

**RECOVERY PROGRAM  
FY 2020-2021 SCOPE OF WORK for:**

Recovery Program Project Number:   129  

*Humpback chub monitoring in Desolation/Gray Canyons*

Reclamation Agreement number:           R19AP00059            
Reclamation Agreement term:           Oct. 1, 2019 – Sept. 30, 2024          

Note: Recovery Program FY20-21 scopes of work are drafted in May 2019. 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.

Lead agency: Utah Division of Wildlife

Submitted by: John Caldwell and Katherine Creighton  
Utah Division of Wildlife Resources  
Moab Field Station  
1165 S. Hwy 191 Suite 4  
Moab, UT 84532  
Phone: 435-259-3781 / 3780; Fax: 435-259-3785  
E-mail: [johncaldwell@utah.gov](mailto:johncaldwell@utah.gov) / [katherinecreighton@utah.gov](mailto:katherinecreighton@utah.gov)

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<u>Category:</u>	<u>Expected Funding Source:</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
<input type="checkbox"/> Unsolicited proposal	

I. Title of Proposal: Humpback chub monitoring in Desolation/Gray Canyons, Green 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.

GREEN 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.B. Conduct population estimate for humpback chub.

V.B.1. Desolation/Gray

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

In 2002, the U.S. Fish and Wildlife Service set recovery goals for the endangered humpback chub. The recovery goals are based on maintaining stable populations of humpback chub in several locations including the Desolation/Gray Canyon population on the Green River. An estimate of population size is required to determine if the recovery goals are being met. Thus, monitoring of humpback chub has focused on producing a population estimate.

Annual population estimates for the Desolation/Gray Canyon humpback chub have been calculated for 2001-03 (Jackson and Hudson 2005), 2006-2007 (Badame 2012), 2010-2011, 2014-2015 (Howard and Caldwell 2018), and preliminarily for 2018 (Caldwell 2018). During 2001 and 2002, sampling occurred during June and July when chubs were more active, thus increasing the probability of mixing between sites. However, due to fish mortality and stress concerns caused by trammel netting in warm water temperatures, in 2003 sampling was moved to September and October. Sampling during 2006-2007 revealed that in the fall humpback chub have high site fidelity (90-100%). Because humpback chub were not moving among sites, population estimates were calculated individually for each site. Subsequently, population estimates for the reach have been calculated by multiplying the mean of the individual site estimates by a determined number of available sites (63) within Desolation and Gray Canyons (Badame 2012). These methods were used for 2010-2011 and 2014-2015 sampling but lack of sufficient recaptures in 2011 and 2015 prevented reach-wide estimates for those years.

Howard and Caldwell (2018) addressed the complexities of attempting to estimate the number of individuals in the Desolation/Gray population. Low densities over a large area create conditions where achieving an adequate number of recaptures can be extremely difficult. During 2018, hoop net and portable submersible PIT antenna effort was greatly increased but resulted in only two sites meeting the previously set criteria for estimates (15 individuals and 2 recaptures). However, the increase in hoop-net effort resulted in documentation of both young-of-the-year and juvenile chub and increased antenna effort resulted in more encounters with tagged fish.

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

Goal: Monitor the Desolation/Gray Canyon humpback chub population.

Objectives:

1. Estimate the number of late juvenile/adult humpback chub at a minimum of four sampling sites within Desolation/Gray Canyons with priority on long-term monitoring sites.
2. Use the mean of individual sites to estimate the total humpback chub population in Desolation/Gray Canyons with a coefficient of variation less than 20%.
3. Calculate a catch per unit effort (CPUE) comparable to past monitoring.
4. Determine proportion of adults that are first year adults (200-220 mm) to monitor recruitment.
5. Document humpback chub reproduction.

