COLORADO RIVER RECOVERY PROGRAM Project#: RZ-RECR
FY 2010-2011 PROPOSED SCOPE OF WORK for:

Razorback emigration from the Stirrup floodplain

Lead Agency: Utah Division of Wildlife Resources

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Category:
__Ongoing project
_X_Ongoing-revised project
__Requested new project
__Unsolicited proposal

Expected Funding Source:
X Annual funds
__Capital funds
__Other (explain)

I. Title of Proposal:

Razorback emigration from the Stirrup floodplain

II. Relationship to RIPRAP:

GENERAL RECOVERY PROGRAM SUPPORT ACTION PLAN
- II. Restore habitat (habitat development and maintenance)
  - II.A. Restore flooded bottomland habitats
    - II.A.1. Conduct inventory of flooded bottomlands habitat for potential restoration

GREEN RIVER ACTION PLAN: MAINSTEM
- II. Restore habitat (habitat development and maintenance)
  - II.A. Restore and manage flooded bottomland habitat
    - II.A.1. Conduct site restoration
    - II.A.2. Acquire interest in high-priority flooded bottomland habitats between Ouray NWR and Jensen to benefit endangered fish
      - II.A.2.a. Identify and evaluate sites

IV. Manage genetic integrity and augment or restore populations (stocking endangered fishes)

III. Study Background/Rationale and Hypotheses:

Floodplain wetlands are presumed to be important rearing habitat for 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 the system when highly productive floodplain habitats are accessible (Muth et al. 1998). This seasonal timing of razorback sucker reproduction indicates possible adaptation for using floodplain habitats for rearing purposes (Muth et al. 1998). It is currently unclear, however, how long young razorback sucker tend to stay in the floodplain before moving back into the river.

The Green River Floodplain Management Plan (2003) identifies the Stirrup floodplain as a high priority habitat for recovery of the endangered razorback sucker, bonytail (*Gila elegans*), and Colorado pikeminnow (*Ptychocheilus lucius*). The natural levee surrounding the Stirrup was breached at the downstream end in March 1997 in an effort to increase the frequency of connectivity of the floodplain to the river. The floodplain now connects at around 14,000 cfs and can fill to approximately 20 acres (Birchell and Christopherson 2004) during spring peak flows. Though it is not extremely large, it is one of the few floodplain habitats in the middle Green River that retains enough water to over-winter fish, thus making it ideal for maintaining razorback sucker over multiple years.

Because of its potential to overwinter fish and because it only has one breach, this site was chosen for a study to research the timing of razorback sucker emigration from highly productive floodplain habitats to the river. Young-of-year, age-1 and age-2 surplus razorback sucker were identified from normal operations at the Ouray National Fish Hatchery and were stocked in the Stirrup in June 2008; surplus age-1 razorback sucker were stocked in June 2009 (no other age classes were available in 2009). These fish were all PIT tagged for individual identification before being stocked into the floodplain. In spring of 2010, these fish will be monitored for whether they choose to remain in the floodplain or return to the river. Stocking may occur again in June 2010 and monitoring will occur again in spring 2011 to obtain multiple years of data. The information gathered during this study will help in identifying and revising management considerations for the Stirrup floodplain and for other floodplains in the middle Green River.

IV. Study Goals, Objectives, End Product:

Goal: Characterize age of emigration of razorback sucker from floodplain wetlands to the Green River.

Objectives:

1. Maintain multiple year-classes of razorback sucker in the Stirrup floodplain throughout the study (stock razorback sucker and maintain sufficient water quality).

2. Determine the average length of time (via age class and size) that razorback sucker stay within the floodplain before migrating to the river by installing and maintaining appropriate technology within the breach of the floodplain during the spring peak.

End Products:

- A final report describing the project and its findings.
- Recommendations focusing on how to incorporate the findings into management of the Stirrup and other floodplains in the middle Green River.

V. Study Area:

The study area is limited to the Stirrup floodplain habitat (RM 276), which is approximately 20 acres in size when flows at Jensen gauge on the Green River are 14,000 cfs.

VI. Study Methods/Approach:

Razorback sucker become entrained into floodplains as larvae. It is currently thought that razorback sucker will stay within the floodplain for two winters and enter the river during spring high flows as age-2 fish (K. Christopherson, Utah Division of Wildlife Resources, pers. comm.). However, this information was collected through other studies and has not been verified with a valid sampling design specifically planned to answer this question. The proposed study design is therefore intended to fill in this information gap and determine the average age class of razorback sucker that tend to move from the floodplain to the river. To this end, excess (fish not needed to meet the stocking goals for the Green River) PIT tagged, young-of-year, age-1, and age-2 razorback sucker have been stocked from the Ouray National Fish Hatchery into the Stirrup (completed in June 2008 and June 2009). If excess fish are again available in 2010 and additional information is needed, similar numbers will be stocked into the Stirrup sometime during the summer so that 2010 results can be verified with sampling in 2011.

