COLORADO RIVER RECOVERY PROGRAM Project#: RZ-RECR
FY 2007-2009 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
__Ongoing-revised project
X 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 out 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 and potentially 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 fills 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 when 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. Surplus razorback sucker were identified from normal operations at the Ouray National Fish Hatchery and are currently being held at the hatchery site for stocking in the Stirrup floodplain. Multiple year classes of razorback sucker will be stocked as they become available, PIT tagged for individual identification, and monitored for how long they choose to stay in the floodplain versus going out to the river. 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 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 (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.

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 registers 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 that is specifically designed 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 PIT tagged, age-1 and age-2 razorback sucker will be stocked from the Ouray National Fish Hatchery into the Stirrup in 2007. The age-2 fish will be large enough to be stocked in late spring 2007 after peak flows recede; however, the age-1 fish will be stocked later in the fall, when they are large enough to be PIT tagged.

Water quality in the Stirrup will be sampled near the beginning of selected months over 2007 through 2009 to ensure proper depth and dissolved oxygen for maintaining razorback sucker throughout the summer and over winter as well. 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 Honda trash pumps with 4" hoses. Because this type of operation requires a temporary water right, we will likely only be able to pump 20 to 40 acre-feet of water into the floodplain; however, this will likely be enough to maintain razorback sucker for another year. The site will also be sampled for remaining razorback sucker before the floodplain ices over (which usually occurs in December or January). Sampling will occur using both trammel nets and fyke nets for maximum coverage of the floodplain.

To monitor fish movement out of the Stirrup, the Recovery Program is looking into installing a stationary PIT tag reader that will allow constant monitoring of PIT tagged fish out of the floodplain. The details of this aspect of the study are still uncertain so this portion of the project will be finalized at a later date. However, we are certain that regardless of the system chosen, it will require weekly data

downloads and daily trips to the floodplain to ensure the functionality of the system. Because spring peak flows that connect the river to the floodplain generally only last around two weeks, it is extremely important to ensure the functionality of the system for the entire time. And because this area is open to the public, there is a high potential for public abuse. Daily trips to the site should ensure the ability to correct any problems with the system in a timely fashion.

To ensure the quality of the data collected, this study should be repeated the following year to see if the results are similar. This would require stocking additional fish into the floodplain after spring peak flows in 2008, additional monitoring (and potentially pumping), and reinstallation of the PIT tag reader during 2009 peak flows. The final report will be written up after data is collected in 2009.

VII. Task Description and Schedule:

Task 1. Pump water from the river into the Stirrup floodplain. This includes preparation of compliance documents for both the BLM and Utah Division of Water Rights. This may also be done again between tasks 3 and 4.

Spring and summer (potential to require pumping at other times of year as well) 2007, 2008

Task 2. Stock razorback sucker in the Stirrup floodplain

Summer and fall 2007; spring and fall 2008

Task 3. Monitor water quality and species assemblage in Stirrup floodplain

January, March, July, August, September, and October 2007, 2008, 2009

Task 4. Research stationary PIT tag readers and determine the appropriate set up for the Stirrup floodplain

May – December 2007

Task 5. Set up stationary PIT tag reader during spring peak flows

April - May 2008, 2009

Task 6. Download PIT tag data and monitor PIT tag array

April - May 2008, 2009

Task 7. Summarize results/findings

December 2009

VIII. FY 2007 – 2009 Work

Deliverable/Due Dates:
Recovery Program annual progress report: November 2007, 2008
Summary report and recommendations due to Program December 2009.

Budget:

Task 1. Pump water from the river into the Stirrup floodplain. It will take approximately 22 days to pump 20 acre-feet into the floodplain. Also accounts for five days for compliance paperwork. Assumes need for two pumping occasions. If two are unnecessary, the unnecessary money allocated for pumping will be carried over or deducted from the following year's budget. This portion of the budget may be reduced or increased slightly depending on who does the pumping and what pumps are available for use.

