FY 2024-25 SCOPE OF WORK PROJECT: 178

Project Title
Use of Stirrup wetland by larval and adult endangered fish

Bureau of Reclamation Agreement Number:
R22PG00033

Reclamation Agreement Term
10/01/2021 - 09/30/2026

Note: Recovery Program FY24-25 scopes of work are drafted in May 2023. 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:
Bureau of Land Management

Principal Investigator:
TBD
Prepared by Cal DeBerard – BLM wildlife biologist, Vernal Field Office

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

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

Relationship to RIPRAP:
GREEN RIVER ACTION PLAN
- II.A. Restore and manage flooded bottomland habitat.
- II.A.5. Manage and/or modify priority floodplain sites for nursery habitat for endangered fish
- II.A.5.e. Stirrup

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 young-of-year (YOY) in the Stewart Lake wetland, PIT-tagged and released into the middle Green River in the fall. This is possible

in large part to the ability to exclude large-bodied non-native fish, maintain water levels throughout the summer, and capture fish by draining the wetland in the fall. This provides a model of success that can be applied to other wetlands in the upper Colorado River Basin as was the case for Johnson Bottom, Sheppard Bottom, and Old Charley Wash (see Project #164). Stewart Lake has produced as many as 3,200 YOY in a single year (Partlow et al. 2022). Although an important step in razorback sucker recovery, it is estimated that 1,740 fish must be recruited into the population each year to maintain an adult 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 need to increase YOY recruitment in mind, several Bureau of Land Management owned 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 biologists working with the Recovery Program. The sites were informally ranked based on a combination of potential cost, simplicity, and suitability for fish. Stirrup wetland ranked the highest. (BC Meeting notes 5-23-17)

Stirrup wetland is located approximately 23km downstream of the Highway 40 Bridge on BLM administered land. Before the wetland was modified, it connected to the river at flows of 13,000 cfs resulting in 20 acres being inundated, and when the river flow is 18,600 the acreage is 28 (Valdez and Nelson 2004). However, it was determined that movement of adult fishes between the wetland and mainstem Green River was limited until discharge is closer to the latter (Hedrick et al. 2012).

The Stirrup wetland was modified in 2021/2022 through a Recovery Program capital project. The project included excavating canals for water management and installing a water control gate and fish screen. In its first year of operation since the new construction, the wetland entrained and reared 551 razorback sucker larvae to the juvenile stage while producing some of the largest wild fish observed from a project of this nature (Goodell and Breen 2022). These fish were released back into the Green River through a controlled draining in October 2022.

Study Goals and Objectives:

Characterize use of a controlled floodplain wetland by larval and adult endangered fishes, emphasizing razorback sucker.

Objectives:

1. Monitor entrainment of larval and adult 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. Monitor escapement (fish moving out of the wetland) of native and nonnative fishes entrained in Stirrup wetland during a controlled release, through physical capture.

4. Determine the extent of nonnative fish colonization in wetland habitats.

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.

Study Area:
Stirrup Wetland is located approximately 23km 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-1990s and modified in 2022. Selenium issues are not anticipated at this location because the main water source enters the wetland directly from the river, and there is limited input from adjacent rangelands. This will provide more management options because no draining deadlines are expected to be in place for selenium control through the oxidation processes. In addition to spring entrainment of juveniles stocking and overwintering of endangered fish from a hatchery may be possible.

Study Methods/Approach:
During the high flow entrainment period, screens will be installed at the Stirrup wetland control structure, and we will sample with light traps within the wetland. The screens will exclude adult fish from entering the wetland for the entire duration that the floodplain is breached. The screens consist of vertical bars 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.

BLM staff will set 4 light traps in the inlet/outlet canal and in the main body of the wetland at the point of floodplain connection prior to wetland filling, and up to 10 light traps in the wetland during and after filling to confirm larval entrainment. 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 in sufficient densities. All larval fish present in light traps will be collected and preserved for later identification by the Larval Fish Lab via co-ordination with the Vernal USFWS staff.

We will utilize various sampling techniques to evaluate fish community composition, and we will monitor water quality in the Stirrup wetland. Following floodplain inundation and disconnection, the wetland will be systematically sampled to evaluate fish community composition through time (until drained). 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 requesting supplemental water

through pumping if needed to maintain water quality and we will monitor wetland gauge height throughout the summer.

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.

Task Description, Deliverables and Schedule:

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

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

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

Task 4: Data entry, analysis and reporting.

Task 5: Weed control and follow-up reclamation.

Task 6: Erosion control and grade modification adjacent to structure using materials on site.

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
5							X	X	X			
6									X			

Budget Summary:

FY2024 will be the third year of operating the Stirrup wetland. The control structure was installed in 2021 during a severe drought year. As such, reclamation seeding was not successful, and weeds are prevalent throughout the disturbance area. Additionally, high river flows (>20,000 cfs) in spring of 2023 overtopped the grade adjacent to the structure allowing non-native fish (carp) to enter the wetland. and causing erosion of the banks. An increase in FY2024 cost projections reflects herbicide treatment and mechanical removal of weeds, reseeding, and placing rock on the banks and adjacent grade.

