

**COLORADO RIVER RECOVERY PROGRAM  
FY 2014-15 PROPOSED SCOPE OF WORK for:**

**Project No.: 132**

Population estimate of humpback chub in Westwater Canyon.

Reclamation Agreement number: R09AP40848

Reclamation Agreement term: 10/1/2010-9/30/2014

Lead Agency: Utah Division of Wildlife Resources

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Category:

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

Expected Funding Sources:

- 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:

**GENERAL RECOVERY PROGRAM SUPPORT ACTION PLAN**

- V. Monitor populations and habitat and conduct research to support recovery actions (research, monitoring, and data management).
- V.A. Measure and document population and habitat parameters to determine status and biological response to recovery actions.

**COLORADO RIVER ACTION PLAN: MAINSTEM**

- V. Monitor populations and habitat and conduct research to support recovery actions (research, monitoring, and data management).

- V.A. Conduct research to acquire life history information and enhance scientific techniques required to complete recovery actions
- V.C.3. Westwater

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

In 2002, the Recovery Program set 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. Setting, maintaining, and monitoring a population necessitates obtaining accurate population estimates based on a multiple mark-recapture model. To achieve downlisting, accurate population estimates are needed over a 5-year monitoring period. Delisting requires a 3-year monitoring period beyond once downlisting is achieved (USFWS 2002)

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.

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. Study Goals, Objectives, End Product(s):

Goal: To estimate the population size of humpback chub in Westwater Canyon with coefficient of variation of less than 20%.

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: Annual progress report detailing these data (including population estimates, 95% confidence intervals, coefficients of variation, and probabilities of capture). 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 – Above Cougar Bar
3. RM 121.7-120.8 - Cougar Bar to Little Hole
4. RM 120.0-119.5 - Hades Bar

VI. Study Methods/Approach:

- 1) 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 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; Above 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 (5-8 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 for total length (mm), 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 in the afternoon. All chubs will be scanned for a PIT tag, tagged (if necessary), measured for total length (mm), 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. 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. Sampling: Complete 3 sampling trips in Westwater Canyon from September-October 2015-2016.

FY15 – two trips will be completed in September 2015.

FY16 – one trip will be completed in October 2015 and two will be completed in September 2016.

FY17 – one trip will be completed in October 2016.

Task 2. Data entry, analysis, and reporting: Data will be entered into a database on the computer and transferred to the UCRRP database manager by January 15 each year following sampling. 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 in November each year following sampling. A final report will be prepared following the final year of sampling.

FY16 – Database submission and annual report

FY17 – Database submission, annual report, prepare final report.

Schedule: FY 2015-2017

Task	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1									X	X		
2										X	X	X

VIII. Deliverables, Due Dates, and Budget by Fiscal Year:

**FY 2015 Costs for UDWR- Moab (same as FY11)**

**Task 1. 2 sampling passes in September 2015**

Labor: salary + benefits + applicable overtime (personnel services)

	<b>Rate</b>	<b>Hours</b>	<b>Cost</b>
Project Leader	\$30.30	180	\$5,454
Biologist	\$27.36	450	\$12,314
Technician	\$17.31	1160	\$20,077
		<b>subtotal</b>	<b>\$37,845</b>

Food and Transport (current expense)

	<b>Rate</b>	<b>Quantity</b>	<b>Cost</b>
Fleet Costs <sup>a</sup> (4 trucks for 8% of total fleet costs)	\$41,616.00	0.08	\$3,329
Food (6 people, 16 days)	\$30.60	96	\$2,938
		<b>subtotal</b>	<b>\$6,267</b>

Equipment (current expense)

	<b>Rate</b>	<b>Quantity</b>	<b>Cost</b>
Camping gear repair/replacement <sup>b</sup> :			\$735
Sampling gear repair/replacement <sup>c</sup> :			\$944
Boating gear repair/replacement <sup>d</sup> :			\$1,326
Fuel for motors (20 gallons/trip)	\$4.08	40	\$163
		<b>subtotal</b>	<b>\$3,168</b>

**Task 1 subtotal** **\$47,280**

**Task 2. Data Entry, Analysis, and Reporting**

Labor: salary + benefits + applicable overtime (personnel services)

	<b>Rate</b>	<b>Hours</b>	<b>Cost</b>
Project Leader	\$30.30	10	\$303
Biologist	\$27.36	230	\$6,294
Technician	\$17.31	0	\$0
		<b>subtotal</b>	<b>\$6,597</b>

**Task 2 subtotal** **\$6,597**

**Grand Total FY 2015** **\$53,876**

<sup>a</sup> The State of Utah uses Automotive Resources Inc. for motor pool operations. Rental is approximately \$6,800/year/vehicle (includes fleet rental, mileage, and gas), which is based on the average annual cost for all trucks used in our program.

