COLORADO RIVER RECOVERY PROGRAM **Project No.: 132**
FY-2011 PROPOSED SCOPE-OF-WORK for:

Lead Agency: Utah Division of Wildlife Resources
Submitted by (Principal Investigators): Darek Elverud (lead), Paul Badame

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Category:
_X_ Ongoing project
___ Ongoing-revised project
___ Requested new project
___ Unsolicited proposal

Expected Funding Source:
_X_ 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_o 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, and 2005: 1,210) with respective profile likelihood intervals (2003: 1,710-6,042, 2004: 1,121-2,967, 2005: 880-1,769), Jackson, draft.

Two-year population estimates were conducted for Westwater Canyon in 2007 and 2008. The population model estimates from Capture M_t model were: (2007: 1,757, 2008: 1,315) with respective profile likelihood intervals (2007: 1,097-3,173, 2008: 969 – 1,896) Elverud 2008. The probability of capture (p-hat) and coefficient of variation (CV) from 2007 and 2008 were: (2007: p-hat = 0.05, CV = 0.27; 2008: p-hat = 0.08, CV = 0.17) Elverud 2008.

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:

1. RM 124.5-123.7 - Above and Below Miners Cabin
2. RM 123.2-121.7 - Between Miners Cabin and Cougar Bar[1]
3. RM 121.7-120.8 - Cougar Bar to Little Hole
4. RM 120.0-119.5 - Hades Bar

[1] *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 prior to nets being set and after nets are pulled. 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:

Task 1) Complete 3 sampling trips in Westwater Canyon from September-October 2011-2012.

FY11 – two trips will be completed in September 2011.
FY12 – one trip will be completed during October 2012 and two will be completed during September 2013.
FY13 – one trip will be completed during October 2013.

Task 2) Data will be entered into a database on the computer and transferred to the UCRRP database manager by January 15 each year.

FY12 – data entered and submitted Jan 2013.
FY13 – data entered and submitted Jan 2014.

Task 3) An annual progress report including: 1) number of passes made; 2) estimator model used (and why) and point estimate (N-hat); 3) confidence interval; 4) probability of capture (p-hat) and coefficient of variation (C.V.); 5) length frequency charts with

demarcation of subadults and adults; and 6) percentage of subadult to adult fish, which will be submitted by Nov. 15 each year.

FY12 – Annual report submitted Nov 2011.
FY13 – Annual report submitted Nov 2012.

Task 4) Prepare final report (FY13)

VIII. Field Season 2011 Work
Deliverables/Due Dates - See above

FY 2011 Budget:

Task 1.
Personnel

Biologists ($340/day x 40 total work days)	$13,600
Technicians ($195/day x 118 total work days)	$23,010
Project Leader ($438/day x 20 total work days)	$ 8,760
Total	$45,370

Travel / Per Diem

Per Diem (6 people @ $25/day for 24 days)	$ 2,400
Mileage-$0.49/mile (170 miles per truck per trip) 4 trucks per trip X 3 trips	$ 666
Vehicle rent (3 trucks @ $250 per month for 1 month	$ 750
Gasoline (boats and generators) 2 trips	$ 1,474
Total	$ 5,290

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)	$ 1,675
Equipment repair and maintenance (outboards, generators, trailers, rafts, oars)	$ 1,541
Total	$ 3,216
Total	**$ 53,876**

FY 2012 Budget:

Task 1.
Personnel

Biologists ($340/day x 60 total work days)	$20,400
Technicians ($195/day x 176 total work days)	$34,320
Project Leader ($438/day x 30 total work days)	$13,140
Total	$67,860

Travel / Per Diem

Per Diem (6 people @ $25/day for 24 days)	$ 3,600
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
Total	$ 7,800

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
Total	$ 4,800
Total	**$ 80,460**

Task 2.
Personnel

Biologists ($340/day x 10 total work days)	$ 3,400
Total	**$ 3,400**

Task 3.
Personnel

Biologists ($340/day x 10 total work days)	$ 3,400
Project Leader ($438/day x 1 work day)	$ 438
Total	**$ 3,838**

FY 2013 Budget:

Task 1.
Personnel

Biologists ($340/day x 20 total work days)	$ 6,800

Technicians ($195/day x 58 total work days)	$11,310
Project Leader ($438/day x 10 total work days)	$ 4,380
Total	$22,490
Travel / Per Diem	
Per Diem (6 people @ $25/day for 24 days)	$ 1,200
Mileage-$0.49/mile (170 miles per truck per trip)	
4 trucks per trip X 3 trips	$ 333
Vehicle rent (3 trucks @ $250 per month for	
1 month	$ 250
Gasoline (boats and generators) 2 trips	$ 726
Total	$ 2,509
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)	$ 825
Equipment repair and maintenance	
(outboards, generators, trailers, rafts, oars)	$ 759
Total	$ 1,584
Total	**$ 26,583**
Task 2.	
Personnel	
Biologists ($340/day x 10 total work days)	$ 3,400
Total	**$ 3,400**
Task 3.	
Personnel	
Biologists ($340/day x 10 total work days)	$ 3,400
Project Leader ($438/day x 1 work day)	$ 438
Total	**$ 3,838**
Task 4.	
Personnel	
Biologist ($340/day x 20 total work days)	$ 6,800
Project Leader ($438/day x 2 total work days)	$ 876
Total	**$ 7,676**

IX. Budget Summary

FY2011	$ 53,876
FY2012	$ 87,698 (estimate)
FY2013	$ 41,497 (estimate)
Total	**$ 183,071**

X. Reviewers

XI. References

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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.