

**RECOVERY PROGRAM
FY 2016-17 PROPOSED SCOPE OF WORK for:**

Recovery Program Project Number: 132

Population estimate of humpback chub in Westwater Canyon.

Reclamation Agreement number: R14AP00007
Reclamation Agreement term: 05/01/2014-09/30/2018

Note: Recovery Program FY16-17 scopes of work are drafted in May 2015. They often are revised before final Program approval and may subsequently be revised again in response to changing Program needs. Program participants also recognize the need and allow for some flexibility in scopes of work to accommodate new information (especially in nonnative fish management projects) and changing hydrological conditions.

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<u>Category:</u>	<u>Expected Funding Sources:</u>
<input checked="" type="checkbox"/> Ongoing project	<input checked="" type="checkbox"/> Annual funds
<input type="checkbox"/> Ongoing-revised project	<input type="checkbox"/> Capital funds
<input type="checkbox"/> Requested new project	<input type="checkbox"/> Other (explain)
<input type="checkbox"/> Unsolicited proposal	

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 2010). 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 2010). 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 2010).

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 2012). 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 2012).

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:

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. 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 (September-October 2016 and 2017).

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 (\hat{N}); 3) confidence interval; 4) probability of capture (\hat{p}) 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 (October-November 2016 and 2017). A final report will be prepared following the final year of sampling (Winter 2017, Spring 2018).

Schedule:

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:

FY2016: Annual Report by November 2016.

FY 2016 Costs for UDWR- Moab
Task 1. Three Sampling Passes in Fall 2016

Personnel Costs (salary + fringe costs)

	Rate	Hours	Cost
Project Leader	\$33.71	200	\$6,742
Biologist	\$30.76	800	\$24,607
Technician	\$16.77	1400	\$23,478
		subtotal	\$54,827

Food and Travel

	Rate	Quantity	Cost
Fleet Costs ^a (3 trucks for 8% of total fleet costs)	\$40,800.00	0.08	\$3,264
Food (6 people, 8 days, 3 trips)	\$30.00	144	\$4,320
		subtotal	\$7,584

Equipment

	Rate	Quantity	Cost
Camping gear repair/replacement ^b :			\$1,720
Sampling gear repair/replacement ^c :			\$2,413
Boating gear repair/replacement ^d :			\$2,850
Fuel for motors (20 gallons/trip)	\$4.00	60	\$240
Submersible PIT antennas	\$3,500.00	2	\$7,000
		subtotal	\$14,223

Task 1 subtotal **\$76,634**

Task 2. Data Entry, Analysis, and Reporting

Personnel Costs (salary + fringe costs)

	Rate	Hours	Cost
Project Leader	\$33.71	60	\$2,023
Biologist	\$30.76	160	\$4,921
		subtotal	\$6,944

Task 2 subtotal **\$6,944**

Grand Total FY 2016	\$83,578
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^a 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.

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

^c Includes, but is not limited to, trammel nets, dip nets, PIT tag readers, scales, spot lights, electrofisher repair, generators, data loggers.

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

^{b,c,d} Estimated costs are based on actual costs from previous years plus an estimated 2% cost of living increase each year following.

FY2017: Annual Report by November 2017. Final Report by 2018.

FY 2017 Costs for UDWR- Moab			
Task 1. Three Sampling Passes in Fall 2017			
<u>Personnel Costs (salary + fringe costs)</u>			
	Rate	Hours	Cost
Project Leader	\$34.38	200	\$6,877
Biologist	\$31.37	800	\$25,100
Technician	\$17.11	1400	\$23,948
		subtotal	\$55,924
<u>Food and Travel</u>			
	Rate	Quantity	Cost
Fleet Costs ^a (3 trucks for 8% of total fleet costs)	\$41,616.00	0.08	\$3,329
Food (6 people, 8 days, 3 trips)	\$30.60	144	\$4,406
		subtotal	\$7,736
<u>Equipment</u>			
	Rate	Quantity	Cost
Camping gear repair/replacement ^b :			\$1,754
Sampling gear repair/replacement ^c :			\$2,461
Boating gear repair/replacement ^d :			\$2,907
Fuel for motors (20 gallons/trip)	\$4.08	60	\$245
NRS 16' Expedition Raft	\$5,100.00	\$1.00	\$5,100.00
		subtotal	\$12,467
Task 1 subtotal			\$76,126
Task 2. Data Entry, Analysis, and Reporting (includes final report)			
<u>Personnel Costs (salary + fringe costs)</u>			
	Rate	Hours	Cost
Project Leader	\$34.38	120	\$4,126
Biologist	\$31.37	500	\$15,687
		subtotal	\$19,813
Task 2 subtotal			\$19,813
Grand Total FY 2017			\$95,939

FY2018: No work will be conducted in FY2018.

FY2019: No work will be conducted in FY2019.

FY2020: Annual Report by November 2020.

FY 2020 Costs for UDWR- Moab

Task 1. Three Sampling Passes in Fall 2020

Personnel Costs (salary + fringe costs)

	Rate	Hours	Cost
Project Leader	\$36.49	200	\$7,297
Biologist	\$33.29	800	\$26,636
Technician	\$18.15	1400	\$25,413
		subtotal	\$59,347

Food and Travel

	Rate	Quantity	Cost
Fleet Costs ^a (3 trucks for 8% of total fleet costs)	\$44,163.23	0.08	\$3,533
Food (6 people, 8 days, 3 trips)	\$32.47	144	\$4,676
		subtotal	\$8,209

Equipment

	Rate	Quantity	Cost
Camping gear repair/replacement ^b :			\$1,861
Sampling gear repair/replacement ^c :			\$2,612
Boating gear repair/replacement ^d :			\$3,085
Fuel for motors (20 gallons/trip)	\$4.33	60	\$260
Submersible PIT antennas	\$3,788.51	2	\$7,577
		subtotal	\$15,395

Task 1 subtotal **\$82,951**

Task 2. Data Entry, Analysis, and Reporting

Personnel Costs (salary + fringe costs)

	Rate	Hours	Cost
Project Leader	\$36.49	60	\$2,189
Biologist	\$33.29	160	\$5,327
		subtotal	\$7,516

Task 2 subtotal **\$7,516**

Grand Total FY 2020	\$90,467
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IX. Program Budget Summary

FY16	\$83,578
FY17	\$95,939
FY18	\$0
FY19	\$0
FY20	\$90,467
total:	\$269,984

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.

Elverud, D.S. 2012. Population Estimates for Humpback Chub (*Gila cypha*) and roundtail chub (*Gila robusta*) in Westwater Canyon, Colorado River, Utah. Final Report Of the Utah Division of Wildlife Resources to the Upper Colorado River Endangered Fish Recovery Program, Denver, CO.

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.

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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.

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.