

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION, UPPER COLORADO REGION
WESTERN COLORADO AREA OFFICE

DRAFT ENVIRONMENTAL ASSESSMENT

INSTALLATION OF NON-NATIVE PREDATORY FISH ESCAPEMENT NET IN
ELKHEAD RESERVOIR, AS AUTHORIZED BY THE UPPER COLORADO RIVER
ENDANGERED FISH RECOVERY PROGRAM

January 2016

PURPOSE AND NEED

This draft environmental assessment (EA) has been prepared to evaluate the environmental impacts of the Bureau of Reclamation (Reclamation) providing partial funds to the Colorado River Water Conservation District (River District) on behalf of the Upper Colorado River Endangered Fish Recovery Program (Recovery Program) to install a net to prevent the escapement of fish from Elkhead Reservoir via the dam spillway. The primary purpose of the barrier net is to contain non-native predatory fish species within Elkhead Reservoir during spillway operation, compatible with the recovery of the four upper Colorado River endangered fish species. This action is needed to prevent non-native predatory fish within Elkhead Reservoir from escaping over the reservoir spillway into the endangered fishes' critical habitat. The outlet works of the dam were equipped with drum screens to prevent the escapement of fish via this pathway when the reservoir was enlarged in 2006. This Draft EA has been prepared in compliance with the National Environmental Policy Act (NEPA) of 1969 (Public Law 91-190) and under current guidelines established by the Council on Environmental Quality, and U.S. Department of the Interior, Bureau of Reclamation.

BACKGROUND

Elkhead Reservoir is located approximately nine miles northeast of Craig, Colorado, in Moffat and Routt Counties. The reservoir is an on-stream reservoir on Elkhead Creek, a major tributary of the Yampa River (see attachment A). The reservoir was constructed in 1974 by Colorado Parks and Wildlife (CPW) and the Yampa Participants, a consortium of power providers. The earthen-fill dam was originally constructed with a total capacity of 13,700 acre-feet of water for agricultural, industrial municipal, species conservation, and recreational uses. Elkhead Reservoir was enlarged by the River District in 2006 to increase the storage capacity to approximately 25,550 acre-feet (CRWCD 2015).

Elkhead Reservoir is a 900 acre reservoir which provides many recreational opportunities, including fishing, boating, water skiing, swimming, hiking, mountain biking, bird watching, camping, and hunting (CPW 2015). Fishing is a popular recreational activity at Elkhead Reservoir, which has led to the introduction of non-native game fish to the reservoir, particularly smallmouth bass (*Micropterus dolomieu*) and northern pike (*Esox Lucius*). These non-native fish can escape into Elkhead Creek and ultimately the Yampa River during periods of high water when use of the reservoir's spillway is necessary. Designated critical habitat for four upper Colorado River endangered fish species occurs in the Yampa River downstream of its confluence with Elkhead Creek, and research has shown escape of these non-native game fish from Elkhead

Reservoir diminishes the efforts of the Recovery Program to achieve recovery goals for the listed fishes (Breton et al. 2013).

NO ACTION ALTERNATIVE

Under the No Action Alternative, Reclamation would not provide funding to the River District, on behalf of the Recovery Program, to install the barrier net. Non-native predatory fish species within Elkhead Reservoir would continue to escape during spillway operation into the endangered fishes' designated critical habitat downstream of the reservoir. Endangered fish populations in the Yampa River would continue to experience predation by non-native predatory fish that escape from Elkhead Reservoir.

PROPOSED ACTION

Under the Proposed Action, Reclamation would provide partial funds to the River District, on behalf of the Recovery Program, to construct the proposed Elkhead Reservoir non-native predatory fish barrier net. The River District will manage construction, in coordination with CPW. The project would include the installation of a 575-foot long by 25-foot high barrier net made of 1/4-inch mesh to contain fish in Elkhead Reservoir during spillway operation. The net will be anchored to micropiles which were installed in the shoreline of Elkhead Reservoir as part of the 2006 Elkhead Reservoir Enlargement Project. Shoreline contact areas which have been eroded by wave action will be restored to allow the net to fit the previously installed anchors. To protect the barrier net from floating debris, an 800-foot long floating debris barrier will be installed in the reservoir upstream of the net. The debris barrier net will require the installation of new concrete anchors at both ends, as well as steel boat anchors along its length. The net and debris barrier will pass 2,500 cubic feet per second (cfs) when the net is 50% clogged, and the net and debris barrier will safely overtop and pass the dam safety inflow design flood without failure or increasing reservoir surcharge during a design flood (see attachment B).

Operation and maintenance of the proposed project will include the removal of visible floating debris from the barrier net and the debris barrier and pressure washing by divers as necessary (estimated need is two to three times per year), and annual inspections. CPW has agreed to complete operation and maintenance work on behalf of the Recovery Program up to an annual expenditure of \$10,000. Actions required which may result in expenditures above \$10,000 in any year will be addressed as they occur by the Recovery Program. (See letter of understanding, attachment C.)

The expected life of the net is approximately seven years. There is no guarantee of funding for a subsequent net at the end of the first net's life cycle. CPW has prepared a Final Elkhead Reservoir Lake Management Plan (Plan) (CPW 2015b) (attachment D), which describes fishery management actions to reduce the number of non-compatible, predatory non-native fish (northern pike and smallmouth bass) in the reservoir, with the goal of establishing a high quality, cost effective, and sustainable fishery that is also compatible with recovery efforts for endangered native fishes and conserves non-listed native fishes. The Plan was submitted to the Recovery Program for review and input.

ENVIRONMENTAL CONSEQUENCES

This section discusses those resources which may be affected by actions taken to construct, manage, and maintain the proposed barrier net. For each resource, the Proposed Action is analyzed in comparison to a No Action Alternative in order to determine potential effects. The proposed action has been determined to have no effect on Socio-Economics; Water Rights and Uses; Water Quality; Wildlife; Access and Transportation; and Agricultural Resources and Soils. Therefore, these resources are not evaluated further in this EA.

Recreational Resources

Elkhead Reservoir is the only public flat water boating area in Moffat County and, as such, is a popular recreational destination, especially for fishing and boating. Recreational use in the reservoir area adjacent to the spillway is currently prohibited due to safety concerns near the reservoir's outlet works and spillway. Much of the project area is located within this publicly closed area. The reservoir has been operating one foot below the maximum reservoir elevation target to avoid operating the spillway, which would likely lead to the escape of non-native fish from the reservoir. This amounts to a voluntary forgoing of 716 acre-feet of the River District's pool, and results in a reservoir surface area that is approximately 10 acres less than full pool.

No Action Alternative: Under the No Action Alternative, the reservoir would continue to operate one foot below the maximum reservoir target to avoid running the spillway as long as the River District continued to volunteer 716 acre-feet of their pool. The reservoir surface area would continue to be approximately 10 acres less than at full pool.