## V. Study Area:

The Desolation and Gray canyons reach occurs south of the Uinta Basin, UT, beginning at Sand Wash (RM 216) and ending 12 river miles upstream of the town of Green River, UT at Swasey's Rapid (RM 132). Within this reach there are four long-term trend monitoring sites: Cedar Ridge (RM 185), Log Cabin (RM 174.4), Cow Swim (RM 160.4), and Coal Creek (RM 145.7) (Figure 1). In addition, past studies have selected other locations to increase sampling coverage. For example, in 2018 Wild Horse (178.5) and Range Creek (151.2) were sampled in addition to the long-term trend sites (Figure 1).

## VI. Study Methods/Approach:

Long-term trend sites will be sampled three times in late summer/early fall. Sampling events will occur approximately two weeks apart. Trammel nets and hoop nets will be used during each sampling event. Trammel nets (6-8 per site) will be set in the evening beginning at approximately 1630 hours and checked every 1.5 to 2 hours to approximately 2230 hours. Nets will be set again before sunrise and checked through mid-morning. Baited hoop nets (20 per site) will be set over night. Portable submersible PIT antennas (two per site) will be used to increase the number of encounters with tagged fish. Antennas will be launched during the first sampling event and retrieved during the last sampling event. Two nights of sampling per sampling trip may be necessary to meet the criteria for reliable population estimates.

All chubs captured will be scanned for a PIT tag, tagged (if large enough and does not already contain a PIT tag), measured (total length in mm), weighed (g), principal dorsal and anal fin rays counted, and released. Photos will be taken for verification when uncertainty of species identification exists. If a small chub is not identifiable the individual will be recorded as a *Gila sp.* Other endangered fish captured will be scanned for a PIT tag, tagged (if large enough and does not already contain a PIT tag), measured for total length (mm), weighed (g), and released. All other native fish captured will be counted and released. All nonnative fish will be counted. In addition, all nonnative fish to be euthanized will be measured for total length (mm), and weighed (g).

The mark and recapture data will be used to create population estimates for the individual sites. All population estimates will be generated using model averaging in Program MARK.

## VII. Task Description and Schedule:

Task 1: Sampling: Complete three eight day trips (one travel day and seven days sampling) in Desolation/Gray Canyon (September -October 2022 and 2023).

Task 2: Data management, analysis, and reporting: Data will be transferred to the UCREFRP database manager by January 15 each year following sampling. An annual progress report will be submitted in November of each year of sampling and will include:

effort, CPUE, capture probabilities, models selected, site population estimates, length frequency graphs, and proportion of adults that are first year adults (October-November).

Task 3: Final Report: A final report will be prepared following the final year of sampling (March 2025).

Schedule: 2022-2023

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

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

	Deliverable	Due Date
FY 2020		
FY 2021		
FY 2022	Annual Report	November 2022
FY 2023	Annual Report, Final Report	November 2023, March 2025
FY 2024		

IX. Budget Summary:

FY	UDWR-Moab
FY 2020	\$0
FY 2021	\$0
FY 2022	\$100,179
FY 2023	\$121,833
FY 2024	\$0
<b>TOTAL</b>	<b>\$222,012</b>

X. Reviewers:

XI. References:

Badame, P.V. 2012. Population Estimate for Humpback Chub (*Gila cypha*) in Desolation and Gray Canyons, Green River, Utah 2006-07. Final Report. Upper Colorado River Endangered Fish Recovery Program.

Caldwell, J.M. 2018. Humpback Chub Population Estimates for Desolation and Gray Canyons, Green River, Utah. Annual Project Report. Upper Colorado River Endangered Fish Recovery

Program.

Howard, J.L. and J.M. Caldwell. 2017. Population Estimate for Humpback Chub (*Gila cypha*) in Desolation and Gray Canyons, Green River, Utah 2001-15. Final Report. Upper Colorado River Endangered Fish Recovery Program.

Jackson, J.A. and J. M. Hudson. 2005. Population Estimate for Humpback Chub (*Gila cypha*) in Desolation and Gray Canyons, Green River, Utah 2001-2003. Final Report. Upper Colorado River Endangered Fish Recovery Program.

XII. Figures

