

COLORADO RIVER RECOVERY PROGRAM
FY 02-04 PROPOSED SCOPE OF WORK for:
(Starvation escapement)

Project No.: 119

Note: Field work for FY 2003 was postponed due to Starvation Reservoir not spilling. If the reservoir spills in 2004 this project will be completed in 2005. FY 03 funds will be carried over.

Note: Final report covered by FY-03 budget.

Evaluation of Nonnative Fish Escapement from Starvation Reservoir.

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January 3, 2002 by Pat Nelson
Budget revised 2/5/02 by Ron Brunson (as requested 1/23/02 by the Management Committee); revised 6/18/03, 2/13/04 by Pat Nelson

<u>Category:</u>	<u>Expected Funding Source:</u>
<input checked="" type="checkbox"/> Ongoing project	<input checked="" type="checkbox"/> Annual funds
<input type="checkbox"/> Ongoing-revised project	<input type="checkbox"/> Capital funds
<input type="checkbox"/> Requested new project	<input type="checkbox"/> Other (explain)
<input type="checkbox"/> Unsolicited proposal	

I. Title of Proposal:

Evaluation of nonnative fish escapement from Starvation Reservoir

II. Relationship to RIPRAP:

General Recovery Program Support Action Plan

III. Reduce negative impacts of nonnative fishes and sportfish management activities (nonnative and sportfish management).

III.A. Reduce negative interactions between nonnative and endangered fishes.

III.A.2. Identify and implement viable active control measures.

III. Study Background/Rationale and Hypotheses:

Background. - The Recovery Program has determined that control of nonnative fishes is necessary for recovery of the endangered fishes. Chronic escapement of nonnative fishes from reservoirs or other impoundments and dispersal into riverine habitats occupied by the endangered fishes where they potentially pose a significant predatory or competitive threat has been identified as a problem. Screening of reservoir outflow to reduce escapement of target nonnative fishes has been implemented at Highline Reservoir and other such fish barriers are being considered for other upper basin reservoirs (e.g., Elkhead; Miller and Laiho 1997). Control of escapement through screening or other types of fish barriers is costly, and the need for such nonnative fish control measures needs to be evaluated on a case-by-case basis. Starvation Reservoir was identified in the 8 March 2000 version of the RIPRAP for such an evaluation beginning in 2002.

Presently, northern pike are of great concern in the Yampa and middle Green Rivers. However, other highly piscivorous species, including walleye and smallmouth bass, are currently increasing in abundance in the middle Green River. A very likely source for escapement of both walleye and smallmouth bass is Starvation Reservoir. This reservoir is located in the Duchesne River drainage and receives inflow from the Strawberry and Duchesne Rivers. The reservoir is primarily a walleye, smallmouth bass and brown trout fishery. There are also rare occurrences of northern pike and yellow perch within the reservoir. Locating major sources of these nonnatives to the river system is the first step in controlling the spread and negative impacts these species may be having on recovery efforts for endangered fish species, particularly Colorado pikeminnow and razorback sucker. This scope of work outlines a procedure to identify locations and rates of escapement of nonnative sportfish from Starvation Reservoir. A synthesis of available data and literature on fish populations in the Duchesne River adjacent to Starvation Reservoir will also be provided to aid in the evaluation of impacts of escapement.

Operation records from Starvation Reservoir from 1986 through 2000 show that spills occur regularly. Starvation Reservoir has spilled seven out of the previous ten years and is operated with the intent to spill each year. Spills generally occur in June with a duration ranging from a week to nearly one month.

IV. Study Goals, Objectives, End Product:

Goal-

Obtain an estimate of the rate of escapement of walleye and smallmouth bass from the spillway and outlet works of Starvation Reservoir.

Objectives-

1. Review and synthesize available data and reports on smallmouth bass populations and other fish species of the Duchesne River adjacent to Starvation Reservoir.
2. Complete an initial draining of the outlet works stilling basin prior to the irrigation season (March).
3. Complete an initial draining of the spillway stilling basin prior to spill (May).
4. Complete an evaluation draining of the spillway stilling basin following spill (July).
5. Complete three sampling passes through the three-mile river reach below Starvation Reservoir (Pre-spill, during spill and post-spill; May - July).
6. Complete an evaluation draining of the outlet works stilling basin following the irrigation season (October).
7. Obtain an estimate of the rate of escapement of target species through the spillway and outlet works of Starvation Reservoir (January).

End Products-

1. An estimate of the rate of escapement of all fish species through the spillway and outlet works of Starvation Reservoir.
2. Recommendations for the need of controlling escapement of nonnative fishes from Starvation Reservoir and preliminary assessment of feasibility.

RIP Annual Report Dec. 2002
RIP Annual Report Dec. 2003
RIP Annual Report Dec. 2004

Draft report to coordinator 15 April 2005; to peer reviewers and Biology Committee 15 May 2005; final report 31 July 2005.