Proposed Action: The Proposed Action would have no effect on the sport fishery in the reservoir. The Plan developed by CPW describes how management of the Elkhead Reservoir fishery will continue to provide for public angling opportunities that are compatible with endangered fish recovery.

The Proposed Action would have a minor, short term effect on camping, as the project would be accessed through Bears Ears Campground, and construction activities would take place adjacent to the campground. If construction occurs during the popular summer camping months, several campsites would be temporarily closed to protect public safety and facilitate a safer construction environment. Temporary noise impacts from construction also have the potential to impact campers. There would be no long-term impacts on camping from the Proposed Action.

Boating access will be limited while the reservoir is drawn down approximately 15 feet below the spillway elevation during construction. Boating access will be restored to normal operations after construction. After project implementation, the reservoir will no longer need to operate below the maximum reservoir target to avoid using the spillway, which will return approximately 716 acre-feet to the River District's pool, and will expand the reservoir's surface area approximately 10 acres while at capacity. An additional approximate one acre of reservoir will be permanently removed from recreational use due to an expanded area near the spillway being netted off by the fish barrier net and debris barrier (see attachment E).

Threatened and Endangered Species

The following species, listed as threatened or endangered under the Endangered Species Act, have the potential to occur within the project area:

Common Name	Status	Habitat Requirement Summary	Habitat in Project Area?
Mexican Spotted Owl <i>Strix occidentalis lucida</i>	Threatened	Generally nests in older mature conifer stands, and on walls of shady wooded canyons.	No
Yellow Billed Cuckoo <i>Coccyzus americanus</i>	Threatened	Breeds in low elevation river corridors with fairly extensive mature cottonwood galleries	No
Colorado Pikeminnow <i>Ptychocheilus lucius</i>	Endangered	Although no habitat is present within the project area, there is downstream designated critical habitat on the Yampa and Colorado Rivers.	Critical habitat downstream
Razorback Sucker <i>Xyrauchen texanus</i>	Endangered	Although no habitat is present within the project area, there is downstream designated critical habitat on the Yampa and Colorado Rivers.	Critical habitat downstream
Humpback Chub <i>Gila cypha</i>	Endangered	Although no habitat is present within the project area, there is downstream designated critical habitat on the Yampa and Colorado Rivers.	Critical habitat downstream
Bonytail <i>Gila elegans</i>	Endangered	Although no habitat is present within the project area, there is downstream designated critical habitat on the Yampa and Colorado Rivers.	Critical habitat downstream
Ute Ladies-Tresses <i>Spiranthes diluvialis</i>	Threatened	Primarily from moist meadows associated with perennial stream terraces, floodplains, and oxbows at elevations between 4300-6850 feet.	No
Black-Footed Ferret <i>Mustela nigripes</i>	Experimental Population – Non-Essential	Limited to open habitat; the same habitat used by prairie dogs: grasslands, steppe, and shrub steppe.	No

No other endangered species have been identified within the project area, and there is no critical habitat within the project area.

No Action Alternative: Under the No Action Alternative, non-native predatory fish species within Elkhead Reservoir would continue to escape during spillway operation into the endangered fishes' designated critical habitat downstream of the reservoir. Endangered fish populations in the Yampa River would continue to experience predation by and compete for resources with non-native predatory fish that escape from Elkhead Reservoir.

Proposed Action: Controlling escapement of non-native fishes from Elkhead Reservoir is one of the proposed actions covered under the umbrella of the Yampa River Programmatic Biological Opinion (PBO). The PBO identified implementation of non-native fish management to reduce competition and predation with endangered fishes as one of the beneficial effects of the Proposed Action. The installation, operation and maintenance of a fish barrier net will further reduce any take of the four endangered fish species from non-native fish predation. It is expected that the

Proposed Action will have a wholly beneficial effect on the listed fish species, and will have no effect on the fishes' critical habitat. Reclamation has consulted with the U.S. Fish and Wildlife Service (FWS), under Section 7 of the Endangered Species Act, regarding effects of the Proposed Action on the four fish species and their critical habitat. The FWS concurred with Reclamation that the proposed action may affect but is not likely to adversely affect the Colorado Pikeminnow, razorback sucker, bonytail, or humpback chub (see attachment G). The project will have no effect on any other federally listed species or designated critical habitat.

Cultural Resources

A cultural resource survey was conducted for the 2006 Elkhead Reservoir Enlargement Project in May of 2003. A report was prepared, titled *Elkhead Reservoir: Cultural Resource Inventory of Proposed New Dam Footprint, Expanded Pool, and Coastline* (MACI 2003). The survey resulted in the recordation of two new sites; however, neither site is eligible for inclusion in the National Register of Historic Places (NRHP), and neither site occurs within the project area for the Proposed Action.

No Action Alternative: Under the No Action Alternative, there would be no effect to cultural resources.

Proposed Action: Because no cultural resources were found within the project area, the Proposed Action will have no potential to affect cultural resources.

Public and Dam Safety

A fish barrier hydrologic impact assessment (AECOM 2015) was completed in October 2015 to assess the potential hydrologic and hydraulic impact of a fish barrier net upstream of the spillway at Elkhead Reservoir. The assessment evaluated existing flood frequency precipitation data and flood routing results for existing conditions and conditions after construction of the Proposed Action.

The barrier net and debris barrier installation is considered a major modification to Elkhead Dam by the Dam Safety Branch of the State Engineer's Office. Drawings and specifications to be used will require approval by the State Engineer's Office prior to construction.

No Action Alternative: Under the No Action Alternative, there would be no change to public and dam safety.

Proposed Action: The hydrologic impact assessment determined that during a flood, the net and debris barrier will safely overtop and pass the dam without dam failure, the net breaking, or increasing reservoir surcharge, even if the net is fully clogged with debris. Drawings and specifications will be approved by the State Engineer's Office prior to construction. The Proposed Action will have no effect on public or dam safety. Several camp sites may be temporarily closed during construction to protect public safety and provide a safer construction environment.

Indian Trust Assets and American Indian Sacred Sites

Indian Trust Assets (ITAs) are legal interests in property held by the United States for Indian Tribes or individuals. Reclamation and other Federal agencies share the responsibility to protect these assets. In managing Federal lands, Federal agencies must, to the extent practicable, permitted by law, and not clearly inconsistent with essential agency functions, accommodate access to and ceremonial use of American Indian sacred sites by Indian religious practitioners

and avoid adversely affecting the physical integrity of such sacred sites. No ITAs have been identified within the project area. No American Indian Sacred Sites are known within the project area.

No Action Alternative: Under the No Action Alternative, there would be no change to ITAs or American Indian Sacred Sites.

Proposed Action: The Proposed Action will not impact ITAs or American Indian Sacred Sites.

Environmental Justice

Executive Order 12898 on Environmental Justice provides that Federal agencies analyze programs to assure that they do not disproportionately adversely affect minority or low income populations or Indian Tribes.

No Action Alternative: Under the No Action Alternative, there would be no high or adverse human health or environmental effects on minority or low-income populations.

