FY 2022-23 SCOPE OF WORK PROJECT: C-20

Project Title

Operation, maintenance, and evaluation of fish escapement barriers in Colorado (Highline Lake and Elkhead Reservoir)

Bureau of Reclamation Agreement Number:

No agreement currently in place. Previous agreement number was RP12AP40001.

Reclamation Agreement Term

Not applicable

Note: Recovery Program FY22-23 scopes of work are drafted in May 2021. They often are revised before final Program approval and may subsequently be revised again in response to changing Program needs. Program participants also recognize the need and allow for some flexibility in scopes of work to accommodate new information (especially in nonnative fish management projects) and changing hydrological conditions.

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Category:
_X_ Ongoing project
__ Ongoing-revised project
__ Requested new project
__ Unsolicited proposal

Expected Funding Source:
_X_ Annual funds
_X_ Capital funds
_X_ Other *[explain]*

Relationship to RIPRAP:

This project will involve the operation and maintenance of the Highline Lake and Elkhead Reservoir spillway nets, and fish monitoring to determine the performance of both spillway nets.

General Recovery Program 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.A.2.c.	Evaluate the effectiveness (e.g., nonnative and native fish response) and develop and implement an integrated, viable active control program.
III.B.	Reduce negative impacts to endangered fishes from sportfish management activities.

Colorado River Action Plan: Mainstem

III.B.	Reduce negative impacts to endangered fishes from sportfish management activities.
III.B.1.	Evaluate control options and implement measures to control nonnative fish escapement from Highline Reservoir.
III.B.1.a.	Operate and maintain Highline Reservoir net.

Green River Action Plan: Yampa River

III.B.1.	Prevent nonnative fish introduction; reduce invasion and recruitment.
III.B.1.a.(2)	Implement control measures as needed to control escapement (during and after Elkhead expansion construction). Post-construction: monitor and maintain Elkhead screens.

Study Background/Rationale and Hypotheses:

The Procedures for Stocking Nonnative Fish Species in the Upper Colorado River Basin (Stocking Procedures) (USFWS 2009) require the use of screens/nets to control escapement of stocked, nonsalmonid fishes from ponds and reservoirs (NFAHC 2014). Specifically, the Stocking Procedures state "public and private waters that have a direct connection to rivers in the Upper Colorado River Basin (UCRB) (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 and the State fish and wildlife agency. The Upper Colorado River Endangered Fish Recovery Program (Recovery Program) will pursue funding for equipping public reservoirs with anti-escapement devices." In addition, and as noted by the Nonnative Fish *ad hoc* Committee (2014), "maintenance of screens and their infrastructure is an ongoing, necessary, and expensive commitment." The committee recommended two high priorities related to this topic, including 1) "that screens be used to manage sport fish populations based on Compatible list species that are considered to be compatible with endangered fish recovery and not for management of non-compatible list or demonstrably invasive species in the UCRB, including northern pike and smallmouth bass," and 2) that "monitoring of all screens on public waters and reporting on their function and maintenance on an annual basis be completed to help ensure their reliability in preventing/controlling fish escapement" (NFAHC 2014). Colorado Parks and Wildlife (CPW) is addressing both of these priorities within this Scope of Work at both Highline Lake and Elkhead Reservoir.

Highline Lake

Funding from the Recovery Implementation Program for endangered fishes in the UCRB became available in 1998 (Martinez 1999) for installation of a fish screen at Highline Lake within the State Park (near Loma, Colorado). The first spillway net at Highline Lake was installed on August 18, 1999, with a projected service life of up to five years under local conditions (Martinez 2000). The Highline Lake spillway 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). It is fabricated of the high tech fiber Dyneema, a material well suited for the spillway net due to its resistance to abrasion, light degradation, and fatigue without special coverings or coatings (Martinez 2002). This increase in net durability has resulted in the spillway net being left in place year-round, even during winter when the lake is frozen (Martinez 2001).

