

**COLORADO RIVER RECOVERY PROGRAM  
FY-2008/2009 PROPOSED SCOPE-OF-WORK for:**

**Project No.: 132**

Population estimate of humpback chub in Westwater Canyon, Colorado River, Utah

Lead Agency: Utah Division of Wildlife Resources

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Category:

- Ongoing project  
 Ongoing-revised project  
 Requested new project  
 Unsolicited proposal

Expected Funding Source:

- Annual funds  
 Capital funds  
 Other (explain)

I. Title of Proposal:

Population estimate of humpback chub in Westwater Canyon, Colorado River, Utah

II. Relationship to RIPRAP:

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

### III. Study Background/Rationale and Hypotheses:

The Recovery Implementation Program for Endangered Fish Species in the Upper Colorado River Basin is currently involved in establishing recovery goals for the endangered humpback chub. Recovery goals will be based in part on maintaining populations of humpback chub in several locations, among which is the Westwater Canyon population on the Colorado River. Establishing and measuring progress toward recovery goals necessitates monitoring to obtain accurate and precise population estimates.

Three-year population estimates were conducted for the Westwater Canyon humpback chub population during 1998-2000 and 2003-2005. Capture  $M_0$  model (null model) population estimates were: (1998: 4,744, 1999: 2,215, 2000: 2,201) with respective profile likelihood intervals (1998: 3,760-14,665; 1999: 1,608-7,508; 2000: 1,335-4,124) Jackson, draft. From 1998 through 2000, the probability of capture ( $p$ -hat) and coefficient of variation (CV) increased slightly (1998:  $p$ -hat=0.035, CV= 0.23; 1999:  $p$ -hat=0.041, CV= 0.28; 2000:  $p$ -hat=0.041, CV= 0.28) Jackson, draft. The population model estimates from Capture  $M_t$  model were: (2003: 2,973, 2004: 1,729, 2005: 1,210) with respective profile likelihood intervals (2003: 1,710-6,042, 2004: 1,121-2,967, 2005: 880-1,769), Jackson, draft. The recently revised approach should further increase the probability of capture and decrease the coefficient of variation through an increase effort using multiple techniques.

The recovery goals require that population estimates for Westwater Canyon humpback chub be conducted on a two years on and then two years off schedule. Information collected previously by the Utah Division of Wildlife Resources- Moab Field Station and recommendations from the USFWS population estimate workshops held in Winter 2002 are incorporated into the approach to provide the best opportunity of determining the most accurate and precise estimate for the Westwater Canyon humpback chub population.

### IV. Goals, Objectives, End Product:

Goal: to estimate the population size of humpback chub in Westwater Canyon with the most precise confidence intervals possible.

Objectives:

- 1) Obtain a population estimate of adult humpback chub (> 200 mm) in Westwater Canyon
- 2) Determine mean estimated recruitment of naturally produced subadult humpback chub (150-199 mm) in Westwater Canyon

### End Product:

An in-depth annual progress report detailing these data (including population estimates, 95% confidence intervals, coefficients of variation, and probabilities of capture) will be completed before the winter Colorado River researchers meeting and provided to the Recovery Program and the USFWS for evaluation. At the completion of this project, the annual progress report will incorporate in-depth analyses (including population estimates, 95% confidence intervals, coefficients of variation, and probabilities of capture) for both years of the study.

### V. Study area:

Westwater Canyon, Colorado River (RM 124.5-112.5), Utah.

Sampling will occur at four locations:

- I. RM 124.5-123.7 - Above and Below Miners Cabin
- II. RM 123.2-121.7 - Between Miners Cabin and Cougar Bar<sup>1</sup>
- III. RM 121.7-120.8 - Cougar Bar to Little Hole
- IV. RM 120.0-119.5 - Hades Bar

<sup>1</sup> *This location will be investigated to determine to what extent it can be sampled based on ability to access the area from a camp.*

### VI. Study Methods/Approach:

Study methods will be similar to those used in the previous humpback chub population estimates in Desolation/Gray and Westwater canyons (Hudson and Jackson, 2003) and incorporate recommendations that resulted from the USFWS population estimate workshops held in Winter 2002.

Three sampling trips will be made in September and October approximately one to two weeks apart. Each of the four sampling locations will be sampled for one night around the crepuscular hours (i.e., late afternoon to midnight, and pre-dawn to mid-morning). Three of these sites will be sampled for an additional night to maximize captures of humpback chub in Westwater Canyon (Above and Below Miners Cabin, RM 124.5-123.7; between Miners Cabin and Cougar Bar, RM 123.2-121.7; Cougar Bar to Little Hole, RM 121.7-120.8).

Humpback chub will be captured using trammel nets and electrofishing at each sampling location. The number of trammel nets set at each sampling location will be maximized according to available sampling habitat (7-14 nets per sampling location). Trammel nets will be fished in 1.5 to 2 hour sets from late afternoon through approximately 2300 hrs. At that time, the nets will be pulled for the remainder of the night. Trammel nets will again be fished in 1.5 to 2 hour nets sets from pre-dawn through mid-morning. All chubs will be scanned for a PIT tag, tagged (if necessary), measured (mm; total length, depth of nuchal

depression, length of origin of pectoral fin to origin of pelvic fin, length of dorsal fin base, length of anal fin base; Douglas et al. 1998, Smith et al. 1979), weighed (g), principal dorsal and anal fin rays counted, and released. Other endangered fish captured will be scanned for a PIT tag, tagged (if necessary), measured for total length (mm), weighed (g), and released. All other fish captured will be measured for total length (mm), weighed (g), and released or disposed of accordingly. This information will be collected immediately after capture to reduce handling stress.

