RECOVERY PROGRAM Recovery Program Project Number: 178
FY 2020-2021 SCOPE OF WORK for:

Managing the Stirrup wetland for endangered fishes

Reclamation Agreement number: TBA
Reclamation Agreement term: pending

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.

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

Expected Funding Source:
X Annual funds
__ Capital funds
__ Other

I. Title of Proposal: Managing the Stirrup wetland for endangered fishes

II. Relationship to RIPRAP:
GREEN RIVER ACTION PLAN

I.D.2.b.(5)(a)– Implement the Larval Trigger Study Plan
II.A.5. Manage and/or modify priority floodplain sites for nursery habitat for endangered fish
II.A.5.e. Stirrup

V.A. Conduct research to acquire life history information and enhance scientific techniques required to complete recovery actions.

III. Study Background/Rationale and Hypotheses:

Floodplain wetlands are recognized as important habitats for early life-stages of razorback sucker (*Xyrauchen texanus*; Wydoski and Wick 1998; Muth et al. 1998; Lentsch et al. 1996; Modde 1996; Tyus and Karp 1990). Reproduction by razorback suckers occurs on the ascending limb of the spring hydrograph, allowing enough time between hatching and swim up for larvae to enter main channel drift when highly productive floodplain habitats are accessible (Muth et al. 1998). Seasonal timing of razorback sucker reproduction indicates possible adaptation for entrainment and use of floodplain habitats for rearing purposes (Muth et al. 1998).

Razorback sucker larvae have been successfully entrained and reared to juvenile size in the Stewart Lake wetland, and are PIT-tagged and released into the middle Green River in the fall (Project #FR-165). This is possible in large part due to the ability to exclude large-bodied non-native fish, maintain water levels and adequate water quality throughout the summer, and capture fish by draining the wetland in the fall. Stewart Lake provides a model of success that has been applied to other wetlands in the upper Colorado River basin such as Johnson Bottom (see Project #FR-164), as well as Shepherd Bottom and Old Charley Wash in the near future. Stewart Lake has produced more than 2,000 young of year (YOY) razorback sucker in a single year (Schelly et al. 2016), but recruitment beyond age-1 fish from such cohorts has yet to be observed. An important step in razorback sucker recovery, it is estimated that 1,740 fish must recruit into the adult population each year to maintain the population at recovery levels (Valdez and Nelson 2004). Therefore, it is crucial that successful recruitment occurs at numerous wetlands simultaneously to effectively bolster adult recruitment in the mainstem Green River.

With the above-mentioned model of success and with the need to increase YOY recruitment in mind, several Bureau of Land Management (BLM) managed wetlands were visited during March of 2017 by members of the Biology Committee and Program Director's Office from the Upper Colorado River Endangered Fish Recovery Program, engineers from the Bureau of Reclamation, and other Recovery Program partner subject matter experts (see BC Meeting notes 5-23-17). Sites were informally ranked based on a combination of potential factors including cost, simplicity, and suitability for fish; Stirrup wetland ranked the highest.

Stirrup wetland is located approximately 23 km downstream of the Highway 40 Bridge on BLM administered land. This is a single-breach floodplain that connects to the Green River at the downstream end when discharge measured at Jensen, Utah is approximately 13,000 cfs, resulting in 20 acres being inundated, and when flows are approximately 18,600 cfs 28 acres are inundated (Valdez and Nelson 2004). However, it has been determined that movement of adult fishes between the wetland and riverine habitats is limited until discharge is closer to the latter (Breen 2011; Hedrick et al. 2012). It is hypothesized that with water control, weir structures, and hands-on management this wetland can entrain and rear razorback sucker larvae, with the ability of releasing fish back into the Green River with a controlled draining. In addition, future operations at the Stirrup floodplain will likely have the flexibility to manage other endangered species such as bonytail. For example, adult hatchery-reared bonytail were stocked in 2011 and 2017 prior to spring peak flows to provide an

additional acclimation period prior to floodplain connection (Breen 2011; Jones et al. 2017).

