

COLORADO RIVER RECOVERY PROGRAM
FY-2012 PROPOSED SCOPE OF WORK for:
O&M of Highline Lake Fish Barrier Net

Project No.: C-20

Lead Agency: Colorado Division of Parks and Wildlife

Submitted by: Alan Martinez, Park Manager

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Category:

- Ongoing Project
 Ongoing-revised project
 Requested new project
 Unsolicited proposal

Expected Funding Source:

- Annual funds
 Capital funds
 Other (explain)

I. Title of Proposal: Replacement and O&M of the Highline Lake Fish Barrier Net

II. Relationship to RIPRAP:

The Procedures for Stocking Nonnative Fish Species in the Upper Colorado River Basin (hereinafter Procedures; 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 "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: Mainstem
- III.B.1.a. Operate and maintain Highline Reservoir net.

III. Study Background/Rationale and Hypotheses:

The spillway barrier net installed at Highline Lake was fabricated of the high tech fiber Dyneema, a high molecular weight polyethylene material. This material was well suited for the net at Highline due to its resistance to abrasion, light degradation, and fatigue without special coverings or coatings (Martinez 2002). The net is 363 feet wide, 19 feet deep, has a dry weight of 1,400 pounds and mesh openings of 0.25 inches (Martinez 2001). The first net had a projected service life of up to 5 years under local conditions (Martinez 2000) and was in place six and a half years, until March 2006. It was determined that the net could be left in place year-round, even during winter when the lake is frozen (Martinez 2001).

The spillway barrier net that was installed on 18 August 1999 was replaced with an identical net on 21 March 2006. During fiscal year 2010-2011 the dive team will be used three times to clean the net due to an increased algal/debris buildup when the net had only been cleaned twice a year.

In addition to the monitoring and maintenance of the original net by State Parks, the Colorado Division of Wildlife (CDOW) performed an evaluation of fish escapement following the placement of this net. Evaluation of the net's performance in controlling escapement of resident and stocked nonnative fishes from the reservoir was favorable (Martinez 2001, 2002). As a result of the findings of this evaluation, the Recovery Program has recommended maintaining a net at this site to continue to control escapement of nonnative fish (PDO 2002). The stocking of warm-water fish species allowed under the Procedures due to the placement of the net at Highline Lake has proven popular with anglers.

Routine monitoring of the new net was performed under the supervision of Alan Martinez, Park Manager at Highline Lake State Park, under a Memorandum of Understanding between State Parks and the Colorado Division of Wildlife, which provided up to \$10,000 per year to cover O&M costs. Future monitoring will continue under the supervision of the Park Manager at Highline Lake State Park which now falls under Colorado Division of Parks and Wildlife (CDPW).

Mandatory annual maintenance/opening of the Highline Lake outlet will be performed during the summertime period of hypolimnetic oxygen depletion to prevent/minimize entrainment or escapement of warmwater fish species from the reservoir during these unscreened releases. Piper (1982) reported that fish thrive at ≥ 5 mg/l of oxygen, show a decrease in feeding and growth from 3-5 mg/l, and may die from 0-3 mg/l, depending on the species. The EPA (1986)

provides information showing that various life stages of several species of nonnative warmwater fish known to occur in Highline Lake are tolerant of oxygen levels < 5 mg/l, including smallmouth bass *Micropterus dolomieu* (Edwards et al. 1983) whose escapement from the reservoir is of particular concern. Burdick et al. (1954) reported that lethal oxygen concentrations for smallmouth bass ranged from 0.73-1.15 mg/l at 60-80° F. Martinez (2002, 2003) reported that oxygen levels typically fell below 2/mg/l below a depth of 6-8 from mid-July until late August and recommended this 2 mg/l threshold for future unscreened outlet releases. Given annual variation, monitoring oxygen levels near the outlet in Highline Lake to detect the period when oxygen is > 2 mg/l should provide up to a six-week window between the first week of July and the first week of September in which the mandatory annual maintenance/opening of the Highline Lake outlet could be performed.

The only exception to this will be in case of an emergency and outlet had to be opened. In this case USFWS would immediately be notified of the outlet opening.

IV. Study Goals, Objectives, End Product:

Study Goals: To operate and maintain a spillway barrier net at Highline Lake to control escapement of resident and stocked nonnative fishes that may reach critical habitat for endangered fishes in the Colorado River main-stem.

Objectives:

1. To monitor and maintain the new net to maintain its function in controlling escapement of nonnative fishes while providing for public safety and maximizing the service life of the net.
2. To provide public awareness of the net's purpose both in facilitating the recovery of endangered fishes and in allowing for stocking and management of select nonnative warm-water sport fish species.

End Products:

1. Further documentation of the feasibility and costs to operate and maintain a large-scale net in a high public use setting.
2. Reduced infusion and interaction of nonnative sport fish into critical habitat that might otherwise escape the reservoir and contribute to negative impacts on endangered fishes.
3. Positive public response to enhanced sport fish management in Highline Lake.

V. Study Area:

Highline Lake State Park near Loma, Colorado.

VI. Study Methods/Approach:

- A. Maintenance: Formerly, the O&M of the original net was funded via a cooperative agreement between State Parks and the CDOW to cover up to \$10,000 in annual costs incurred by Highline Lake State Park. A new agreement to cover the net's O & M costs went into effect as of March 2005. As of July 1, 2011 CDPW will cover the net's O & M.
- B. Monitoring: CDPW has established standardized sampling sites (electrofishing) in Mack Wash to annually monitor use by native fish species and concurrently detect escapement of warm-water sport fishes.

VII. Task Description and Schedule:

FY 2006-on:

- A. Maintenance: Ensure funding is available to Highline State Park to provide for net's O&M in future years.
- B. Monitoring: Ensure that annual electrofishing is performed in Mack Wash to monitor escapement of fish from Highline Lake.

VIII. FY- 2012 Work:

Deliverables/Due Dates FY 2012

Provide annual report on O&M, including documentation of costs, to Recovery Program.

- Budget

FY 2012 Cost Estimates:

A. Maintenance: Annual	\$ 5,000
B. Monitoring:	\$ 5,000
C. Net Replacement	\$ 90,000

IX. Budget Summary:

CDPW will cover annual O&M costs up to \$10,000. If costs for a given year exceed \$10,000 then a request will be submitted to the Recovery Program to cover the additional costs. This situation has not occurred to date.

X. Reviewers:

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XI. References:

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