Since the original installation in 1999, the Highline Lake spillway net has been replaced on two occasions, March 21, 2006 and most recently, March 14, 2014. The 2014 replacement occurred after Highline Lake was drawn down 20 feet during a dredging operation in the fall of 2013. The removal of the 2006 spillway net and installation of the 2014 spillway net occurred on dry land. All of the remnants of the original spillway net were removed, and all of the existing thimbles and manta ray bolts were inspected. The 2014 replacement net was connected and tightened in a manner ensuring no openings that fish would be able to escape through.

Routine monitoring of the Highline Lake spillway net is performed under the supervision of Alan Martinez, Park Manager at Highline Lake State Park. A dive team inspected and cleaned the net on three occasions across the 2014 boating season. Since that time, the dive team has increased their inspections and cleanings to five occasions per year due to increased algal/debris buildup on the spillway net. Colorado Parks and Wildlife will continue to provide up to $10,000 per year to cover operations and maintenance costs associated with the spillway net.

The bottom release (outlet) on Highline Lake, if not operated appropriately, is another potential source of nonnative fishes downstream to Mack Wash and Salt Creek, tributaries to critical habitat for endangered fishes of the Colorado River. A mandatory annual maintenance/opening of the Highline Lake outlet is to be performed during the summer period when hypolimnetic oxygen depletion occurs, precluding and/or minimizing escapement of warmwater fish species (NFAHC 2014). Multiple studies (Piper et al. 1982; USEPA 1986) indicate that various fish species may be tolerant of dissolved oxygen concentrations less than 5 mg/L. Martinez (2002, 2003) reported that dissolved oxygen concentrations in Highline Lake generally decreased to less than 2 mg/L below a depth of 19-26 feet from mid-July until late August, and recommended this 2 mg/L threshold for unscreened outlet releases at Highline Lake. Monitoring dissolved oxygen levels near the Highline Lake outlet to detect this threshold should provide the possibility for a maximum six week window between July 1 and September 1 during which the mandatory opening of the outlet could be performed (NFAHC 2014).

The Highline Lake outlet structure was operated over a two week period in October 2013 in order to draw the reservoir down 20 feet for the dredging operation. A "sock" net attachment was installed over the culvert directly south of the outlet structure during this time, since the outlet structure was operated outside of the period when dissolved oxygen concentrations would be greater than 2 mg/L. The net aperture was similar to that of the spillway net, and was effective in catching fish that were flushed out of the outlet structure. This attachment will be used in the same capacity in the future, when mandatory outlet tests are required outside of the six week window and dissolved oxygen concentrations are sufficient for fish survival.

In addition to the annual monitoring and maintenance of the Highline Lake spillway net by Highline State Park personnel, the Colorado Division of Wildlife (CDOW) performed an evaluation of fish escapement following the installation of the 1999 spillway net. Evaluation of the net's performance in controlling escapement of resident and stocked nonnative fishes from the reservoir was favorable (Martinez 2002). As a result of the findings of this evaluation, the Recovery Program recommended maintaining a spillway net at this site to continue controlling the escapement of nonnative fish (PDO 2002). Further, CPW will continue to complete annual sampling to monitor fish escapement in the spring before spilling (within the reservoir, between the spillway net and spillway), and in the fall after spilling (outside of the reservoir, at several established sites within Mack Wash and/or Salt Creek). These fish monitoring costs will be covered by CPW up to $5,000/year.

Elkhead Reservoir

On September 23, 2016 a spillway net similar to the one at Highline Lake was installed just upstream of the spillway in Elkhead Reservoir at Elkhead Reservoir State Park (near Craig, Colorado). The Elkhead Reservoir net is made of the same high tech fiber Dyneema as the Highline net, but is more than 200 feet longer and almost twice as deep, 575 feet long and 30 feet deep, as the Highline net. An 800 feet long, foam-filled debris boom that is 2 feet in diameter with a 4 feet skirt that extends beneath the water surface is situated upstream of the spillway net to reduce wave action and protect the net from large logs and other debris.