<sup>b</sup> Includes, but is not limited to, tents, sleeping pads, toilet system, cookware, stoves, propane, charcoal, satellite phone and service, drybags, coolers, first aid supplies.

<sup>c</sup> Includes, but is not limited to, trammel nets, dip nets, PIT tag readers, scales, spot lights, electrofishing units, generators, data loggers.

<sup>d</sup> Includes, but is not limited to, raft repair/replacement, outboard motor parts and maintenance, propellers, oars, raft frame repair, dry boxes.

<sup>b,c,d</sup> Estimated costs are based on actual costs from previous years plus an estimated 2% cost of living increase each year following.

**FY 2016 Costs for UDWR- Moab (2% increase from FY12)**

**Task 1. 1 sampling pass in October 2015, 2 passes in September 2016**

<u>Labor: salary + benefits + applicable overtime (personnel services)</u>			
	<b>Rate</b>	<b>Hours</b>	<b>Cost</b>
Project Leader	\$30.91	260	\$8,036
Biologist	\$27.91	720	\$20,096
Technician	\$17.65	2200	\$38,838
		<b>subtotal</b>	<b>\$66,970</b>
<u>Food and Transport (current expense)</u>			
	<b>Rate</b>	<b>Quantity</b>	<b>Cost</b>
Fleet Costs (4 trucks for 12% of total fleet costs)	\$42,448.32	0.12	\$5,094
Food (6 people, 24 days)	\$31.21	144	\$4,495
		<b>subtotal</b>	<b>\$9,588</b>
<u>Equipment (current expense)</u>			
	<b>Rate</b>	<b>Quantity</b>	<b>Cost</b>
Camping gear repair/replacement:			\$1,114
Sampling gear repair/replacement:			\$962
Boating gear repair/replacement:			\$1,925
Fuel for motors (20 gallons/trip)	\$4.16	60	\$250
		<b>subtotal</b>	<b>\$4,251</b>
<b>Task 1 subtotal</b>			<b>\$80,809</b>

**Task 2. Data Entry, Analysis, and Reporting**

<u>Labor: salary + benefits + applicable overtime (personnel services)</u>			
	<b>Rate</b>	<b>Hours</b>	<b>Cost</b>
Project Leader	\$30.91	40	\$1,236
Biologist	\$27.91	240	\$6,699
Technician	\$17.65	40	\$706
		<b>subtotal</b>	<b>\$8,641</b>
<b>Task 2 subtotal</b>			<b>\$8,641</b>

<b>Grand Total FY 2016</b>	<b>\$89,451</b>
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**FY 2017 Costs for UDWR- Moab (2% increase from FY13)**

**Task 1. 1 sampling pass in October 2016 plus final report preparation**

<u>Labor: salary + benefits + applicable overtime (personnel services)</u>			
	<b>Rate</b>	<b>Hours</b>	<b>Cost</b>
Project Leader	\$31.53	80	\$2,522
Biologist	\$28.47	200	\$5,694
Technician	\$18.01	800	\$14,405
		<b>subtotal</b>	<b>\$22,621</b>
<u>Food and Transport (current expense)</u>			
	<b>Rate</b>	<b>Quantity</b>	<b>Cost</b>
Fleet Costs (4 trucks at 4% of total fleet costs)	\$43,297.29	0.04	\$1,732
Food (6 people, 8 days)	\$31.84	48	\$1,528
		<b>subtotal</b>	<b>\$3,260</b>
<u>Equipment (current expense)</u>			
	<b>Rate</b>	<b>Quantity</b>	<b>Cost</b>

Camping gear repair/replacement:			\$192
Sampling gear repair/replacement:			\$292
Boating gear repair/replacement:			\$1,247
Fuel for motors (20 gallons/trip)	\$4.24	20	\$85
		<b>subtotal</b>	<b>\$1,815</b>
<b>Task 1 subtotal</b>			<b>\$27,697</b>

**Task 2. Data Entry, Analysis, and Reporting**

<u>Labor: salary + benefits + applicable overtime (personnel services)</u>			
	<b>Rate</b>	<b>Hours</b>	<b>Cost</b>
Project Leader	\$31.53	80	\$2,522
Biologist	\$28.47	400	\$11,388
Technician	\$18.01	40	\$720
		<b>subtotal</b>	<b>\$14,630</b>

<b>Grand Total FY 2017</b>	<b>\$42,327</b>
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IX. Program Budget Summary

	UDWR-Moab
FY2014	\$0
FY2015	\$53,876
FY2016	\$89,451
FY2017	\$42,327
FY2018	\$0
total:	\$185,654

X. Reviewers:

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.

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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.

U.S. Fish and Wildlife Service. 2002. Humpback chub (*Gila cypha*) Recovery Goals: amendment and supplement to the Humpback Chub Recovery Plan. U.S. Fish and Wildlife Service, Mountain-Prairie Region (6), Denver, Colorado.