Task (FY 2007)	**Work days**	**Cost**
Labor		
Leader ($438/day)	7	$3066
Biologist ($340/day)	6	$2040
Tech ($195/day)	44	$8580
Travel		
Mileage (1 truck)		$1058
Per diem ($9/day)		$ 396
Supplies (gas for pump)		$ 990
Equipment		

FY 2007 Total **$16,130**

(Mileage calculated based on an average of 75 miles/day X $.37/mi + $10/day rental fee).
(Gas for pump calculated as 55 gallons/week at $3.00/gallon).

Task (FY 2008)	**Work days**	**Cost**
Labor		
Leader ($449/day)	7	$3143
Biologist ($349/day)	6	$2094
Tech ($200/day)	44	$8800
Travel		
Mileage (1 truck)		$1058
Per diem ($9/day)		$ 396
Supplies (gas for pump)		$ 990
Equipment		

FY 2008 Total **$16,751**

(Mileage calculated based on an average of 75 miles/day X $.37/mi + $10/day rental fee).
(Gas for pump calculated as 55 gallons/week at $3.00/gallon).

Task 2. Stock razorback sucker in the Stirrup floodplain. No cost to UDWR.

Task 3. Monitor water quality and species assemblage in Stirrup floodplain.

Task (FY 2007)	**Work days**	**Cost**
Labor		
Leader ($438/day)	3	$ 1314
Biologist ($340/day)		
Tech ($195/day)	3	$ 585
Travel		
Mileage		$ 114
Per diem		
Supplies (gas for pump)		
Equipment		

FY 2007 Total **$ 2013**

(Mileage calculated based on an average of 75 miles/day X $.37/mi + $10/day rental fee).

Task (FY 2008)	**Work days**	**Cost**
Labor		
Leader ($449/day)	6	$ 2694
Biologist ($349/day)		
Tech ($200/day)	6	$ 1200
Travel		
Mileage		$ 227
Per diem		
Supplies (gas for pump)		
Equipment		

FY 2008 Total **$ 3434**

(Mileage calculated based on an average of 75 miles/day X $.37/mi + $10/day rental fee).

Task (FY 2009)	**Work days**	**Cost**
Labor		
Leader ($460/day)	3	$ 1380
Biologist ($358/day)		
Tech ($205/day)	3	$ 615
Travel		
Mileage		$ 113
Per diem		
Supplies (gas for pump)		
Equipment		

FY 2009 Total **$ 2108**

(Mileage calculated based on an average of 75 miles/day X $.37/mi + $10/day rental fee).

Task 4. Research stationary PIT tag readers and determine the appropriate set up for the Stirrup floodplain (FY 2007; no cost).

Task 5. Set up stationary PIT tag reader. Unknown if this will be UDWR or another agency/individual/company. Cost will be determined later.

Approximate costs for each type of array discussed are as follows (based on information from Melissa and Craig) (does not include set up or installation time):

- Biomark FDX custom built reader ~ $50,000. No additional tagging cost.
- FDX "homemade" reader ~ $11,000. Potentially no additional tagging cost unless we chose to tag fish with the larger tags. The Biology Committee selected this option during the 05/09/2007 conference call. This is the amount that has been figured into the final SOW costs.
- HDX "homemade" reader ~ $3000. Half duplex tags would be an additional cost.

Task 6. Download PIT tag data and monitor PIT tag array. Assumes spring peak flows lasting two weeks.

Task	**Work days**	**Cost**
Labor		
Leader ($438/day)	2	$ 876
Biologist ($340/day)	2	$ 680
Tech ($195/day)	14	$2730
Travel		
Mileage (1 truck)		$ 529
Per diem ($9/day)		$ 126
Supplies (gas for pump)		
Equipment		
FY 2007 Total		**$ 0**
FY 2008 Total		**$ 4941**
FY 2009 Total (FY 2008 + 2.5%)		**$ 5065**

Task 7. Summarize results/findings.

Task (FY 2009)	**Work days**	**Cost**
Labor		
Leader ($438/day)	5	$2190
Biologist ($340/day)	2	$ 680
Tech ($195/day)		
Travel		
Mileage		

Gas (motor)
Supplies (gas for pump)
Per diem
Equipment

FY 2009 Total **$ 2870**

IX. Budget Summary

Year	Basic Cost	Cost w/FDX simple reader
FY 2007	$18,143	$18,143
FY 2008	$25,126	$36,126
FY 2009	$10,043	$10,043

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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