Proposed Action: The Proposed Action would not involve any relocations, health hazards, hazardous waste, property takings, or substantial economic impacts. The Proposed Action would not have disproportionately high or adverse human health or environmental effects on minority or low-income populations or Indian Tribes.

Air Quality

Air quality is generally excellent in the project area, and there are no air quality non-attainment areas in the vicinity (EPA 2015).

No Action Alternative: Under the No Action Alternative, there would be no change in air quality.

Proposed Action: The Proposed Action would have a minor, short-term effect on air quality as a result of dust and exhaust which may be created by construction equipment. There would be no long-term impacts on air quality from the Proposed Action.

Cumulative Impacts

The Upper Colorado River Basin Nonnative and Invasive Aquatic Species Prevention and Control Strategy (Strategy) establishes that it is a high priority for the Recovery Program to “install, evaluate and maintain structures (i.e. screens) to minimize escapement of invasive species” from reservoirs (Martinez et al. 2014). Similarly, it is a high priority to “monitor screens on all public water to ensure that they are functioning to prevent or control escapement of non-native fishes, particularly problematic piscivores.” However, the Strategy recognizes that screens should not be relied upon to contain species incompatible with the recovery of endangered fishes, as the threat of escapement from catastrophic failures and of illegal introduction to other locations is still too great to allow for the preservation of populations of problematic non-native predators. It is the position of the Recovery Program that reservoir populations of problematic non-native species should be eliminated (UCREFRP 2015).

To address the problem of non-native predators at Elkhead Reservoir, CPW prepared a Final Elkhead Reservoir Lake Management Plan (Plan). The goal of the Plan is to implement fishery management actions that will minimize the number of the most problematic non-native fish (northern pike and smallmouth bass) in the reservoir. The desired end result is to establish a reservoir fishery that is compatible with recovery efforts, and which will eliminate the need to

net the spillway. The Proposed Action will serve as a way to limit escapement of those predators while CPW continues to take steps to reduce the problematic fish species (Reclamation 2015).

Cumulative impacts of past, present, and reasonably foreseeable future actions in and near the Proposed Action area would result in beneficial effects related to the four upper Colorado River endangered fish species. Overall, cumulative impacts associated with other aspects of the Proposed Action and future projects would be minimal.

No Action Alternative: Under the No Action Alternative, CPW would implement their Plan with the goal of minimizing non-native fish in the reservoir. Non-native predatory fish species within Elkhead Reservoir would continue to escape during spillway operation into the endangered fishes’ designated critical habitat downstream of the reservoir. Endangered fish populations in the Yampa River would continue to experience predation by non-native predatory fish that escape from Elkhead Reservoir.

Proposed Action: Under the Proposed Action, non-native predatory fish species would not continue to escape during spillway operation into the endangered fishes’ designated critical habitat downstream of the reservoir while CPW works on minimizing non-native fish within the reservoir. Endangered fish populations in the Yampa River would not experience predation by non-native predatory fish which have escaped from Elkhead Reservoir.

Summary of Impacts

Resource	No Action Alternative	Proposed Action
Recreational Resources	The reservoir surface area would continue to be 10 acres less than at full pool.	Potential for a temporary closure of a few campsites, temporary noise impacts from construction. No long-term impacts on camping from the Proposed Action. Limited boating while reservoir is drawn down 15 feet below the spillway during construction. Reservoir’s surface area would expand 10 acres at capacity. One acre of reservoir will be permanently removed from recreational use.
Threatened & Endangered Species	Endangered fish in the Yampa River would continue to experience predation by non-native predatory fish that escape from Elkhead Reservoir.	Beneficial effect on the listed fish species, and will have no effect on the fishes’ critical habitat. No effect on any other federally listed species or designated critical habitat.
Cultural Resources	No effect	No effect
Public & Dam Safety	No effect	No effect
Indian Trust Assets & American Indian Sacred Sites	No effect	No effect
Environmental Justice	No effect	No effect

Resource	No Action Alternative	Proposed Action
Air Quality	No effect	Minor, short-term effect as a result of dust and exhaust created by construction equipment. There would be no long-term impacts
Cumulative Impacts	No change	Non-native predatory fish species would not continue to escape during spillway operation into the endangered fishes' designated critical habitat downstream of the reservoir while CPW works on minimizing non-native fish within the reservoir.

ENVIRONMENTAL COMMITMENTS

The following environmental commitments will be implemented as an integral part of the Proposed Action.

- The River District is responsible for obtaining any required Federal, state, or local permits to construct and operate the project, including permits under the Clean Water Act (Section 402 and 404 permits).
- Prior to construction, drawings and specifications for barrier net and debris barrier installation will be approved by the Dam Safety Branch of the Colorado State Engineer's Office.
- Access to the project area's east end will be confined to the access route through the Bears Ears Campground or across the spillway approach channel (while the reservoir level is below the spillway channel elevation), as identified in attachment B.
- Access to the project area's west end will be confined to an area which was prepared and left as a maintenance work staging area after the dam enlargement project (see attachment F).
- Straw wattles, silt curtains, cofferdams, dikes, straw bales, or other suitable erosion control measures shall be used to prevent erosion from entering water bodies during construction.
- Fuels, lubricants, hydraulic fluids, and other petrochemicals shall be stored and dispensed in an upland staging area, away from water resources.
- Equipment shall be inspected daily and immediately repaired as necessary to ensure equipment is free of petrochemical leaks.
- Construction equipment shall be parked, stored, and serviced only at the designated upland staging area.
- Ground disturbances shall be limited to only those areas necessary to safely implement the Proposed Action.
- Vegetation removal shall be confined to the smallest portion of the Proposed Action Area necessary for completion of the work.
- Following construction, all disturbed areas above the normal high water elevation of the reservoir shall be smoothed, shaped, contoured and reseeded to as near to their pre-project conditions as practicable.

- The River District, in coordination with CPW, will ensure the effectiveness of the barrier with periodic inspections to detect tears or other defects in the net. Sampling in the stilling basin will take place on the descending limb of reservoir spilling. The sampling will detect fish escaping the reservoir, possibly indicating failure of the spillway net. The sampling will be designed to differentiate escapement from the reservoir from upstream movement from Elkhead Creek.
- In the event that threatened or endangered species are encountered during construction, all construction activities shall stop until Reclamation has consulted with FWS to ensure that adequate measures are in place to avoid or reduce impacts to the species.
- In the event that cultural and/or paleontological resources are discovered during construction, all construction activities shall stop until Reclamation has completed consultation with the SHPO and appropriate measures are implemented to protect or mitigate the discovered resource.

