

**RECOVERY PROGRAM
FY 2018-19 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 FY18-19 scopes of work are drafted in May 2017. 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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Date Last Modified: 6/1/2017 4:22:00 PM

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 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 2007-2008 and 2011-2012. 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 population model estimates for 2011-2012 were calculated using robust design closed capture models. The estimates for 2011 were 1,467 (1,175-1,861 95% CI) and 1,315 (1,022-1,1713 95% CI) for 2012 (Hines et al 2016). The probability of capture (p -hat) and coefficient of variation (CV) from 2011 and 2012 were: (2011: p -hat = 0.23, CV = 0.12; 2012: p -hat = 0.16, CV = 0.13) (Hines et al 2016).

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 2020 and 2021).

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 2020 and 2021).

Task 3: A final report will be prepared following the final year of sampling (January-August 2022)

Schedule:

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

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

UDWR personnel costs are based on previous year costs plus a 2% increase on hourly rates and fringe costs per year. Vehicle rental is approximately \$8,000/year/vehicle (includes fleet rental, mileage, and gas), which is based on the average annual cost for all trucks used in our program. Vehicle costs for this budget are an estimated percentage of this total based on previous year's usage. Equipment costs are based on previous year costs and rates with a 2% increase on all line items for each year following. Equipment includes but is not limited to trammel nets, scales,

outboard repair, rafts, oars, dry boxes, coolers, tents, sleeping pads, PFDs, first aid supplies, satellite phone services, propane, fuel, etc...

FY2018: No work for this SOW will be conducted in FY2018. A final report will be written in 2018 but is included under the FY2017 SOW and FY2017 budget.

FY2019: No work will be conducted in FY2019.

FY2020: Annual Report by November 2020. Final Report by 2022.

FY 2020 Costs for UDWR- Moab

Task 1. Three Sampling Passes in Fall 2020

<u>Personnel Costs (salary + fringe costs)</u>			
	Rate	Hours	Cost
Project Leader	\$36.48	200	\$7,297
Biologist	\$33.62	800	\$26,897
Technician	\$17.65	1400	\$24,703
		subtotal	\$58,897
<u>Food and Travel</u>			
	Rate	Quantity	Cost
Fleet Costs (3 trucks for 8% of total fleet costs)	\$42,448.32	0.10	\$4,245
Food (6 people, 8 days, 3 trips)	\$31.21	144	\$4,495
		subtotal	\$8,739
<u>Equipment</u>			
	Rate	Quantity	Cost
Camping gear repair/replacement:			\$2,102
Sampling gear repair/replacement:			\$2,771
Boating gear repair/replacement:			\$3,433
Fuel for motors (20 gallons/trip)	\$4.16	60	\$250
Yamaha 40 HP Motor	\$6,034.32	1	\$6,034
		subtotal	\$14,590
Task 1 subtotal			\$82,226

Task 2. Data Entry, Analysis, and Reporting

<u>Personnel Costs (salary + fringe costs)</u>			
	Rate	Hours	Cost
Project Leader	\$36.48	60	\$2,189
Biologist	\$33.62	180	\$6,052
		subtotal	\$8,241

Task 2 subtotal	\$8,241
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Grand Total FY 2020	\$90,467
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FY2021: Annual Report by November 2021. Final Report by 2022.

FY 2021 Costs for UDWR- Moab

Task 1. Three Sampling Passes in Fall 2021

Personnel Costs (salary + fringe costs)

	Rate	Hours	Cost
Project Leader	\$37.21	200	\$7,443
Biologist	\$34.29	800	\$27,435
Technician	\$18.00	1400	\$25,197
		subtotal	\$60,075

Food and Travel

	Rate	Quantity	Cost
Fleet Costs (3 trucks for 8% of total fleet costs)	\$43,297.29	0.10	\$4,330
Food (6 people, 8 days, 3 trips)	\$31.84	144	\$4,584
		subtotal	\$8,914

Equipment

	Rate	Quantity	Cost
Camping gear repair/replacement:			\$2,144
Sampling gear repair/replacement:			\$2,826
Boating gear repair/replacement:			\$3,502
Fuel for motors (20 gallons/trip)	\$4.24	60	\$255
Hoop Nets	\$143.79	10	\$1,438
		subtotal	\$10,165

Task 1 subtotal	\$79,154
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Task 2-3. Data Entry, Analysis, and Reporting (includes final report)
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Personnel Costs (salary + fringe costs)

Project Leader	\$37.21	140	\$5,210
Biologist	\$34.29	660	\$22,634
Statistician consultation (Mary Connner)			\$2,000
		subtotal	\$29,844

Task 3 subtotal	\$29,844
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Grand Total FY 2021	\$108,998
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FY2022: A final report will be written in 2022 but is included in the FY2021 budget.

IX. Program Budget Summary

	UDWR- Moab
FY18	\$0
FY19	\$0
FY20	\$90,467
FY21	\$108,998
FY22	\$0
total:	\$199,465

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.

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.