Routine monitoring of the Elkhead Reservoir spillway net is performed under the supervision of Jacob Dewhirst, Park Manager at Elkhead Reservoir State Park. A dive team from the contractor that built and installed the spillway net completed an inspection in mid-summer, 2017. Based on that inspection and

others since that time, CPW is predicting that the spillway net will need to be cleaned and inspected by a dive team on at least four occasions annually. The number of cleanings/inspections will be dependent on hydrological conditions across the season, and normal wear from year to year. Colorado Parks and Wildlife will provide up to $10,000 per year to cover operations and maintenance costs associated with the spillway net.

There is also an outlet tower at Elkhead Reservoir, but the outlet structures are also screened to preclude fish escapement out of Elkhead Reservoir downstream into Elkhead Creek, a tributary to critical habitat for endangered fishes of the Yampa River. Maintenance and operation of the outlet works are shared between the Colorado River Water Conservation District (CRWCD) and the City of Craig.

In addition to the annual monitoring and maintenance of the Elkhead Reservoir spillway net by Elkhead Reservoir State Park personnel, CPW will also be completing annual sampling to monitor fish escapement in the spring before spilling, and in the fall after spilling (within the reservoir, between the spillway net and spillway). The stilling basin will also be sampled within the same time frame in the spring and fall, when there is no connection between Elkhead Reservoir and Elkhead Creek (i.e., either the reservoir has yet to spill or the reservoir has completed spilling for the year). These fish monitoring costs will be covered by CPW up to $5,000/year.

Study Goals, Objectives, End Product(s):

The study goal for both Highline Lake and Elkhead Reservoir is to operate and maintain spillway nets at both waters to control escapement of resident and stocked nonnative fishes that may reach critical habitat for endangered fishes in the Colorado River and Yampa River, respectively.

The study objectives for both Highline Lake and Elkhead Reservoir include the following:

1) To monitor and maintain the spillway nets so that the nets' function is retained in controlling the escapement of nonnative fishes, while providing for public safety and maximizing the life of the nets.

2) To provide public awareness of the spillway nets' purpose both in facilitating the recovery of endangered fishes, and in allowing for the stocking and management of approved nonnative warmwater sportfish species compatible with endangered fish recovery efforts.

The end products for both Highline Lake and Elkhead Reservoir include the following:

1) Further documentation of the feasibility and costs to operate and maintain large-scale spillway nets in high public use settings.

2) Reduced infusion and interaction of nonnative sportfish into critical habitat that might otherwise escape the reservoir and contribute to negative impacts on endangered fishes.

3) Positive public response to enhanced sportfish management in Highline Lake and Elkhead Reservoir.

In compiling and organizing the data collected, CPW will follow quality assurance and quality control protocols provided annually by the Recovery Program Director's Office. An Annual Report will be prepared and distributed to interested parties following the field season, generally by the end of December.

The seven year-old Highline Lake spillway net is reaching the end of its useful life cycle. Colorado Parks and Wildlife is anticipating that the current spillway net will need to be replaced and installed as early as 2022. Colorado Parks and Wildlife has collaborated with the Recovery Program and the U.S. Bureau of Reclamation (USBOR) to begin planning and securing funds for the purchase of a new spillway net, which may occur as early as the fall of 2021. Installation of the new spillway net will be contingent on how the current spillway net performs across the 2021 boating season. Funds for the purchase and installation of this new spillway net are not being requested through this Scope of Work.

Study Area:

Highline Lake State Park, Loma, Colorado; Elkhead Reservoir State Park, Craig, Colorado

Study Methods/Approach:

Highline Lake

Since 2015, the Recovery Program has implemented a two-tiered strategy for reducing populations of problematic nonnative predators in endangered species habitats by 1) performing large-scale removal of nonnative predators, especially focusing on spawning disruption; and 2) preventing escapement of nonnative predators from off-channel sources by containing or eradicating populations. The combination of these two strategies is important because reducing in-river reproduction and limiting emigration from off-channel sources limits population growth after in-river removal is performed. Currently, the Recovery Program removes nonnative smallmouth bass, northern pike and walleye from over 600 miles of river. Screens have been installed on 5 of 7 major reservoir outlets to prevent escapement with 2 more pending.