CONSULTATION AND COORDINATION

Scoping for this Draft EA was completed by Reclamation, in consultation with the following agencies and organizations, during the planning stages of the Proposed Action to identify the potential environmental and human environment issues and concerns associated with implementation of the Proposed Action:

- Colorado Parks & Wildlife, Grand Junction, CO
- Colorado Parks & Wildlife, Elkhead Reservoir, CO
- U.S. Fish & Wildlife Service, Ecological Services Field Office, Grand Junction, CO
- U.S. Army Corps of Engineers, Colorado West Regulatory Branch, Grand Junction, CO
- Colorado River Water Conservation District, Glenwood Springs, CO
- Upper Colorado River Endangered Fish Recovery Program
 - State of Colorado
 - State of Utah
 - State of Wyoming
 - Colorado River Energy Distributors Association
 - Colorado Water Congress
 - National Park Service
 - U.S. Fish & Wildlife Service
 - Utah Water Users Association
 - Western Area Power Administration
 - Western Resource Advocates
 - Wyoming Water Association

CPW hosted an Elkhead Reservoir Fisheries Management Meeting on February 5, 2015 to discuss the Proposed Action with interested parties and identify potential concerns for the Proposed Action. Concerns raised during the Elkhead Reservoir Enlargement Project also helped identify potential concerns.

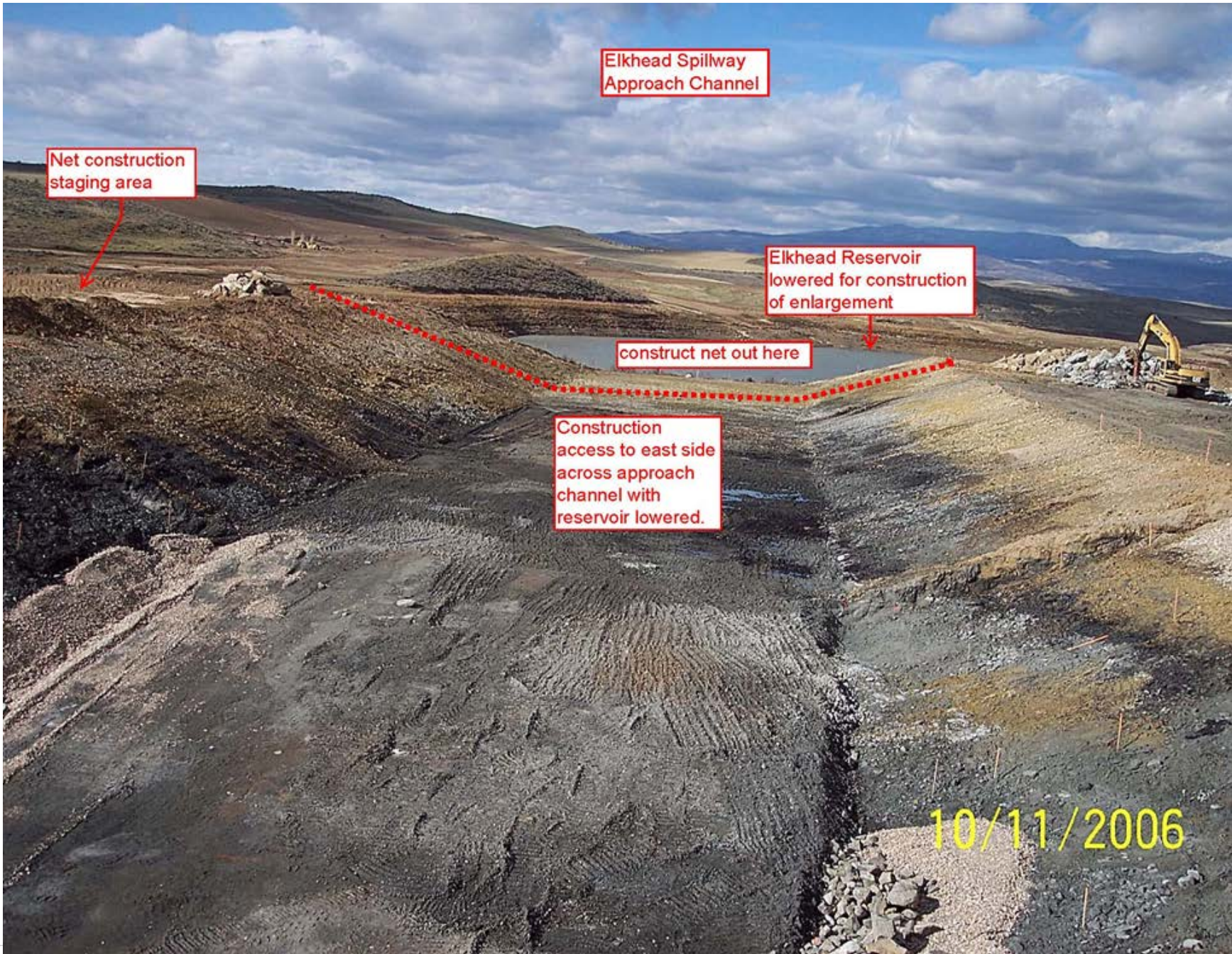
In compliance with NEPA, this Draft EA will be available for public comment for a 30-day period (via Reclamation's website). This Draft EA is being distributed to xxx organizations and xxx private landowners.

REFERENCES

- AECOM 2015. Vensel, Chad. Elkhead Creek Dam – Fish Barrier Hydrologic Impact Assessment. Memorandum. AECOM. October 28, 2015.
- Breton, A. R. et al. Escapement Rates of Translocated Smallmouth Bass (*Micropterus dolomieu*) From Elkhead Reservoir to the Yampa River. April 2013. Accessed on: December 22, 2015. Website at: <http://www.coloradoriverrecovery.org/documents-publications/technical-reports/nna/Project161.pdf>.
- CPW 2015a. Elkhead Reservoir. Colorado Parks and Wildlife. Accessed on: December 9, 2015. Website at: <http://cpw.state.co.us/placestogo/parks/ElkheadReservoir/Pages/default.aspx>.
- CPW 2015b. Final Elkhead Reservoir Lake Management Plan, Third Revision. Colorado Parks and Wildlife. January 6, 2016.
- CRWCD 2015. Elkhead Reservoir. Colorado River Water Conservation District. Accessed on: December 9, 2015. Website at: <http://www.coloradoriverdistrict.org/district-business/elkhead-reservoir-enlargement-project/>.
- EPA 2015. Criteria Pollutant Nonattainment Summary Report. U.S. Environmental Protection Agency. Accessed on: December 9, 2015. Website at: <http://www3.epa.gov/airquality/greenbook/ancl3.html>.
- MACI 2003. Lee, Jennifer Borresen. Elkhead Reservoir: Cultural Resource Inventory of Proposed New Dam Footprint, Expanded Pool, and Coastline. Metcalf Archaeological Consultants, Inc. May 2003.
- Martinez, Patrick et al. Upper Colorado River Basin Nonnative and Invasive Aquatic Species Prevention and Control Strategy. February 2014. Accessed on: December 22, 2015. Website at: http://www.coloradoriverrecovery.org/general-information/program-elements/nna/Basinwide_%20stategy-2015.pdf.
- Reclamation 2015. Warner, Ed (Bureau of Reclamation, Western Colorado Area Office). Letter to: Eric Kuhn (Colorado River Water Conservation District). Subject: Elkhead Reservoir Fish Escapement Net. April 30, 2015.
- UCREFRP 2015. Upper Colorado River Endangered Fish Recovery Program, Program Manager and Non-Native Fish Coordinator. Letter to: Upper Colorado River Endangered Fish Recovery Program Management Committee. Subject: Assignment from January 12, 2015 joint meeting of the MC & BC: “The Program Director’s office next will outline screening in context of the Basinwide Strategy and compile list of tentative projects going forward.” March 17, 2015.

