °C).

Sampling was conducted for two nights at each site during each of the three passes. Humpback chub and roundtail chub were targeted at these sites using trammel nets and electrofishing. Trammel nets were set in the 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. Eight to nine trammel nets were set per site depending upon habitat availability and speed at which fish could be 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. Electrofishing effort during the first pass was increased on the second day after a storm event. Sampling by trammel net had to be suspended due to the large amounts of debris in the river. Sampling by electrofishing replaced trammel netting until day four when the river finally cleared enough for trammel netting to be effective once again. 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 292 individual adult humpback chub, 763 individual adult roundtail chub, 12 adult *Gila* with intermediate characteristics, and eight bonytail were collected in Westwater Canyon during 2005. Eight subadult humpback chub, 138 subadult roundtail chub, and 55 subadult *Gila* were collected as well. An additional 203 *Gila* less than 150 mm TL were collected. Fish identified simply as *Gila* were either too small to reliably identify in the field or displayed characteristics of both species. Average total length of humpback chub caught via trammel nets was 273.6 mm with a range of 182-386 mm. Average total length of humpback chub caught via electrofishing was 254.5 with a range of 165-350. Average total length of roundtail chub caught via trammel nets was 265 mm with a range of 177-416 mm. Average total length of roundtail chub caught via electrofishing was 221.7 with a range of 119-379. The majority of chub less than 150 mm TL was collected during electrofishing.

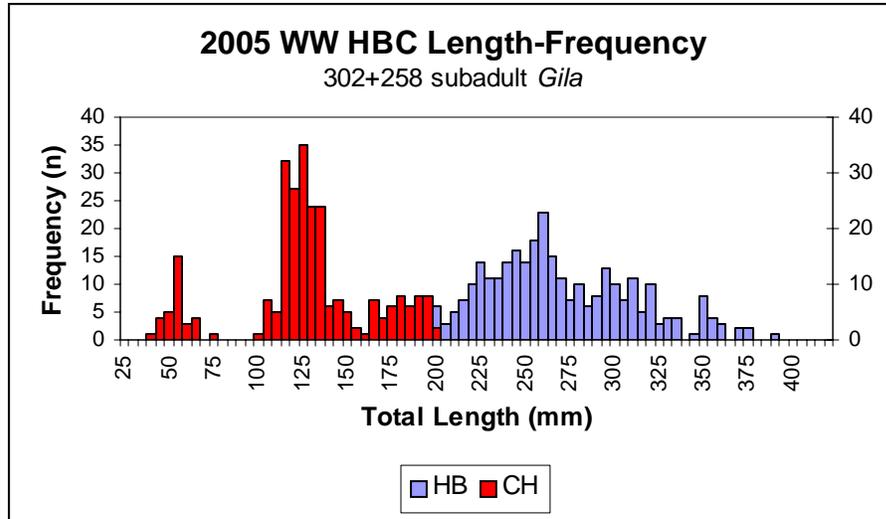


Figure 1. Length-frequency histogram for 2005 humpback chub in Westwater Canyon. Subadults in red were identified as *Gila* and are represented in the humpback chub and roundtail chub histograms.

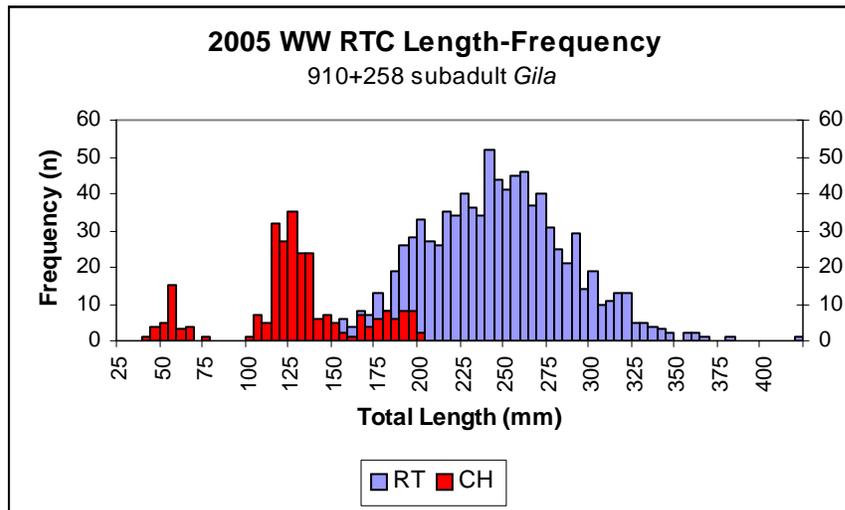


Figure 2. Length-frequency histogram for 2005 roundtail chub in Westwater Canyon. Subadults in red were identified as *Gila* and are represented in the humpback chub and roundtail chub histograms.