Water quality in the Stirrup will be sampled near the beginning of each month over summer 2010 to ensure proper depth and dissolved oxygen for maintaining razorback sucker throughout the summer and over winter as well if the study is slated to continue in 2011. The floodplain completely filled due to high flows in spring 2008 and again in spring 2009; however, if during any of these sampling occasions, the dissolved oxygen falls below 3.5 mg/l or the depth falls below 4.0 feet, we will pump water into the floodplain using at least a 6” trash pump. Sampling in spring 2009 could not occur until the floodplain filled entirely because fish seemed hesitant to move through the shallow

water. If the floodplain is not full in spring 2010 or spring 2011 (if study continues in 2011), we will fill it before connection to increase the sampling duration. We will attempt to sample the site to see whether razorback sucker have survived the summer at least once after ice off in the spring, which will likely occur in March. Sampling this floodplain has proven difficult in the past due to overall depth and low conductivities; however, multiple gear types will be used in an effort to contact these fish again. In order to better identify the overwintering size of the population, we will attempt a population estimate by mark-recapture methods. If successful, this will help us compare results of the PIT tag reader with the actual number of fish in the Stirrup. This will be done in the spring and fall to best estimate the number of fish that moved out and the age class of those fish. With three antennas (see below) in the Stirrup breach, we should not miss any tagged fish moving out of the floodplain; however, a population estimate in the pond before and after the survey should allow us to confirm whether this was the case.

To monitor fish movement out of (and into) the Stirrup, the Recovery Program has already purchased a Digital Angel FS1001M Reader (MUX), which is essentially a stationary PIT tag reader. The MUX can run up to six antennas at one time; however, we have identified the need for only three antennas. Multiple antennas allow for determination of direction and a probability of detection, and also ensure that nearly all of the tags passing through the antenna are read. If a fish sits too near to an antenna, the antenna cannot read another tag until the first fish has moved out of the read range of the antenna. If there are many fish moving through the antenna at the same time, there is a much greater chance that all fish will be picked up with multiple opportunities (antennas) for the tag to be read.

Similar to 2008, we had poor battery recharging in 2009 and so have purchases an additional solar panel and four batteries, which will give us 24V and 200 amp-hours. Given that the MUX with three antennas uses about 1 amp per hour, this setup should allow us to leave the system at the Stirrup without ever having to recharge the batteries.

To attempt to replicate results from 2009, this study will be repeated in 2010 with a final report due in 2011. If few fish are recorded moving out of the Stirrup in 2010 (as in 2009), this study may continue in 2011. This will require stocking additional fish into the floodplain after spring peak flows in 2010 as previously mentioned, additional monitoring (and potentially pumping), and reinstallation of the PIT tag reader and antenna during 2011 peak flows. The final report will be submitted as draft in late 2010.

VII. Task Description and Schedule:

Task 1. Pump water from the river into the Stirrup floodplain. This includes preparation of compliance documents for the Utah Division of Water Rights (the EA for work on BLM property was finalized in 2007). Pumping may not be necessary, but is included here in case depths in the floodplain fall below 4.0 feet.

Fall 2009, spring 2010

Task 2. Stock razorback sucker in the Stirrup floodplain

The Ouray National Fish Hatchery stocked age-1 and age-2 razorback sucker in the Stirrup in June 2008; age-1 fish in June 2009; and may stock again in 2010 after peak flows recede.

Task 3. Monitor water quality and/or species assemblage in Stirrup floodplain, conduct population estimate

October 2009; January (water quality only), March/April, and October 2010

Task 4. Set up stationary PIT tag reader during spring peak flows

May – June 2010

Task 5. Download PIT tag data and monitor PIT tag array

May – June 2010

Task 6. Summarize results/findings/submit final report

June – December 2010

VIII. FY 2010-2011 Work

Deliverable/Due Dates:
Recovery Program annual progress report: November 2009, 2010, 2011.
Draft summary report and recommendations due to Program December 2010.

Budget:

FY10

Task 1: Pumping	**Work days**	**Cost**
Labor		
Leader ($438/day)	2	$876
Tech ($195/day)	7	$1,365
Travel		
Mileage (#11204; 5% of annual usage)		$340
Supplies		
Gas, etc.		$1,260
Equipment		
Pump rental	14	$2,000
TOTAL		**$5,841**

The State of Utah switched to Automotive Resources Inc. for motor pool operations. It is now easier to calculate the percent of total annual usage that each project requires and multiple that percent by the total annual cost. This will be the new method we use to allocate vehicle costs to

each project.

