FY 2020 ANNUAL REPORT PROJECT: 175

Project Title

Evaluate the potential of reestablishing humpback chub in Dinosaur National Monument

Bureau of Reclamation Agreement Number:
Not applicable

Project/Grant Period:
Start date: 06/06/19
End date: FY24
Reporting period end date: 11/09/2020
Is this the final report? Yes ____ No x__

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Abstract:

The most recent recovery plan for humpback chub (U.S. Fish & Wildlife Service 2002) includes recovery criteria for a self-sustaining population in Dinosaur National Monument (DNM; Whirlpool Canyon/Island Park in the Green River, and Yampa Canyon in the Yampa River); however, the species' 2018 species status assessment (SSA) considers this population functionally extirpated because individuals have not been collected in the population since 2004 in the Yampa River and 2006 in the Green River (U.S. Fish & Wildlife Service 2018). The objective of this study is to explore the feasibility and strategies for reintroducing humpback chub in the Upper Colorado River Basin, specifically in Dinosaur National Monument. If the Dinosaur National Monument population could be re-established as a natural self-sustaining population via translocation or stocking efforts, it would provide additional confidence in their recovery. The products of this work are a discussion paper that evaluates and identifies the best methods and strategies for procuring and releasing humpback chub into the upper basin, and implementation of approved recommendations for reintroducing humpback chub into DNM to reestablish a population. Sites other than DNM were also examined for the potential to start new populations or augment existing populations. Currently the paper is under review by the Biology Committee of the Upper Colorado River Endangered Fish Recovery Program; the paper is expected to be completed in FY2021.

Study Schedule:
Recommendation Paper: 2019-2021. Plan recommendations may be implemented in future years.

Relationship to RIPRAP:
Define relationship to RIPRAP: Yampa, IV.A.1 (Augment or restore populations as needed, and as guided by the Genetics Mgmt. Plan)

Accomplishment of FY 2020 Tasks and Deliverables, Discussion of Initial Findings and Shortcomings:

History and Justification

Dinosaur National Monument was one of five extant populations of humpback chub in the Upper Colorado River Basin (upper basin) when the species was protected under the Endangered Species Act in 1973. Recovery Plans for the species, including the most recent 2002 Recovery Goals, include recovery criteria for a self-sustaining population in DNM. However, this population of humpback chub is now considered functionally extirpated after the last collection of the species was documented in 2004 (Yampa River) and 2006 (Green River). Although the most recent population estimates in Yampa Canyon ranged from 320 in 2001 to 224 adults in 2003 (Finney 2006), no population estimates have been possible since 2003 because too few humpback chub have been captured. In 2007 about 400 juveniles were taken from Yampa Canyon to hatchery facilities to evaluate the survival of young humpback chub during transport and in a hatchery setting, and potentially for the purpose of establishing a refuge population (Fuller et al. 2008). It was determined after the fish were large enough to identify that no humpback chub were in the sample (Bohn et al. 2019), confirming that the number of humpback chub is low and roundtail chub and hybrids are common.

In response to this extirpation of the DNM population, a Humpback Chub Reintroduction ad hoc Team (Team) was formed at the request of the Biology Committee of the UCRRP in July 2017, for the purpose of exploring the feasibility and strategies for reintroducing humpback chub into portions of the upper basin to establish one or more new populations or to augment existing ones. DNM was considered

a primary focus because it recently supported a population, it is designated critical habitat for the species, and it is included in current recovery criteria for the species. The Team completed a draft evaluation of introduction sites but did not complete a final report.

Task One, Develop Discussion White Paper

The Team was re-convened in January 2020 with the goal of completing the report. Dr. Rich Valdez (SWCA) was contracted to author and finalize the white paper; Melissa Trammell (National Park Service) was chosen as the Team lead. A draft white paper was completed by Dr. Valdez and the Team in October 2020, reviewed by the Recovery Program Director's Office by November 5, and submitted to the BC for review on November 6, 2020. As noted in the SOW, the white paper included:

1. A history of humpback chub collections in Dinosaur National Monument (Whirlpool, Lodore, and Split Mountain canyons of the Green River, as well as the Yampa River including Yampa Canyon);
2. An evaluation of habitat suitability for the humpback chub in DNM;
3. A recommendation of the source of fish to use to repatriate DNM;
4. Alternative means of procuring and releasing fish, including, but not limited to:
    a. live translocation of young fish from upper basin populations,
    b. live translocation of young fish from Grand Canyon, and
    c. development of brood stock and release of hatchery reared fish; and
5. Recommendations for reintroducing humpback chub into DNM to restart a population.

Pending BC approval, task two, procurement of fish for implementation of recommendations, may begin in FY21 and continue in late summer/fall in subsequent years.