FY Year	*BLM Vernal Field Office*
2024	$13,219
2025	$10,552
2026	$10,229
2027	$9,644
2028	$9,836
Total	$53,480

Reviewers:
Tildon Jones, Habitat Coordinator

References:
Bestgen, K.R., R.C. Schelly, R.R. Staffeldt, M.J. Breen, D.E. Snyder, and M.T. Jones. 2017. First reproduction by stocked bonytail in the upper Colorado River basin. North American Journal of Fisheries Management 37:2:445-455.

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Goodell, J. and M.J. Breen. 2022. Use of Stirrup wetland by larval and adult endangered fish. Project 178 Annual Report of Utah Division of Wildlife Resources to Upper Colorado River Endangered Fish Recovery Program, Denver, Colorado.

Hedrick, T.N., Breton, A.R., and S.P. Keddy, S.P. 2012. Razorback sucker survival and emigration from the Stirrup floodplain, middle Green River, Utah 2007-2010. Publication Number 12-10, Final Report of the Utah Division of Wildlife Resources to the Upper Colorado River Endangered Fish Recovery Program, Denver, Colorado.

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Muth, R.T., G.B. Haines, S.M. Meismer, E.J. Wick, T.E. Chart, D.E. Snyder, and J.M. Bundy. 1998. Reproduction and early life history of razorback sucker in the Green River, Utah and Colorado, 1992 – 1996. Final Report submitted to the Recovery Implementation Program for Endangered Fish Species in the Upper Colorado River Basin. U.S. Fish and Wildlife Service, Denver, CO. 62 pp.

Partlow, M.S., M.J. Breen, and S.J. Hyder. 2022. Use of Stewart Lake floodplain by larval and adult endangered fishes. Project 165 Annual Report of Utah Division of Wildlife Resources to Upper Colorado River Endangered Fish Recovery Program, Denver, Colorado.

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Valdez, R.A. and P. Nelson. 2004. Green River subbasin floodplain management plan. Upper Colorado River Basin Endangered Fish Recovery, Project Number C-6, Denver Colorado.

SUMMARY OF PROPOSED COSTS

Name of Servicing Agency:	Bureau of Land Management
Project Name:	178 - Use of Stirrup Wetland by larval and adult endangered fish

		YEAR 1		YEAR 2		YEAR 3		YEAR 4		YEAR 5		TOTAL
Enter the BEGINNING dates for each year ------>		**10/1/2024**		**10/1/2025**		**10/1/2026**		**10/1/2027**		**10/1/2028**		
		Through		Through		Through		Through		Through		
Enter the ENDING dates for each year ------->		**9/30/2025**		**9/30/2026**		**9/30/2027**		**9/30/2028**		**9/30/2029**		
DIRECT LABOR AND FRINGE BENEFIT COSTS:		**YEAR 1**		**YEAR 2**		**YEAR 3**		**YEAR 4**		**YEAR 5**		**TOTAL**
Direct Labor - Hourly		$ 10,474.80		$ 9,505.34		$ 9,394.81		$ 8,816.09		$ 8,992.41		$ 47,183.46
Fringe Benefits - Hourly		$ 649.44		$ 525.37		$ 535.88		$ 546.60		$ 557.53		$ 2,814.82
Subtotal of Direct Labor & Fringe Benefits:		**$ 11,124.24**		**$ 10,030.71**		**$ 9,930.69**		**$ 9,362.69**		**$ 9,549.94**		**$ 49,998.27**
OTHER DIRECT COSTS:		**YEAR 1**		**YEAR 2**		**YEAR 3**		**YEAR 4**		**YEAR 5**		**TOTAL**
Materials and Supplies		$ 1,710.00		$ 214.20		$ -		$ -		$ -		$ 1,924.20
Travel Costs		$ -		$ -		$ -		$ -		$ -		$ -
Equipment		$ -		$ -		$ -		$ -		$ -		$ -
Contractors		$ 600.00		$ 612.00		$ 624.24		$ 636.72		$ 649.46		$ 3,122.42
Subtotal of Other Direct Costs:		**$ 2,310.00**		**$ 826.20**		**$ 624.24**		**$ 636.72**		**$ 649.46**		**$ 5,046.62**
INDIRECT/OVERHEAD COSTS:		**YEAR 1**		**YEAR 2**		**YEAR 3**		**YEAR 4**		**YEAR 5**		**TOTAL**
Subtotal of Labor and Other Direct Costs:		**$ 13,434.24**		**$ 10,856.91**		**$ 10,554.93**		**$ 9,999.41**		**$ 10,199.40**		$ 55,044.90
Total dollars exempt from indirect/overhead base:		$ -		$ -		$ -		$ -		$ -		
<Enter Description of Indirect/OH Cost #1>	3.00%	$ 403.03	3.00%	$ 325.71	3.00%	$ 316.65	3.00%	$ 299.98	3.00%	$ 305.98		$ 1,651.35
Total dollars exempt from indirect/overhead base:		$ -		$ -		$ -		$ -		$ -		
<Enter Description of Indirect/OH Cost #2>	3.00%	$ -	0.00%	$ -	0.00%	$ -	0.00%	$ -	0.00%	$ -		$ -
Subtotal of Indirect/Overhead Costs:		**$ 403.03**		**$ 325.71**		**$ 316.65**		**$ 299.98**		**$ 305.98**		**$ 1,651.35**

	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	TOTAL
GRAND TOTAL:	**$ 13,837.26**	**$ 11,182.62**	**$ 10,871.58**	**$ 10,299.40**	**$ 10,505.38**	**$ 56,696.24**