Gas for pump assumes 20 gallons/day at $4.50/gallon

Labor and equipment days do not match because it only takes one half-day to fill the pumps.

Task 2: Stocking (no funding necessary to UDWR)

Task 3: Monitor/sampling	**Work days**	**Cost**
Labor		
Leader ($438/day)	9	$3,942
Tech ($195/day)	9	$1,755
Travel		
Mileage (#11204; 10% of annual usage)		$680
Supplies		
Gas, etc.		$200
Equipment		
Pump rental		
TOTAL		**$6,577**

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Task 4: Reader installation	**Work days**	**Cost**
Labor		
Leader ($438/day)	2	$876
Tech ($195/day)	2	$390
Travel		
Mileage (#12995; 5% of annual usage)		$340
Supplies		
Gas, etc.		
Equipment		
Pump rental		
TOTAL		**$1,606**

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Task 5: Monitor reader	**Work days**	**Cost**
Labor		
Leader ($438/day)	7	$3,066
Tech ($195/day)	2	$390
Travel		
Mileage (#12995; 15% of annual usage)		$1,020
Supplies		
Gas, etc.		
Equipment		
Pump rental		

TOTAL	**$4,476**

The State of Utah switched to Automotive Resources Inc. for motor pool operations. It is now easier to calculate the percent of total annual usage that each project requires and multiple that percent by the total annual cost. This will be the new method we use to allocate vehicle costs to each project.
Labor and mileage days do not match because checking the reader is done in half-day increments.

Task 6: Summarize results (no funding required in FY10)

Grand Total **$18,500**

FY11

Task 1: Pumping (conducted Fall 2010) Added to SOW in Oct. 2010	**Work Days**	**Cost**
Labor		
Bio ($340/day)	2	$680.00
Tech II ($271/day)	2	$542.00
Tech II ($222/day)	2	$444.00
Tech ($195/day)	2	$975.00
Travel		
Mileage (#11204; 5% of annual usage)		$340
Supplies		
Gas, etc.		$1,260
Equipment		
Pump rental	14	$2,000
TOTAL		**$6,241**

Task 2: Stocking (no funding necessary to UDWR)

Task3: Reader installation (Spring 2011) Added to SOW 26 Jan 2011	**Work days**	**Cost**
Labor		
Leader ($438/day)	2	$876
Tech ($195/day)	2	$390
Travel		
Mileage (#12995; 5% of annual usage)		$340
Supplies		
Gas, etc.		
Equipment		
Pump rental		
TOTAL		**$1,606**

The State of Utah switched to Automotive Resources Inc. for motor pool operations. It is now easier to calculate the percent of total annual usage that each project requires and multiple that percent by the total annual cost. This will be the new method we use to allocate vehicle costs to each project.

Task 5: Monitor reader (Spring 2011) Added to SOW 26 Jan 2011	Work days	Cost
Labor		
Leader ($438/day)	7	$3,066
Tech ($195/day)	2	$390
Travel		
Mileage (#12995; 15% of annual usage)		$1,020
Supplies		
Gas, etc.		
Equipment		
Pump rental		
TOTAL		**$4,476**

The State of Utah switched to Automotive Resources Inc. for motor pool operations. It is now easier to calculate the percent of total annual usage that each project requires and multiple that percent by the total annual cost. This will be the new method we use to allocate vehicle costs to each project.

Task 6: Summarize results (will start in October 2010, which is FY11)	Work days	Cost
Labor		
Leader ($438/day)	12	$5,256
Tech ($195/day)		
Travel		
Mileage (1 truck)		
Supplies		
Gas, etc.		
Equipment		
Pump rental		
TOTAL		**$5,256**

Grand Total (new total)	**$17,579**

IX. Budget Summary

FY 2010	$18,500
FY 2011	$17,579

X. Reviewers:

XI. Works Cited:

Birchell, G.J. and K. Christopherson. 2004. Survival, growth, and recruitment of larval and juveniles razorback sucker (*Xyrauchen texanus*) introduced into floodplain depressions of the Green River, Utah. Utah Division of Wildlife Resources, publication no. 04-15, Salt Lake City, Utah.

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Valdez, R.A. and P. Nelson. 2003. Green River Subbasin Floodplain Management Plan. Biology Committee Review Draft, R.A. Valdez & Associates, Inc., Upper Colorado River Endangered Fish Recovery Program, Denver, CO.

Lentsch, L., T. Crowl, P. Nelson, and T. Modde. 1996. Levee removal strategic plan. Utah Division of Wildlife Resources, Salt Lake City, UT. 21 pp.

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