

I. Project Title: Highline Lake screening O&M

II. Principal Investigators:

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III. Project Summary:

A spillway barrier net designed to control escapement of nonnative, warm water fishes from Highline Reservoir (Highline Lake State Park, Colorado) that might enter the Colorado River was installed in August 1999. Research has shown that nonnative fishes eat young, native fish and compete for food and habitat in the river. In addition to keeping the nonnative and native fishes apart, installation of the fish barrier net brings the reservoir into compliance with the nonnative fish stocking requirements established by the states of Colorado, Utah, and Wyoming, and the U.S. Fish and Wildlife Service.

The fish barrier net is made of Dynema, a high molecular weight polyethylene material, which is extremely strong and durable. The net is approximately 363 feet wide, 19 feet deep, weighs 1,400 pounds, and has mesh openings no larger than a quarter inch. The net stretches across an area of the reservoir that empties into a concrete spillway that flows into Mack Wash and Salt Creek before reaching the Colorado River. It is designed to flex with the surge of the current and changing water depth to prevent fish from escaping over or under it.

As this is the first time this separation has been attempted an MOU was reached between the Colorado Division of Parks (CDP), the Colorado Recovery Program, and the Colorado Division of Wildlife (CDOW) to permit CDP to operate and maintain the net with funding from the CDOW and the Colorado Recovery Program.

On March 21, 2006 the original spillway barrier net was removed and on March 22, 2006 the replacement spillway net was installed.

IV. Study Schedule: 1999- on-going

V. Relationship to RIPRAP: Colorado River Action Plan: Main stem

The Procedures for Stocking Nonnative Fish Species in the Upper Colorado River Basin (CDOW et al. 1996) included specific reference to the need to screen the spillway at Highline Lake to control escapement of nonnative, warm water fish species. This requirement prescribed that "Public and private waters that have a direct connection to rivers in the Upper Colorado River Basin (e.g., Elkhead Reservoir, Highline Reservoir and

many ponds) will be equipped or managed with an anti-escapement device or practice acceptable to the Service (USFWS) and the State fish and Wildlife Agency." In addition, the Procedures, section IV.6, state that "The Program (RIP) will pursue funding for equipping public reservoirs with anti-escapement devices" (CDOW et al. 1996, Martinez 1997). Funding from the Recovery Implementation Program for Endangered Fishes in the Upper Colorado River Basin (RIP) became available in 1998 (Martinez 1999) for installation of a fish screen at Highline Lake and the net was installed on 18 August 1999.

General Recovery Program Support Action Plan:

III. Reduce negative impacts of nonnative fishes and sport fish management activities.

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

III.A.2.c. Implement and evaluate the effectiveness of viable active control measures.

III.B. Reduce negative impacts to endangered fish from sport fish management activities.

III.C. Ensure public involvement occurs as appropriate.

Colorado River Action Plan: Main stem

III.B.1.a. Operate and maintain Highline Reservoir net.

VI. Accomplishment of **FY 2010** Tasks and Deliverables, Discussion of Initial Findings and Shortcomings:

Task 1. Maintain Protective Buoy Line: The buoy line was inspected on a weekly schedule with the Park's Patrol Boat during the summer season. The boat safety line broke but was repaired by United Underwater Contractors on their July cleaning. No other issues or problems were identified. The connecting cable, shackles, U bolts are in good working order. The boat safety line is looking weak and should be replaced in the near future.

Task 2. Net Cleaning and Repair Operations (in water): Last year the 3 cleanings were very successful and lightened the load on the net. Cleaning of the net took place July 18, 2009, September 18, 2009 and we are scheduled for a third cleaning the 10th of November once the irrigation water is turned off to the lake. The first cleaning this year took place about a month late on July 18th due to scheduling conflicts but with the net being cleaned 3 times last year the load was manageable. The net was cleaned manually by divers from United Underwater Contractors.

Task 3. Weekly visual survey—The net top line and floats along with the skirt and the PVC pipe sections that we use to deploy the skirts were visually checked on a weekly basis with the Park Patrol Boat – on weekends the Patrol Boat would be on-the-water for several hours and when time permitted we would examine the net from the water surface.