Draft Recommendations:

The Team deliberated over a series of webinars and concluded that establishing a population in DNM is feasible, based on the following synthesis of information:

- **Reintroduction Area**. The most suitable area for reintroduction is DNM because (1) it recently supported a population of humpback chub, (2) the physical habitat is unaltered, (3) flow management by the UCRRP is in place to support minimum summer base flows, and (4) nonnative fish management is in place to suppress the threats of predation and competition. Bringing fish into DNM is necessary to restore the population, as the probability of natural demographic rescue from immigrating fish of other populations is low.
- **Source of Fish**. The most appropriate source of humpback chub is the population in the Desolation/Gray Canyons (Deso/Gray) reach of the Green River. This population (1) is located in the same river basin as DNM and is the nearest population to DNM, (2) is the most closely genetically related to the extirpated population, and (3) appears large enough to support this effort based on most recent population estimates. Furthermore, introducing humpback chub from

Deso/Gray into DNM (4) provides redundancy to the Deso/Gray population and (5) would not harm the genetic integrity of the Deso/Gray genetic management unit via downstream emigration of fish because the translocated fish would possess similar alleles.

- **Production and Stocking Strategy**. The most viable production and stocking strategy is to remove wild fish from the Deso/Gray population to develop a future broodstock for either paired spawning and/or voluntary spawning in hatchery ponds. This strategy would maximize the number of fish used for reintroduction without further negatively affecting the demographics of the Deso/Gray source population by minimizing the numbers of wild fish removed.
- **Numbers of Fish Needed from Deso/Gray**. A total of 500 humpback chub (~250 females and ~250 males) would need to be collected from the Deso/Gray population to establish a hatchery broodstock. According to and individual-based model, a maximum of 100 adults per year can be removed for five consecutive years, or fewer fish over a longer time period, without causing negative demographic impact to the population. Priority should be given to removing available juveniles and subadults to minimize the number of adults removed annually.
- **Numbers of Fish Needed to Stock DNM**. Consecutive years of stocking juveniles, subadults, and/or adults is recommended, in accordance with the numbers of fish identified in document tables. A multi-year stocking program should be established that releases the recommended numbers of fish for consecutive years to minimize the risk of poor environmental conditions or high mortality in a given year. Stocking rates should target a sustainable population of 600 adults and should be estimated using low survival estimates (S = 0.61) to conservatively gauge and refine the stocking strategy, and possibly adjust the numbers of fish stocked if monitoring shows that the system can support a different number of humpback chub. A mixture of available size fish may be used to determine which size yields the best survival, reproduction, and recruitment.
- **Additional Plans**. A "Humpback Chub Procurement and Hatchery Production Plan" and a "Humpback Chub Reintroduction and Monitoring Plan" may need to be developed if the recommendations contained in this document are adopted.

The Team also offers the following recommendations[1] (not necessarily in order) for reintroducing humpback chub into the Upper Colorado River Basin:

1. Develop a Humpback Chub Procurement and Hatchery Production Plan that details how fish will be taken from the wild to a hatchery and spawned to produce fish for reintroduction.
2. Develop a Humpback Chub Reintroduction and Monitoring Plan that details how and where hatchery-produced fish will be released to the wild and how they will be monitored for success.
3. Remove 500 fish from the Deso/Gray population to establish a hatchery broodstock in accordance with modeled recommendations of this report and the procurement and hatchery

[1] These recommendations are still considered draft, as they have not been approved by the Biology Committee.

production plan; use juveniles and subadults when available to reduce the numbers of adults removed.

4. Ensure that hatchery facilities and personnel are available to accommodate the recommended stocking strategy of broodstock development for paired matings and voluntary spawning in hatchery ponds, including hatchery trucks for transporting fish.
5. Release fish into the Yampa and/or the Green rivers of DNM in accordance with modeled recommendations of this report and the reintroduction and monitoring plan.
6. Establish and implement a monitoring program for the stocked fish that, if possible, integrates with existing monitoring programs, and is in accordance with the reintroduction and monitoring plan.
7. Ensure compliance and permitting with all applicable laws and regulations.
8. Ensure adherence to all fish health protocols and inspections.

Project Status:
Completion of the white paper was delayed approximately 3 months due to additional analysis requested by the Team. Initial procurement of fish was anticipated to begin in October 2020, but is now expected to begin later in FY21, or early FY22, and continue through at least FY24. The procurement and holding of fish will require collaboration among agencies including Utah Division of Wildlife, and the US Fish and Wildlife Service.

2020 Budget Status
Funds Provided: $40,000 was provided from the "Section 7 depletion funds" held by NFWF to SWCA in two increments. The MC approved the initial $24,928 in March 2020 and approved a time and cost extension in September, 2020 for completion, due to additional analysis requested by the Team.

Funds Expended: approximately $30,000
Difference: $10,000
Percent of the FY 2020 work completed, and projected costs to complete: 75%
Recovery Program funds spent for publication charges: -0-

Status of Data Submission
No data produced in FY2020

Signed:
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11/9/2020

Suggested Reference for white paper
Valdez, R.A., M. Trammell, T. Jones, K. McAbee, and D. Speas. 2020. Restoring humpback chub in Dinosaur National Monument: A White Paper that explores the feasibility and strategies for establishing or augmenting populations of humpback chub. Humpback Chub Reintroduction *ad hoc* Team. Upper Colorado River Endangered Fish Recovery Program, Denver, CO.