V. Study Area:

The primary study area will be in the stilling basins of the spillway (May - July) and outlet works (March - October) of Starvation Reservoir and a three-mile reach of river beginning at the base of the stilling basins (May - July).

VI. Study Methods/Approach:

Initial Draining of Stilling Basins -

Sampling will focus on the stilling basins of the outflow and spillway of Starvation Reservoir. The stilling basins of the spillway and outlet works will be drained by pumping prior to spilling and all fish will be removed, identified, measured and enumerated. A block net weir will be installed down river from the stilling basins to block movement of fish from downstream sections of the river into the stilling basins. The block will be constructed using stock panels for a rigid frame overlaid with ½" mesh screening and will be anchored to the bank using gabion baskets. The center of the block will also be anchored to a steel post and/or gabion basket. The block will be in place, monitored and cleaned daily during the spill period.

Evaluation Draining of Stilling Basins-

Timing of escapement through the spillway will be evaluated by sampling the stilling basin during the spill period using electrofishing, trammel nets and fyke nets. Escapement timing will be estimated based on catch per effort. Following the spill period, the stilling basin of the spillway will be drained a second time. The stilling basin of the outlet works will be drained following the irrigation season (Oct.). All fish within the drained stilling basins will be collected, identified, measured and enumerated. An estimate of the rate of escapement will be calculated relative to the volume of water discharged over the spillway and through the outlet. This discharge data is available from dam operation records. All walleye and smallmouth bass collected in the stilling basins will be lethally removed.

River Reach Monitoring-

Movement of fish from areas downstream of the block will be monitored by completing at least three sampling passes (pre-spill, during spill and post-spill) on the three-mile section of river directly below the block. Backpack electrofishing will be employed when river flows allow and an electrofishing boat will be used during higher flows. All target species collected below the block in the three mile reach will be marked with a pelvic fin clip. All fish collected in the stilling basins will be examined for pelvic fin clips.

Pumping-

Water in the stilling basins will be pumped out using two 11 hp Honda 4" Trash pumps capable of pumping ~ 600 g.p.m. (1.3 cfs) with 95 ft. head lift. These pumps weigh 165 lbs., making it possible to move them down the bank as the water level drops. There is approximately 1.5 cfs of seepage into the stilling basin of the spillway and potentially the same amount of seepage into the stilling basin of the outlet. At least two pumps will be used at a time in each stilling basin to keep up with seepage and drain the basin. It will take approximately 40 hours to pump out the stilling basin of the spillway and 30 hours to pump out the stilling basin of the outlet works.

VII. Task Description and Schedule:

Field work for this proposed two year investigation will be conducted primarily during the months of March through October. Sampling of stilling basins and the three mile downstream river reach will occur during this time period to collect fish and document escapement.

- Task 1. Nov. - March Order and prepare equipment. This task relates to objectives 2 - 5.
- Task 2. March Install block weir and begin initial draining of outlet works stilling basin and fish removal. Relates to objective 2.
- Task 3. May Install block weir and begin initial draining of spillway stilling basin and fish removal. Relates to objective 3.
- Task 4. March - July Monitor block weir, stilling basins and three mile river reach. Relates to objectives 2 - 5.
- Task 5. July Evaluation draining of spillway stilling basin. Objective 4.
- Task 6. October Evaluation draining of outlet works stilling basin. Relates to objective 5.
- Task 7. Sept. - Nov. Data entry and analysis. Relates to objectives 1 and 3 - 7.
- Task 8. Nov. - April Report Preparation. Relates to objective 1 and 3 - 7.
Annual RIP report (Dec. 2002/2003/2004)
Draft Report (April 2005)

VIII. FY-2002 Work
Deliverables/Due Dates-

Annual RIP report (Dec. 2002)

FY-2002 Budget

Task 1: Prepare Equipment.

<u>Labor-</u>	
Biologist (1 wk)	1000
Technician (2 @ 4 wks)	4000
Seasonal (1@4 wks)	1600
Other	500
Task subtotal	<u>7100</u>

Task 2: Install block and drain outlet works stilling basin.

<u>Labor-</u>	
Biologist (1 wk)	1,000
Technician (2 @ 2 wks)	2,000
Seasonal (1@ 2 wks)	800
Equipment (maint. fuel)	1,000
Travel	600
Task subtotal	<u>5,400</u>

Task 3: Install block and drain spillway stilling basin.

<u>Labor-</u>	
Biologist (2 wks)	2,000
Technician (2 @ 2 wks)	2,000
Seasonal (1@ 2 wks)	800
Equipment (maint. fuel)	1,500
Travel	600
Task subtotal	<u>6,900</u>

Task 4. Monitor stilling basins, block and river reach.