ATTACHMENT B – Proposed Project Plan



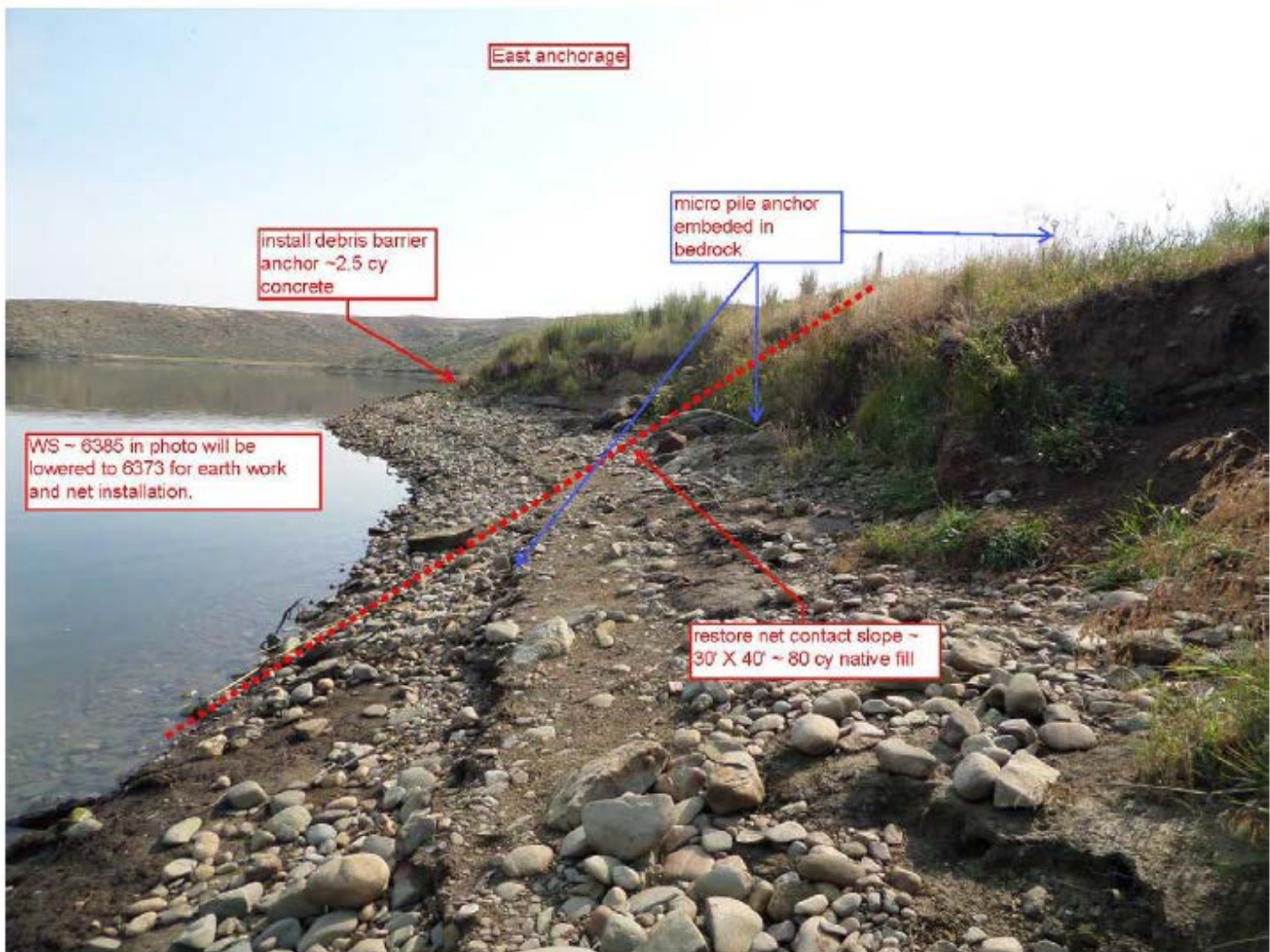


East end

Bank restoration will require approximately 80 cubic yards of native fill be placed in a disturbance area of about 1200 square feet. Approximately 2.5 cubic yards of concrete will be required for the debris barrier anchor in a disturbance area approximately 225 square feet.



This photograph shows an example of a debris barrier anchor. Similar anchors will be constructed at Elkhead Reservoir under the Proposed Action.



West End

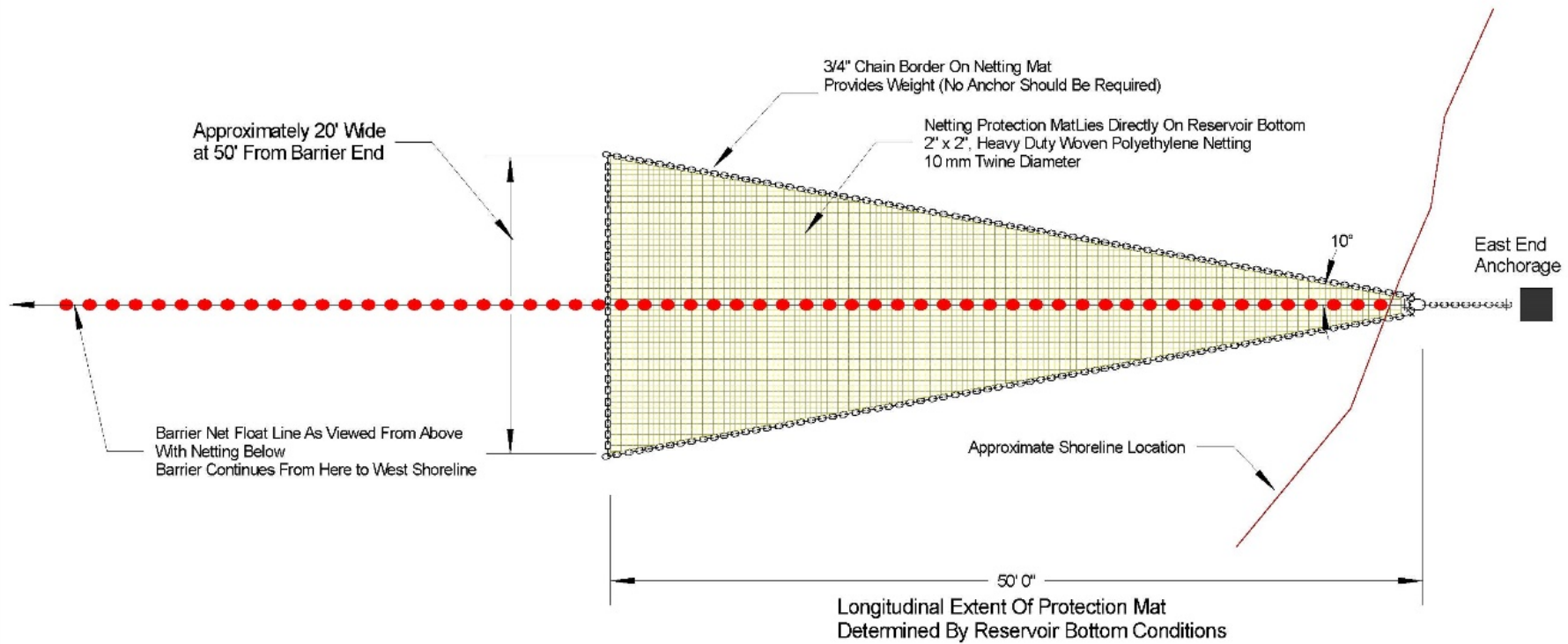
The west end of the planned spillway barrier net lands in an area which has not experienced as much wave erosion as the east end and less shoreline restoration will be required.