Task 4. Underwater Survey—the net was inspected by United Underwater Contractors, the same divers that have been checking the net for the last several years and they prepared a report for each of their inspections. The reports are available at the park.

The highlights of the report submitted on July 18, 2010 were: 1) the net, thimbles, shackles, manta bolts and cable were completely inspected and all were in good condition. The safety boat cable was broken and 2 buoys were missing from the line. This was repaired and the spreaders were reset. All of the hardware is looking good with the exception of the boat safety cable. 2) All anchoring cables are attached to the 4 manta bolts and the safety wire is in place and holding the shackles secure. 3) All of the spreader bars are in place. 4) The top ½ of the net was thick with growth due to the late cleaning but the growth cleaned off well. 5) The net was thick with hooks, fishing tackle, trash and weeds which were also all cleaned off.

The highlights of the report submitted on September 18, 2010 were: 1) the net, lead line, thimbles, shackles, manta bolts and cable were completely inspected. All of the hardware is looking good but the cable is in poor condition. 2) All anchoring cables are attached to the 4 manta bolts and the safety wire is in place and holding the shackles secure. 3) All of the spreader bars are in place. 4) The second cleaning had much less vegetation on it which reduced the stress and wear and tear on the net. 5) One fishing arrow and the normal amount of fishing tackle were removed from the net.

The highlights of the report submitted on November 7, 2010 were: 1) the net, lead line, thimbles, shackles, manta bolts and cable were completely inspected. All of the hardware is looking good but the safety cable is in poor condition and is in need of being replaced. 2) All anchoring cables are attached to the 4 manta bolts and the safety wire is in place and holding the shackles secure. 3) 4 new spreaders were added. 4) The third cleaning is keeping a lot less strain and wear and tear off the net. The cleanings will be moved up next year since the first cleaning had the most buildup on the net. 5) No fishing arrows were found in the net this cleaning but the normal heave amount of fishing tackle was removed.

VII. Recommendations:

The safety cable that keeps boats away from the net is in poor condition and needs to be replaced in the near future. The net is currently still in good condition but we will need to start looking at replacing the net sometime in the spring of 2012 which would be approximately the same timeframe that the original net lasted.

VIII. Timing and Monitoring of Unscreened Outlet Releases:

Gate Opening Protocol and Dates When the Gate Was Opened at Highline in 2010.

Pilot tests of outlet gate sluicing were conducted at Highline Dam during the summer of 2010. A fish net barrier has not been installed for the outlet gate, so State Parks worked with the DOW to determine the proper conditions for protection of Endangered Species. We used the following protocol:

Temperature and dissolved oxygen (DO) profiles were collected to a depth of 10 meters. The readings were taken in the middle of the afternoon, when the DO concentrations and water temperatures were highest. A distinct stratification develops during the summer months, when DO levels are below 5 mg/l. These concentrations do not support the presence of warm water fish species near the outlet gate. Stratification was initially

observed on 07/09/10, and persisted through 09/02/10. Stratification was not found on 10/01/10, and was assumed to have ended sometime during the month of September.

During the periods when lake stratification was verified, gate sluicing was authorized between 9:00 pm and 9:00 am. This is the low point in the daily DO sag curve for the lake.

During the 2010 season, the gate was opened and sluiced on 07/23, 07/28, 07/30, 08/03, and 08/05. In all cases, the gate was opened around 7:00 am, and closed by 9:00 am.

All previous annual project reports failed to have outlet gate opening information included so I have researched files at the park for all unscreened outlet releases. This has happened since I have been the Park Manager (March 2006) on an annual basis during the inspection of the dam except for the spring of 2010. The outlet structure was opened on June 8, 2009, April 8, 2008, April 3, 2007, April 17, 2006, and September 3, 2003. I was unable to locate any notes for gate openings from 1999 – 2002 and for the 2004 and 2005 years. In addition if there were any other openings of the outlet other than for the dam inspection those dates were not filed.

IX. Project Status:

This project is on-track and on-going

X. FY 2010 Budget Status:

- A. Funds provided: ??
- B. Funds Expended: \$3,000.00
- C. Difference: ??
- D. Recovery funds spent on publication: \$0

XI. Status of Data Submission: NA

XII. Signed: Alan Martinez 12-8-10
Principal Investigator Date