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

Goal:

Manage a controlled floodplain wetland to improve recruitment and survival of larval and adult endangered fishes, emphasizing razorback sucker.

Objectives:

1. Entrain larval endangered fishes during high-flow connection of riverine and wetland habitats.

2. Examine fish community composition and habitat characteristics in the Stirrup wetland following floodplain connection to assess summer survival of wild-spawned and potentially stocked razorback sucker and other endangered fishes.

3. Release juvenile native fishes back to the river during a controlled release, through physical capture.

4. Determine the extent of nonnative fish colonization in wetland habitats and remove nonnative species during draining

End Products:

An annual report describing how Stirrup wetland functions as habitat for larval and adult endangered fishes. We will provide information on: (1) larval razorback sucker entrainment, (2) fish community composition, water quality parameters, and wetland habitat characteristics through time following the connection period, and (3) species-specific information on fishes emigrating from the floodplain during the drawdown period.

V. Study Area:

Stirrup Wetland is located approximately 23 km downstream of the Highway 40 Bridge on BLM administered
land. Water enters and exits the wetland through a single downstream breach that was created in the mid 1990's. If the water control structure is built as currently designed max water depth will be 8ft during years of maximum fill, with a total surface area approximately 22 acres.

VI. Study Methods/Approach:

During the high flow entrainment period, an exclusionary screen will be installed at the Stirrup wetland water control structure, and we will sample with light traps within the wetland to verify larval razorback sucker entrainment. The screen will exclude adult nonnative fishes from entering the wetland for the entire duration that the floodplain is connected. The exclusionary screen will consist of diamond shaped mesh (<1/2" opening), which will exclude large-bodied fishes (limiting competition and predation on larval native fishes) while allowing larval razorback sucker and small-bodied fishes to move into the wetland freely.

Approximately 10 light traps will be positioned in the outlet canal and in the main body of the wetland

at the point of floodplain connection. Daily sampling will initiate following larval detection in the Green River main channel (Project #22f), and conclude when the floodplain is disconnected from the main channel or when we have verification that razorback sucker larvae have reached the interior of the wetland. All larval fish present in light traps will be collected and preserved for later identification by the Colorado State University Larval Fish Lab.

Following floodplain inundation the wetland will be systematically sampled to evaluate fish community composition through time. Once entrainment of larval razorback suckers is confirmed with light traps, we will allow ample growing time and conduct surveys (e.g., fyke nets, seines) as needed to determine growth throughout the summer until draining. We will also monitor water quality parameters (dissolved oxygen, pH, conductivity and temperature) using continuous loggers. If needed work with USFWS and the Utah division of water rights to pump supplemental water from the river into the wetland

Wetland drawdown (timing and duration of release) will be coordinated with the Recovery Program. The fish kettle in the control structure will allow us to effectively sample fish leaving the wetland to determine survival and growth of wild-spawned razorback suckers and other native fishes. Fish will be collected from the kettle using seines, endangered fish will be weighed measured and implanted with a pit tag and released in the river. All non-native fish will be euthanized.

VII. Task Description and Schedule:

Task 1: Install, operate and maintain screen and gate in the Stirrup wetland control structure while filling the wetland.

Task 2: Sample the Stirrup wetland fish community and monitor post-connection water quality.

Task 3: Sample fishes exiting the Stirrup wetland control structure during drawdown using the built-in fish kettle.

Task 4: Data entry, analysis and reporting.

Task	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1				X	X	X						
2						X	X	X	X			
3									X	X		
4										X	X	X

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

FY 2020-2024
Program annual reports due each November.
Project data will be submitted to the Recovery Program Database Manager by January.

IX. Budget Summary:
FY 2020 will be the first year of operating Stirrup wetland, operating costs may fluctuate in future years as we learn the intricacies of operating this control structure.

	BLM
FY 2020	$38,670
FY 2021	$12,316
FY 2022	$14,006
FY 2023	$13,356
FY 2024	$14,675
TOTAL	$93,024

X. Reviewers: Tildon Jones

XI. References:

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