A 2.5 cubic yard concrete debris barrier anchor will be required. Minimal grading will be required and a disturbance area of about 15' x 15'.



Shoreline treatment at net ends and bank interface will be a small mesh net panel anchored by weighting with perimeter chains.

Plan View Of Barrier Net With Heavy Duty Netting Protection Net Below



Notes:

- 1) This drawing represents a 50% design level and should not be used for construction
- 2) At lower pool levels netting protection mat will be visible on beach

Pacific Netting Products, Inc.
25993 United Rd NE
Kingston, WA 98346
Tel. 1-888-582-7438

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Colorado River Water Conservation District

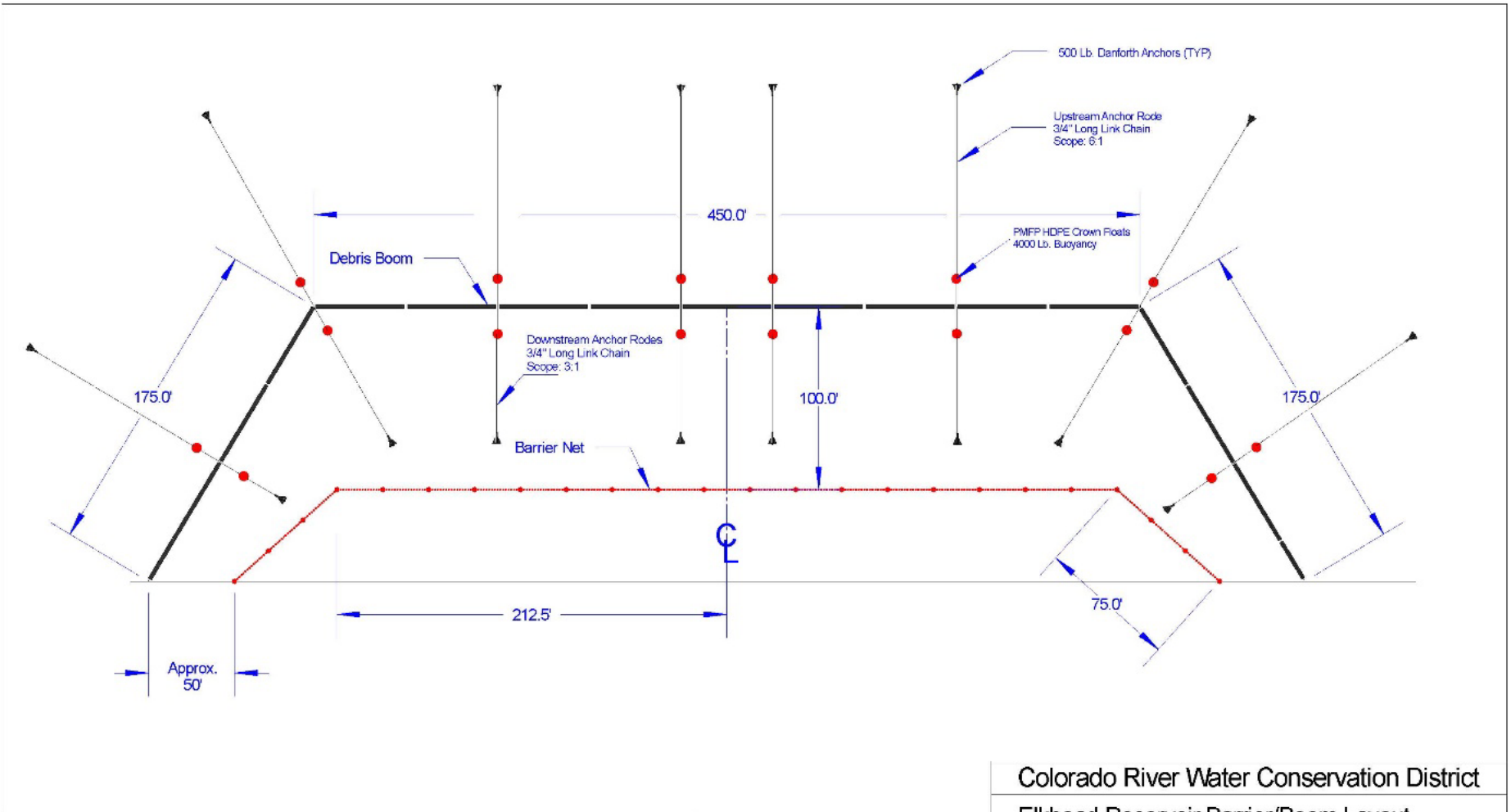
Elkhead Reservoir Barrier Net- Shoreline Net Protection

Approvals

Designer: Glenn Kramer
Project Manager: R. Tenney/ G. Kramer
Project No.