Over the past decade, this strategy has been applied with general success for smallmouth bass, northern pike, and walleye. For example, in the Yampa River smallmouth bass populations have been contained at Elkhead Reservoir via a spillway net and outlet screen, while spawning has been disrupted via intense nest disruption. As a result, even with occasional strong year classes, the adult population of smallmouth Bass in Little Yampa Canyon remains low compared to almost all prior years (Hawkins 2020). Northern pike are also contained at Elkhead Reservoir, while spawning in the Yampa River is disrupted via early spring backwater gill-netting. Abundance estimates show that this effort has resulted in a large reduction in Yampa River northern pike between Hayden and Craig compared to estimates a decade ago (Bestgen et al. 2020). Similarly, in the upper Colorado River, containment at Rifle Gap Reservoir, along with containment and removal at the Mamm Creek gravel ponds, appears to have successfully suppressed catch of northern pike in endangered fish habitats (Francis 2020). Reservoir containment of walleye is the priority; in-river walleye recruitment has not been documented, so spawning disruption is not needed. Catches of walleye in the middle Green River over the past few years have declined from previous norms (Partlow and Elbin 2020), likely the result of eradication and containment of populations at Red Fleet and Starvation Reservoirs. These examples demonstrate that a two-tiered approach is generally successful at limiting populations of problematic predators.

This project focuses on off-channel control of nonnative fishes at Highline Lake and Elkhead Reservoir. As part of the project, CPW will include off-channel escapement prevention via

spillway nets. In addition, CPW will remove individuals of nonnative, non-compatible species outside of the spawning period in areas downstream of the spillway nets, stilling basin (at Elkhead Reservoir), and within Mack Wash downstream of Highline Lake in order to reduce population abundance. Colorado Parks and Wildlife will measure response to these efforts utilizing electrofishing and gill net sets to evaluate fish community composition.

Highline Lake

Formerly, the operations and maintenance of the original spillway net were funded via a cooperative agreement between Colorado State Parks and the CDOW to cover up to $10,000 in annual costs incurred by Highline Lake State Park. Colorado State Parks and the CDOW merged to form CPW in 2011. As of July 1, 2011, CPW will be responsible for covering the operations and maintenance costs of the spillway net up to $10,000 annually, contingent on the availability of funds. If annual costs exceed $10,000, then CPW and the Recovery Program will share the additional costs at a 50:50 ratio.

Colorado Parks and Wildlife will continue to complete annual sampling to monitor fish escapement in the spring before spilling (within the reservoir, between the spillway net and spillway), and in the fall after spilling (outside of the reservoir, at several established sites within Mack Wash and/or Salt Creek). Colorado Parks and Wildlife will complete this annual sampling at the agency's expense, contingent on the availability of funds.

Elkhead Reservoir

Per a May 20, 2015 CPW letter to the USBOR outlining CPW's obligations related to the "Elkhead Reservoir Fish Escapement Net," CPW will be responsible for covering the operations and maintenance costs of the spillway net up to $10,000 annually, contingent on the availability of funds. Operation and maintenance costs exceeding the $10,000 per year limit will be cost shared equally (50:50) between CPW and the Recovery Program, subject to the mutual agreement of CPW and the Recovery Program. If mutual agreement on the expenditure of funds exceeding the first $10,000 in any calendar year cannot be obtained, the issue will be referred to the Recovery Program's Implementation Committee for resolution. Resolution will occur in a timely manner, to avoid impacting the safe and prudent operation of Elkhead Reservoir.

At the end of the useful life cycle of the spillway net, the Recovery Program, CPW, CRWCD, and USBOR will consult on the need to replace the net, and if needed, who will assume responsibility for installation, operation, and maintenance.