Trammel netting resulted in 1,142.4 hours of effort and electrofishing was conducted for 30.1 hours total. Catch per unit effort (CPUE) is presented for each species by sampling approach in Table 1. Trammel net CPUE values for 2005 are similar to those recorded in 2003 and 2004. Electrofishing CPUE was about half

of what was observed in 2003 and 2004. The electrofishing catch rates for 2003 and 2004 were 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 2003-2005.

<b>2003</b>	<b><i>Trammel Nets</i></b>	<b><i>Electrofishing</i></b>	<b><i>Hoop Nets</i></b>
<b><i>Humpback Chub</i></b>	0.168	8.824	0.000
<b><i>Roundtail Chub</i></b>	0.468	34.804	0.020
<b><i>Gila</i></b>	0.004	40.196	0.070
<b>2004</b>	<b><i>Trammel Nets</i></b>	<b><i>Electrofishing</i></b>	<b><i>Hoop Nets</i></b>
<b><i>Humpback Chub</i></b>	0.164	7.901	0.012
<b><i>Roundtail Chub</i></b>	0.496	27.901	0.045
<b><i>Gila</i></b>	0.013	9.382	0.000
<b>2005</b>	<b><i>Trammel Nets</i></b>	<b><i>Electrofishing</i></b>	<b><i>Hoop Nets</i></b>
<b><i>Humpback Chub</i></b>	0.176	3.322	-
<b><i>Roundtail Chub</i></b>	0.379	15.813	-
<b><i>Gila</i></b>	0.020	8.205	-

Long-term recapture rates during 2005 for humpback chub and roundtail chub were similar to the period from 1998 to 2004 (Table 2). Within-year recaptures during 2005 for humpback chub were approximately double those from 1998 to 2004, and roundtail chub within-in year recaptures were higher than the 1998-

2003 period, but slightly less than 2004. Of 292 total adult humpback chub captured, 38 of those had been PIT tagged in previous years. Twenty-four of those 292 individuals were recaptured within 2005. Of 763 total adult roundtail chub captured, 40 of those had been PIT tagged in previous years. Forty-four of those 763 individuals were recaptured within 2005.

Table 2. Adult humpback chub and roundtail chub captures, long-term recaptures, and within-year recaptures for Westwater Canyon 1998-2000 and 2003-2005.

<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>
<b>1998</b>	488	54	14	389	42	9
<b>1999</b>	281	65	10	486	70	13
<b>2000</b>	279	76	6	527	73	18
<b>2003</b>	298	50	12	636	43	9
<b>2004</b>	290	41	11	817	48	56
<b>2005</b>	292	38	24	763	40	44

Electrofishing was conducted during all three passes in 2005. Electrofishing was conducted in the afternoon and the evening and proved to be extremely productive during the afternoon in collecting juvenile chub. However, trammel netting produced twice as many adult humpback chub as electrofishing over the three passes.

Within-year recaptures of humpback chub increased in 2005 to about double the numbers seen in previous years. This increase might be attributed to the increase in electrofishing effort. Furthermore, within-year recaptures of roundtail chub continue to remain high in 2005.

Electrofishing effort in 2005 is the highest ever conducted in Westwater Canyon. It proved to be extremely productive, even during the middle of the day. Previous recorded and anecdotal data suggests otherwise. Trammel netting however still appears to be the most effective method for capturing humpback chub. Supplementing trammel netting with electrofishing as done this year has proven to be most effective in increasing the capture and recapture of all chub.

VII. Recommendations

1. Electrofishing should be conducted during every pass.
2. Electrofishing should be conducted in the afternoon before nets are set as well as in the evening after nets are pulled.
3. Electrofishing should be conducted during times when the river is too debris laden for trammel netting.
4. Radiotelemetry tracking of humpback chub and roundtail chub may help explain movement patterns that have not been documented.

VIII. Project Status: Ongoing

Third year of three-year project completed.

IX. FY05 Budget:

A. Funds budgeted:	\$ 83,490
B. Funds expended/obligated:	\$ 66,792
C. Difference:	\$ 16,698
D. Percent FY2005 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: Julie A. Jackson Date: 11/18/2005