Drawn By: G. Kramer
Checked By: Scale: 1" = 6'
Date Drawn: Sept 18, 2015
Drwg No.: Elkhead Reservoir Fish Barrier
Shoreline Bottom Protection

Anchorage layout



Note:
 This drawing represents a 50% design level
 and should not be used for construction
 Anchor rodes lengths to suit available water depths

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Colorado River Water Conservation District	
Elkhead Reservoir Barrier/Boom Layout	
Approvals	
Designer: Glenn Kramer	Drawn By: G. Kramer
Project Manager: R. Tenney/ G. Kramer	Checked By: _____ Scale: 1" = 50'
Project No.	Date Drawn: Oct 10, 2015
	Drwg No.: Elkhead Reservoir Barrier/Boom Layout

ATTACHMENT C – Letter of Understanding



United States Department of the Interior

BUREAU OF RECLAMATION
Upper Colorado Region
Western Colorado Area Office
445 West Gunnison Avenue, Suite 221
Grand Junction, CO 81501

IN REPLY REFER TO:

WCG-BUilenberg
ENV 3.00

APR 30 2015

Mr. Eric Kuhn
General Manager
Colorado River Water Conservation District
Glenwood Springs, CO 81602

Subject: Elkhead Reservoir Fish Escapement Net

Dear Mr. Kuhn:

The Upper Colorado River Endangered Fish Recovery Program (Program) has identified Elkhead Reservoir as a source of problematic nonnative predatory fish (northern pike and smallmouth bass). These fish are escaping over the reservoir spillway into designated critical habitat, and are impeding efforts to recover the federally listed, endangered Colorado pikeminnow, razorback sucker, humpback chub and bonytail chub. To address this problem, the Program has authorized the U.S. Bureau of Reclamation to provide funding to the Colorado River Water Conservation District (District), to install a net to minimize the escapement of nonnative predatory fish.

The purpose of this letter is to document the following understandings regarding responsibilities for funding, installation, operation, maintenance and replacement of the net and the independent but related reservoir fishery management actions:

- 1) Colorado Parks and Wildlife (CPW) will develop a revised Elkhead Reservoir Lake Management Plan (Plan). The goal of the Plan is to implement fishery management actions that will minimize the number of the most problematic non-native fish (northern pike and smallmouth bass) in the reservoir and, over time, lead to their eradication. The desired end result is to establish a reservoir fishery that is compatible¹ with recovery efforts, and which will eliminate the need to net the spillway. The Plan will be submitted to the Program for review and input prior finalization. To the extent possible, it is the intent of CPW to provide a draft of the Plan to the Program by April 30, 2015.
- 2) The State of Colorado will provide \$500,000 to the District to partially cover the estimated cost of installing the net. The current estimated cost of installing the net is \$880,000. The balance of the installation cost will be provided by Reclamation to the District, on behalf of the Program. The existing Reservoir Enlargement Agreement between the District, Fish and Wildlife Service and Reclamation, will be used as the contracting vehicle to transfer funds to

¹ As defined in: Nonnative Fish ad hoc Committee. 2014. Upper Colorado River Basin Nonnative and Invasive Aquatic Species Prevention and Control Strategy. Upper Colorado River Endangered Fish Recovery Program, Denver, Colorado.

the District. Reclamation's action of providing funding as described herein is contingent on complying with the National Environmental Protection Act, other applicable laws and regulations, and availability of funds. The District will keep the Program, CPW and Reclamation informed of changes in the estimated installation cost as this information becomes available.

- 3) To the extent possible, it is the intent of the District, CPW, Program and Reclamation to install the net in calendar year 2015.
- 4) CPW will provide staff, equipment, supplies and materials to perform the day-to-day operation and maintenance associated with keeping the net operational, up to \$10,000 per year. Operation and maintenance costs exceeding the \$10,000 per year limit will be cost shared equally (50:50) between CPW and the Program, subject to the mutual agreement of CPW and the 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 Program's Implementation Committee for resolution. Resolution will occur in a timely manner, to avoid impacting the safe and prudent operation of Elkhead Reservoir.
- 5) At the end of the useful life cycle of the net, the Program, CPW, District and Reclamation will consult on the need to replace the net, and if needed, who will assume responsibility for installation, operation and maintenance.

This letter represents Reclamation's understanding of the intentions of the Program, CPW, District and Reclamation. Any substantive deviations from these understandings by any of these parties will be communicated to the other parties in writing prior to taking actions that conflict with the intent of this understanding. Nothing contained in this document will be considered precedent setting on future reservoir fish escapement actions taken by the Program.

Sincerely,

Ed Warner
Area Manager

ATTACHMENT D – Draft Final Elkhead Reservoir Lake Management Plan



COLORADO

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December 15, 2015

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RE: Acknowledgement of Review and Comment - Final Elkhead Reservoir Lake Management Plan

Dear Colleagues:

Colorado Parks and Wildlife thanks you for your comments and suggestions which have been of great value during the draft phases of the Elkhead Reservoir Lake Management Plan. We appreciate and have addressed your comments in the final version of the plan and will now consider the plan to be final, and begin to implement the agreed upon actions.

The Colorado Parks and Wildlife Commission approved unanimously the regulation changes described in the plan at their November meeting, and the changes will become effective on April 1, 2016.

Roger Wilson had several concerns that we would like to respond to outside of the LMP document:

1. Our intent for creating a diverse fishing experience is explained in more detail in Section III, B, found on pages 10-11. The only fish species that we would consider stocking into Elkhead Reservoir are confined to the “compatible” species list in Table



- 1 (Appendix C) on pages 19-20 of the LMP. Tiger muskie and wiper are compatible with native fish recovery if all reservoir outlets are screened and are the most likely candidates for introduction when the spillway net installation is completed.
2. We appreciate Utah's work towards the creation of sterile smallmouth bass and look forward to perfection of this worthy but elusive goal.
3. We have reserved chemical reclamation as the ultimate solution to the removal of nonnative fish stocks should the netting and population reduction actions fail to achieve the reduction of escapement.
4. We hope to promulgate angler events and tournaments directed towards the reduction of nonnative reservoir fish stocks. There is no current bounty on northern pike at Elkhead Reservoir and we do not intend to create a bounty system outside of the incentivized angler harvest events and tournaments. The Colorado River Water Conservation District has maintained a successful bounty program on northern pike at Wolford Mountain Reservoir for a number of years and have indicated their desire to continue their program.

Thank you again for your valued cooperation as we move towards achieving endangered fish recovery while providing angling opportunity and incentivized angler harvest of nonnative fish.

Sincerely,



Doug Krieger
Aquatic Section Chief (Acting)

C: Hebein, Crockett

ELKHEAD RESERVOIR

66438

Lake Management Plan

Final and Approved Revision

Colorado Parks and Wildlife

January 6, 2016

Executive Summary:

The goal of the Elkhead Lake Management Plan is to describe fishery management actions in advance of the installation of a spillway net that will prevent fish escapement when the reservoir spills. The plan will also provide the angling public with sport fisheries that are: 1) appropriate to Elkhead Reservoir ecological conditions; 2) suit the needs of the angling public; and 3) do not impact downstream fishery management. To meet these objectives, the Elkhead Reservoir fishery will be managed for largemouth bass, black crappie, and bluegill. Additional angling opportunity will be provided with seasonal stocking of catchable rainbow trout and potential introductions of sterile varieties of compatible fish.