Colorado Parks and Wildlife will complete annual sampling to monitor fish escapement in the spring before spilling, and in the fall after spilling (within the reservoir, between the spillway net and spillway). The stilling basin will also be sampled within the same time frame in the spring and fall, when there is no connection between Elkhead Reservoir and Elkhead Creek (i.e., either the reservoir has yet to spill or the reservoir has completed spilling for the year). Colorado Parks and Wildlife will complete this annual sampling at the agency's expense, contingent on the availability of funds.

Task Description, Deliverables and Schedule:

Highline Lake

Operations and Maintenance

Task 1. Maintain protective buoy line.
Schedule: March/April - November

Task 2. Spillway net cleaning and repair operations (in water).
Schedule: March/April - November

Task 3. Weekly visual survey.
Schedule: March/April - November

Task 4. Underwater survey.
Schedule: March/April - November

Task 5. Preparation of an Annual Report documenting operations and maintenance, and related costs (generally by the end of December).
Schedule: November - December

Schedule FFY 2022-2026:

Task	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1			X	X	X	X	X	X	X	X	X	
2			X	X	X	X	X	X	X	X	X	
3			X	X	X	X	X	X	X	X	X	
4			X	X	X	X	X	X	X	X	X	
5											X	X

The spillway net will be inspected and cleaned on at least five occasions per year by a contracted dive team for a total annual cost of $12,500 ($2,500 per inspection/cleaning). This routine maintenance of the spillway net should decrease algal/debris buildup, and prolong the life of the spillway net.

Fish Monitoring

Task 1. Fish sampling to monitor fish escapement downstream of the spillway net (within the reservoir, between the spillway net and spillway).
Schedule: February/March (pre-spill conditions)

Task 2. Fish sampling to monitor fish escapement downstream of the spillway net (outside of the reservoir, within Mack Wash and/or Salt Creek).

Schedule: November (post-spill conditions)

Task 3. Equipment maintenance, data entry, data analysis, and preparation of an Annual Report (generally by the end of December).
Schedule: February/March - November/December

Schedule FFY 2022-2026:

Task	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1		X	X									
2											X	
3		X	X	X	X	X	X	X	X	X	X	X

Elkhead Reservoir

Operations and Maintenance

Task 1. Maintain protective debris boom.
Schedule: March/April - September

Task 2. Spillway net cleaning and repair operations (in water).
Schedule: March/April - September

Task 3. Weekly visual survey.
Schedule: March/April - September

Task 4. Underwater survey.
Schedule: March/April - September

Task 5. Preparation of an Annual Report documenting operations and maintenance, and related costs (generally by the end of December).
Schedule: November - December

Schedule FFY 2022-2026:

Task	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1			X	X	X	X	X	X	X			
2			X	X	X	X	X	X	X			
3			X	X	X	X	X	X	X			
4			X	X	X	X	X	X	X			
5											X	X

The spillway net will be inspected and cleaned on at least four occasions per year by a contracted dive team for a total cost of $16,000 ($4,000 per inspection/cleaning). This routine maintenance of the spillway net should decrease algal/debris buildup, and prolong the life of the spillway net.

Fish Monitoring

Task 1. Fish sampling to monitor fish escapement downstream of the spillway net (within the reservoir, between the spillway net and spillway).
Schedule: March (pre-spill conditions) and September/October (post-spill conditions)

Task 2. Fish sampling to monitor fish escapement downstream of the spillway net (outside of the reservoir, within the stilling basin and prior to and post-connection with Elkhead Creek).
Schedule: March (pre-spill conditions) and September/October (post-spill conditions)

Task 3. Equipment maintenance, data entry, data analysis, and preparation of an Annual Report (generally by the end of December).
Schedule: March - November/December

Schedule FFY 2022-2026:

Task	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1			X						X	X		
2			X						X	X		
3			X	X	X	X	X	X	X	X	X	X

Budget Summary:

Highline Lake & Elkhead Reservoir

Colorado Parks and Wildlife will be responsible for covering the operations and maintenance costs of each spillway net up to $10,000 annually, contingent on the availability of funds. If annual costs exceed $10,000, then CPW and the Recovery Program will share the additional costs at a 50:50 ratio. Colorado Parks and Wildlife will also cover the costs associated with monitoring fish escapement at each reservoir (up to $5,000 annually), contingent on the availability of funds.