<u>Labor-</u>	
Biologist (4 wks)	4,000
Technician (2 @ 8 wks)	8,000
Seasonal (1@ 8 wks)	3,200
Travel	2,000
Equipment (maint. fuel)	1,200
Task subtotal	<u>18,400</u>

Task 5. Evaluation draining of spillway stilling basin.

<u>Labor-</u>	
Biologist (2 wks)	2,000
Technician (2 @ 2 wks)	2,000
Seasonal (1@ 2 wks)	800
Equipment (maint. fuel)	1,200
Travel	1,000
Task subtotal	<u>7,000</u>

Task 6. Evaluation draining of outlet works stilling basin.

<u>Labor-</u>	
Biologist (1 wk)	1,000
Technician (2 @ 2 wks)	2,000
Seasonal (1@ 2 wks)	800
Equipment (maint. fuel)	1,000
Travel	600
Task subtotal	<u>5,400</u>

Task 7. Data entry and analysis.

<u>Labor-</u>	
Biologist (3 wks)	3,000
Technician (2 wks)	1,000
Task subtotal	<u>4,000</u>

Task 8. Report preparation.

<u>Labor-</u>	
Biologist (5 wks)	5,000
Technician (2 wk)	1,000
Task subtotal	<u>6,000</u>

Budget (Capital Items)

Fyke nets (5 @ \$600 each)	3,000
Two Water Pumps (11 hp Honda trash pump w/ intake and discharge hoses and fittings)	5,200
Weir block (2 @ \$800 each; materials include stock panels, netting, posts, gabions etc.)	1,600
Subtotal	<u>9,800</u>
<u>Total FY-2002 Budget</u>	
Project Total	\$70, 000

FY-2003 Work

Deliverables/Due Dates

Annual RIP report (Dec. 2003)

FY- 2003 Budget

Task 1: Prepare Equipment.

<u>Labor-</u>	
Biologist (1 wk)	1000
Technician (2 @ 4 wks)	4000
Seasonal (1@ 4 wks)	1600
Other	500
Task subtotal	<u>7100</u>

Task 2: Install block and drain outlet works stilling basin.

<u>Labor-</u>	
Biologist (1 wk)	1,000
Technician (2 @ 2 wks)	2,000
Seasonal (1@ 2 wks)	800
Equipment (maint. fuel)	1,000
Travel	600
Task subtotal	5,400

Task 3: Install block and drain spillway stilling basin.

<u>Labor-</u>	
Biologist (2 wks)	2,000
Technician (2 @ 2 wks)	2,000
Seasonal (1@ 2 wks)	800
Equipment (maint. fuel)	1,500
Travel	600
Task subtotal	6,900

Task 4. Monitor stilling basins, block and river reach.

<u>Labor-</u>	
Biologist (4 wks)	4,000
Technician (2 @ 8 wks)	8,000
Seasonal (1@ 8 wks)	3,200
Travel	2,000
Equipment (maint. fuel, replacement netting)	2,200
Task subtotal	19,400

Task 5. Evaluation draining of spillway stilling basin.

<u>Labor-</u>	
Biologist (2 wks)	2,000
Technician (2 @ 2 wks)	2,000
Seasonal (1@ 2 wks)	800
Equipment (maint. fuel)	1,200
Travel	1,000
Task subtotal	<u>7,000</u>

Task 6. Evaluation draining of outlet works stilling basin.

<u>Labor-</u>	
Biologist (1 wk)	1,000
Technician (2 @ 2 wks)	2,000
Seasonal (1@ 2 wks)	800
Equipment (maint. fuel)	1,000
Travel	500
Task subtotal	<u>5,300</u>

Task 7. Data entry and analysis.

<u>Labor-</u>	
Biologist (3 wks)	3,000
Technician (3 wks)	1,500
Task subtotal	<u>4,500</u>

Task 8. Report preparation.

<u>Labor-</u>	
Biologist (6 wks)	6,000
Technician (3 wks)	1,500
Task subtotal	<u>7,500</u>

FY - 2003 Budget

Project Total **\$63,100**

FY-2004/2005 Work

Deliverables/Due Dates

Draft report to coordinator 15 April 2005; to peer reviewers and Biology Committee 15 May 2005; final report 31 July 2005.

IX. Budget Summary

FY 2002 -	\$70,000
FY 2003 -	\$63,100
Total -	\$133,100

X. References

Martinez, P. J. 2000. Fish Anti-escapement Strategies/Devices for Ponds/Reservoirs. Job No. 2 *in* Westslope warmwater fisheries. Job progress report. Colorado Division of Wildlife Fish Research Section, Fort Collins, CO. 41 pp.

Miller, W. J., and D. Laiho. 1997. Feasibility evaluation of non-native fish control structures. Final Report of Miller Ecological Consultants, Inc. to Upper Colorado River Endangered Fish Recovery Program, Denver, Colorado.

Personal communication, Ed Johnson, Utah Division of Wildlife Resources, Vernal, UT.