Electrofishing will be conducted at each sampling location during the crepuscular period. In addition, electrofishing will be conducted in intervening reaches between sampling locations. All chubs will be scanned for a PIT tag, tagged (if necessary), measured (mm; total length, depth of nuchal depression, length of origin of pectoral fin to origin of pelvic fin, length of dorsal fin base, length of anal fin base), weighed (g), principal dorsal and anal fin rays counted, and released. Other endangered fish captured will be scanned for a PIT tag, tagged (if necessary), measured for total length (mm), weighed (g), and released. All other fish captured will be measured for total length (mm), weighed (g), and released or disposed of accordingly. This information will be collected immediately after capture to reduce handling stress.

VII. Task Description and Schedule:

1. Three pass mark-recapture sampling for humpback chubs in Westwater; fall 2007 (FY-07 and FY-08); and fall 2008 (FY-08 and FY-09).
2. Compile data annually, prepare preliminary population estimate to be made available before the winter Colorado River researchers meeting and provided to the Recovery Program and USFWS for evaluation. Estimates will include numbers of adults (>200 mm TL) in the population, as well as recruitment by juveniles (150-199 mm TL); Nov-Dec 2007 (FY-08); and Nov-Dec 2008 (FY-09)
3. Complete final report describing population size and structure of humpback chub in Westwater; Nov-June 2009 (FY09)

VIII. Work Deliverables/Due Dates - See above

Annual progress reports; November 2007-8  
Final Report; June 2009

IX. Budget Summary

**FY 08 Tasks 1 & 2:**

Personnel

Biologists (\$30.12/hr x 10hr/day x 104 total work days)	\$ 31,325
Technicians (\$17.17/hr x 10hr/day x 176 total work days)	\$ 30,048
Project Leader (\$38.74/hr x 10hr/day x 11 total work days)	\$ 4,261

Personnel Total \$ 65,634

Travel / Per Diem

Per Diem (6 people @ \$20/day for 24 days)	\$ 2,880
Mileage-\$0.49/mile (170 miles per truck per trip)	
4 trucks per trip X 3 trips	\$ 1,000
Vehicle rent (4 trucks @ \$250 per month for 1 month)	\$ 1,000
Gasoline (boats and generators) 3 trips	\$ 2,200

Travel Total \$ 7,080

Equipment

Misc. gear and camping equipment (tents, dry bags, stoves, cookware, chairs, tables, toilets, trammel nets, oars, oar blades, life jackets, dip nets, GPS units, digital camera, scales)	\$ 2,500
Equipment repair and maintenance (outboards, generators, trailers, rafts, oars)	\$ 2,300

Equipment Total \$ 4,800

**FY 08 Total** \$ 77,514

**FY 09 Tasks 1 & 2:**

Personnel

Biologists (\$35/hr x 10hr/day x 60 total work days)	\$ 21,000
Technicians (\$20/hr x 10hr/day x 62 total work days)	\$ 12,400
Project Leader (\$46/hr x 10hr/day x 4 total work days)	\$ 1,840

Personnel Total \$ 35,240

Travel / Per Diem

Per Diem (6 people @ \$30/day for 8 days)	\$ 1,440
Mileage-\$0.50/mile (170 miles)	
4 trucks per trip X 3 trips	\$ 1,000
Vehicle rent (4 trucks @ \$250 per month for 1 month)	\$ 1,000
Gasoline (boats and generators)	\$ 750

Travel Total \$ 4,190

Equipment		
Misc. gear and camping equipment		\$ 500
Equipment repair and maintenance (outboards, generators, trailers, rafts, oars)		\$ 500
	<u>Equipment Total</u>	<u>\$ 1,000</u>
	<u>FY 09 Tasks 1 &amp; 2 Total</u>	<u>\$ 40,430</u>

**FY 09 Task 3:**

Personnel		
Biologists (\$35/hr x 10hr/day x 25 total work days)		\$ 8,750
Technicians (\$20/hr x 10hr/day x 5 total work days)		\$ 1,000
Project Leader (\$46/hr x 10hr/day x 4 total work days)		\$ 1,840
	<u>Personnel Total</u>	<u>\$ 11,590</u>

Travel / Per Diem		
Per Diem (\$30/day for 4 days)		\$ 120
Mileage-\$0.50/mile (350 miles)		\$ 175
Vehicle rent		\$ 125
Lodging and Registration		\$ 300
	<u>Travel Total</u>	<u>\$ 720</u>

FY 09 Task 3 Total \$ 12,310

**FY 09 Total** **\$ 52,740**

Annual Totals

FY2008	\$ 77,514
FY2009	\$ 52,740

**Total** **\$ 130,254**

X. Reviewers

Tom Chart, USBR  
Dr. Richard Valdez, Valdez and Associates

XI. References

Douglas, M.E., R.R. Miller, and W.L. Minckley. 1998. Multivariate discrimination of Colorado Plateau *Gila* spp.: The “art of seeing well” revisited. Transactions of the American Fisheries Society 127:163–173.

Hudson, J.M. and J.A. Jackson. 2003. Population Estimates for Humpback Chub (*Gila cypha*) and Roundtail Chub (*Gila robusta*) in Westwater Canyon, Colorado River, Utah. 1998-2000. Utah Division of Wildlife Resources.

Jackson, J.A. Draft. Population Estimate for Humpback Chub (*Gila cypha*) and Roundtail Chub (*Gila robusta*) in Westwater Canyon, Colorado River, Utah 2003-2005. Draft Final Report for the Upper Colorado River Basin Endangered Fish Recovery Program, Denver Colorado

Smith, G.R., R.R. Miller, and W.D. Sable. 1979. Species relationships among fishes of the genus *Gila* in the upper Colorado River drainage. U.S. Nat. Park Serv. Trans. Proc., Ser. 5:613-623.