FFY Year	CPW	CPW and Recovery Program
2022-2026	Operations and maintenance up to $10,000 at each reservoir	If costs exceed $10,000, CPW and Recovery Program share costs 50:50

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References:

Bestgen, K. R., K. A. Zelasko, T. Eyre, C. Smith, G. C. White, and M. T. Jones. 2020. Abundance estimation following increased removal verifies declining trends of northern pike in the Yampa River, Colorado. Final report to the Upper Colorado River Endangered Fish Recovery Program. Denver Federal Center, Lakewood, Colorado. Department of Fish, Wildlife, and Conservation Biology, Colorado State University, Fort Collins. Larval Fish Laboratory Contribution 218.

Francis, T. 2020. Removal of nonnative fish in the upper Colorado River between Grand Valley Water User's Dam (Government Highline Diversion Dam) near Palisade, Colorado, and Potash, Utah. Project 126a, 126b, 123d. Annual Report to the Upper Colorado River Endangered Fish Recovery Program.

Hawkins, J.A. 2020. Evaluation of smallmouth bass and northern pike management in the middle Yampa River. Project 125/98c. Annual Report to the Upper Colorado River Endangered Fish Recovery Program.

Martinez, P.J. 1999. Westslope warmwater fisheries. Federal Aid in Fish and Wildlife Restoration Project-F-325-R4 Progress Report. Colorado Division of Wildlife, Fort Collins, Colorado.

Martinez, P.J. 2000. Westslope warmwater fisheries. Federal Aid in Fish and Wildlife Restoration Project-F-325-R5 Progress Report. Colorado Division of Wildlife, Fort Collins, Colorado.

Martinez, P.J. 2001. Westslope warmwater fisheries. Federal Aid in Fish and Wildlife Restoration Project F-325-R6 Progress Report, Colorado Division of Wildlife, Fort Collins, Colorado.

Martinez, P. J. 2002. Westslope warm water fisheries. Federal Aid in Fish and Wildlife Restoration Project F-235-R7 Progress Report. Colorado Division of Wildlife, Fort Collins, Colorado.

Martinez, P. J. 2003. Westslope warm water fisheries. Federal Aid in Fish and Wildlife Restoration Project F-235-R8 Progress Report. Colorado Division of Wildlife, Fort Collins.

Nonnative Fish *ad hoc* Committee (NFAHC). 2014. Upper Colorado River basin nonnative and invasive aquatic species prevention and control strategy. Upper Colorado River Endangered Fish Recovery Program, Nonnative Fish *ad hoc* Committee. U.S. Fish and Wildlife Service, Lakewood, Colorado.

Partlow, M.S. and K.R. Elbin. 2020. Nonnative fish control in the middle Green River. Project 123b. Annual Report to the Upper Colorado River Endangered Fish Recovery Program.

Piper, R.G., I.B. McElwain, L.E. Orme, J.P. McCraren, L.G. Fowler, and J.R. Leonard. 1982. Fish hatchery management. U.S. Fish and Wildlife Service, Washington, D.C.

Program Director's Office (PDO). 2002. Nonnative fish control workshop. Summary, conclusions, and recommendations. Program Director's Office, Upper Colorado River Endangered Fish Recovery Program, Lakewood, Colorado.

U.S. Environmental Protection Agency. 1986. Ambient aquatic life water quality criteria for dissolved oxygen (freshwater). U.S. Environmental Protection Agency, Duluth, Minnesota.

U.S. Fish and Wildlife Service. 1996. Procedures for stocking nonnative fish species in the upper Colorado River basin. U.S. Fish and Wildlife Service, Denver, Colorado.

U.S. Fish and Wildlife Service. 2009. Procedures for stocking nonnative fish species in the upper Colorado River basin. U.S. Fish and Wildlife Service, Denver, Colorado.