

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 2011** 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 is in need of being replaced and we are working with United Underwater Contractors to replace as soon as lake ices up. No other issues or problems were identified. The connecting cable, shackles, U bolts are in good working order.

Task 2. Net Cleaning and Repair Operations (in water): We have continued to do 3 cleanings of the net since it has shown to be very successful to lighten the load on the net. Cleaning of the net took place April 12, 2011, August 26, 2011 and October 4, 2011. The first cleaning this year took place 3 months earlier than the first cleaning took place last year. The early cleaning was a result of a large surge of water this Spring which ultimately started to pull the net under with the volume of water and debris being flushed into the lake. The net was cleaned manually all 3 times 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 April 12, 2011 were: 1) Cleaning was done early due to high water and large amount of debris. The net was partially submerged and the top skirt was over the top of the net. The top skirt was repositioned and the spreader bars were reattached. 2) All anchoring cables are attached to the 4 manta bolts and the safety wire is in place and holding the shackles secure. 3) The net, thimbles, shackles, manta bolts and cable were completely inspected and all were in good condition. The safety boat cable is about worn out and in need of being replaced. 4) The front and back of the net were solid with moss and scrubbed off. 5) The net had trees, tumble weeds, numerous branches and a lot of other debris pushing on the front of the net which was removed. Once debris was removed, moss cleaned off and top skirt repositioned the net held the surface.

The highlights of the report submitted on August 26, 2011 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 boat cable is in poor condition and is missing approximately 5 of the buoys. 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 debris on the front of the net but was the net was thick with moss.

The highlights of the report submitted on October 14, 2011 were: 1) the net, lead line, thimbles, shackles, manta bolts and cable were completely inspected. All of the hardware is looking good but the boat safety cable is in poor condition and is being requested to be replaced once the lake freezes over. 2) All anchoring cables are attached to the 4 manta bolts and the safety wire is in place and holding the shackles secure. 3) The net was thick with moss and algae growth and was scrubbed clean as possible. 4) Dozens of hooks and lures, branches and other debris were removed from the front of the net. 5) NO zebra or Quagga mussels are being found on the net.

VII. Recommendations:

The boat safety cable that keeps boats away from the net is in poor condition and will be replaced this winter once ice forms on the lake so the dive team can work on the surface instead of underwater. The net is currently still in good condition but past its recommended life cycle and will be replaced sometime in the spring of 2012. Due to the large amount of debris being washed into the lake in the spring we will continue to do 3 cleanings even though the net will be brand new. The early cleaning will mostly be done to remove the debris and any moss buildup.

VIII. Timing and Monitoring of Unscreened Outlet Releases:

Gate opening protocol and dates when the gate can be opened at Highline was done in 2010. The dam engineer did the annual inspection prior to the dates that the park has been given the okay to open the head gate and do unscreened outlet releases so there was no opening of the head gate during this inspection. The project manager in charge of dam safety, Mike Havens wanted to operate the head gate this fall but again it fell outside

of the dates we were authorized to open the head gate and do outlet releases so there was no opening of the head gate in 2011.

The opening of the head gate 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. In 2010 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. 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 2011 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                      12-1-11  
Principal Investigator                      Date