FY 2022-23 SCOPE OF WORK PROJECT: 129

Project Title
Humpback chub monitoring and broodstock collections in Desolation/Gray Canyons, Green River, Utah

Bureau of Reclamation Agreement Number:
R19AP00059

Reclamation Agreement Term
Oct. 1, 2019 – Sept. 30, 2024

Note: Recovery Program FY22-23 scopes of work are drafted in May 2021. 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 Resources

Principal Investigator:
Zach Ahrens, Biologist
Utah Division of Wildlife Resources
Moab Field Station
1165 S. US Highway 191 Suite 4
Moab, UT 84532
Phone: (435) 259-3781
Email: zachahrens@utah.gov

Category:
__ Ongoing project
X Ongoing-revised project
__ Requested new project
__ Unsolicited proposal

Expected Funding Source:
X Annual funds
__ Capital funds
__ Other *[explain]*

Relationship to RIPRAP:
GENERAL RECOVERY PROGRAM SUPPORT ACTION PLAN
IV.A.4.c.5 Secure and manage humpback chub in hatcheries according to the Genetic Management Plan: Desolation & Gray Canyons population
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 action (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

Study Background/Rationale and Hypotheses:
In 2002, the US 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 Canyons 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. Additionally, researchers have recommended including additional metrics in the monitoring regime of this population such as trammel net catch-per-unit-effort, an index of recruitment, site-specific abundance trends, and survival.

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 2018-2019 (Caldwell 2021). Over the course of these monitoring efforts field sampling techniques have evolved to preserve fish survival and to improve monitoring precision. Current techniques include fall sampling to reduce stress concerns caused by trammel netting during warm water temperatures and using hoop nets to increase capture of younger life stages. Abundance estimates are currently calculated for individual sites because high site fidelity of humpback chub violates open modeling assumptions; reach-wide abundance estimates are no longer calculated because lack of verification of habitat availability across the entire reach precludes extrapolation of individual estimates across the entire reach. In 2018 and 2019, Caldwell (2021) increased effort to get more captures and recaptures at individual sites to improve site-specific estimates. This resulted in a recommendation to sample for two nights per site instead of one.

Recent plans to conserve Desolation-Gray humpback chub *Gila cypha* (HBC) genetics and re-introduce the species into Dinosaur National Monument require collection of wild individuals to establish captive broodstock ("White Paper", Valdez *et al.* 2021). This scope of work also outlines a plan to collect wild HBC and transfer to USFWS hatchery staff.

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

1) Monitor the Desolation/Gray Canyon HBC in the fall of 2023 and 2024.
2) Procure wild HBC as hatchery broodstock while avoiding negative population effects to the source population.

Objectives:

1. Estimate abundance at individual sampling sites.
2. Estimate survival.
3. Calculate catch-per-unit-effort (CPUE) and an index of recruitment.
4. Compare results to past monitoring.

5. Make conclusions about the status and stability of the population

6. Make recommendations about improving monitoring.

7. Collect wild HBC for hatchery broodstock in a manner that will not negatively impact the wild population.

Study Area:

The Desolation and Gray canyons reach of the Green River 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 sites used for long-term monitoring of HBC; Cedar Ridge (RM 185), Log Cabin (RM 174.4), Cow Swim (RM 160.4), and Coal Creek (RM 145.7) (Figure 1). HBC aggregations are also known to occur at additional sites which have been sampled in the past for HBC monitoring, e.g. Wild Horse (RM 178.5) and Range Creek (151.2). For broodstock collection, additional sites will be sampled in order to avoid over-exploitation of adult HBC at any given site based on past site abundance estimates and White Paper guidelines.

Study Methods/Approach:

Long-term monitoring sites and any additional selected sites will be sampled during three trips in late September and October for abundance estimation. Timing of sampling is intended to avoid mortality from use of entanglement gear before river temperatures decline to $\leq$ 20°C. Trammel nets and baited hoop nets will be used to collect humpback chub. Trammel nets will be set in the evenings and mornings to target periods of higher fish activity. Baited hoop nets will be set over night. Portable submersible PIT antennas will be set during the first sampling pass and retrieved during the final sampling pass.

Fish will be measured (mm), weighed (g), identified to species, and released. All endangered fish and roundtail chub *Gila robusta* will be scanned for a PIT tag. If the fish is large enough and does not already contain a PIT tag, one will be implanted. To avoid unnecessary cumulative stress, HBC to be collected as broodstock will be not be subjected to the above protocols. Individuals destined for the hatchery will be handled minimally and not implanted with PIT tags in the field.

Trammel net catch-per-unit-effort and an index of recruitment will be calculated for comparison to past monitoring. The capture/recapture data will be used to estimate abundance for the individual sites.

Utah Division of Wildlife Resources will coordinate with USFWS Ouray NFH staff to collect HBC from Desolation and Gray Canyons and transport to hatchery facilities. Fish will be transferred to hatchery staff as soon as feasible during and/or after each collection trip to minimize holding time and associated stress in the field.

Task Description, Deliverables and Schedule:

Task 1: Complete three sampling trips in each of two consecutive years for abundance estimation in Desolation/Gray Canyon (September-October 2023 & 2024).

Task 2: Conduct 1-3 trips (depending on calendar year and efficacy of collections) in coordination with USFWS hatchery staff to collect HBC broodstock and transport to Ouray NFH Randlett Unit (2022-

2026). We anticipate that three trips will take place in 2022 and 2025, while one trip will take place in 2023, 2024, and 2026.

Task 3: Manage and analyze data, complete annual reports. 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 results from that year.

Task 4: A final report detailing all sampling will be prepared and submitted to the coordinator by December of 2025.

Schedule: 2022-2025

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

Budget Summary:

Note: These are estimates and will be revised when project details are refined.

FY Year	*UDWR-Moab*
2022	$110,000
2023	$150,000
2024	$150,000
2025	$110,000
2026	$40,000
Total	$560,000

Reviewers:

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. 2021. Humpback Chub *Gila cypha* Monitoring in Desolation and Gray Canyons of the Green River, Utah, 2018-2019. Final Report. Upper Colorado River Endangered Fish Recovery Program.

Howard, J. and J. Caldwell. 2018. 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

Valdez, R.A., M. Trammell, T. Jones, K. McAbee, and D. Speas. 2021. Reintroducing humpback chub in Dinosaur National Monument: A White Paper that explores the feasibility and strategies