The design and implementation of a spillway net is a critical aspect for successfully meeting these criteria for the fishery. In addition to the new spillway net, new management strategies will focus on reducing the number of smallmouth bass and northern pike in Elkhead Reservoir. Smaller populations of these species will further reduce the likelihood of escapement to the degree that escapement will be unlikely to impact endangered species recovery in the Yampa River or conservation of non-listed native species. Several strategies will be used to reduce the smallmouth bass and northern pike populations. 1) Smallmouth bass collected during Yampa River nonnative removal projects will no longer be translocated to waters within the drainage basin. 2) New fishing regulations will allow unlimited harvest of smallmouth bass and northern pike. 3) Harvest incentive events, such as fishing contests, will be used to increase angler harvest of the undesired species. 4) Mechanical removal will take place opportunistically whenever the fish community is sampled at Elkhead Reservoir.

I. Introduction

Constructed in 1974, Elkhead Reservoir is a main-stem water storage facility on Elkhead Creek, a major tributary to the Yampa River. Elkhead Reservoir supplies water to a variety of interests, including cooling water to the Tri-State Generation and Transmission Association's Craig Power Plant, drinking water to the City of Craig, late season augmentation flows to the Yampa River for endangered species recovery, and a recreational pool for sport fishing and other flat water recreation. Sport fish management at Elkhead Reservoir has undergone many revisions and modifications based on improved understanding of the aquatic environment in the Yampa River basin (CDOW 1994; 2007). This plan details the fisheries

Elkhead Reservoir LMP 2015

Page 1 of 21

management strategies and desired outcomes at Elkhead Reservoir that will result in a desirable, high quality fishery compatible with native fish management and endangered fish recovery in downstream rivers.

This is the third revision of the Elkhead Reservoir Lake Management Plan (LMP). The original LMP was written and approved in 1994 and focused on providing a high quality largemouth bass and smallmouth bass fishery (CDOW 1994). The 2007 revision of the LMP continued to manage the reservoir as a bass fishery, but was revised in response to issues related to endangered species recovery in the Yampa River (CDOW 2007). This third revision further responds to new data and revises reservoir management by addressing and reducing nonnative fish escapement. This will be accomplished with the spillway net installation, modification of species composition by revision of the fish stocking schedule and angling regulations, and by promoting adaptive responses to engage the angling public and to address changing conditions and management expectations.

Management of Elkhead Reservoir:

Water storage and release operations at Elkhead Reservoir are managed for multiple users by the Colorado River Water Conservation District, while CPW manages the fishery, visitor and recreational use through the Elkhead State Park. Varied ownership and uses of water stored in Elkhead Reservoir create unique management issues since reservoir releases support agricultural, industrial, municipal, and species conservation purposes. The original construction allocated 8,310 acre-feet for cooling water for the Craig Station Power Plant and 5,390 acre-feet for a recreational pool.

After a detailed assessment of the potential human demand and the need for flow augmentation in the Yampa River (BBC Research and Consulting 1998), an 11,956 acre-feet storage enlargement was completed in 2006. This enlargement includes storage pools for downstream flow augmentation and future water needs in the Yampa River basin. Downstream flow augmentation is managed with a permanent 5,000 acre-feet pool and a 2,000 acre-feet lease for 20-years.

Elkhead Reservoir is the only public flat-water boating area in Moffat County and is managed as an independent State Park. Elkhead State Park provides a wide array of year-round recreational opportunities including fishing, boating, jet skiing, water skiing, swimming, picnicking, wildlife viewing, hiking, mountain biking, camping, hunting, and bird watching. During a typical year, the park has approximately 123,679 visitors. These visitors provide a strong economic benefit into Moffat and Routt Counties since it is a popular location for outdoor recreation for both the local community and travelers. Elkhead State Park has 15 campsites, accommodating tent camping and recreational vehicles. Elkhead Reservoir has one boat ramp and all trailered boats pass through an Aquatic Nuisance Species check station which inspected 4,323 boats in 2013.

Elkhead Reservoir Release Gates:

Elkhead Reservoir is equipped with a labyrinth weir and spillway capable of conveying discharge of up to 25,000 cfs, a bottom-release gate that is capable of totally draining the reservoir, and a multi-gate tower with upper, mid-level and bottom gate release options. All of the outlet gates are screened with one-quarter inch openings to prevent the escapement of Age 1+ and larger fish from the reservoir, and are fitted with air bubble anti-fouling devices. The bottom release gate is 6 feet in diameter and can carry up to 450 cfs, while the three gates on the tower can release a total of up to 90 cfs. Water is released primarily through the screened outlets and the reservoir is operated to minimize flow over the spillway. Water released from the reservoir flows down Elkhead Creek for approximately eight miles where it merges with the Yampa River.

Fisheries Management:

Management of the aquatic resources in the Yampa River drainage is detailed in the 2010 Yampa River Basin Aquatic Wildlife Management Plan (CDOW 2010). The plan identified management goals for specific species, waters and sub drainages. Elkhead Reservoir is managed as part of the Elkhead Creek (YP-6) Fish Management Unit (FMU) in that plan. The Elkhead Creek FMU encompasses 223 square miles of total area with a mixture of land ownership by private parties, United States Forest Service, Bureau of Land Management, Colorado State Land Board, and Colorado Parks and Wildlife. The area has an elevation range from approximately 6,200 feet at the confluence with the Yampa River to over 10,000 feet. The wide range of elevation allows the FMU to support conservation populations of Colorado River cutthroat trout in coldwater rivers and streams along with cool and warmwater species in Elkhead Reservoir. The Yampa River Basin Aquatic Wildlife Management Plan calls for management of all resources in the FMU for the benefit of both native species and angler recreation (CDOW 2010).

Management of the Yampa River below the confluence with Elkhead Creek is detailed under the plans for the Middle Yampa River (YP-5) and Lower Yampa River (YP-12) FMU's. Both FMU management plans call for exclusive management of the mainstem Yampa River for native species including the endangered species and the non-listed native fish species.

CPW manages Elkhead Reservoir as a cool water fishery that provides angling opportunity for both boat and shore fishing. The species most commonly fished for are smallmouth bass, black crappie, northern pike, largemouth bass, and bluegill. Different species and sizes of trout have been stocked in the reservoir in the past to provide a put and take fishery. Rainbow trout were very poorly represented in standard sampling during most years, suggesting low post-stocking survival. Predation by northern pike is suspected to be a major factor limiting survival and return to creel for catchable rainbow trout. Stocking of catchable-size rainbow trout was discontinued after 2011 due to concerns about the effectiveness of those efforts.

Since the construction of the reservoir in 1974, management goals and actions have changed in response to changing ecological conditions, sampling data, and evolving management objectives. The original Elkhead Reservoir LMP called for managing the reservoir as a largemouth bass and smallmouth bass fishery through the use of restrictive harvest regulations and by stocking fingerling largemouth bass (CDOW 1994).

The Colorado River Water Conservation District completed an enlargement of Elkhead Reservoir in late 2006, and the first revision to the LMP was completed in 2007 to provide for management of the fishery in the enlarged reservoir. The 2007 amendment emphasized primarily smallmouth bass, and secondarily largemouth bass, as the focal species. As detailed in the 2007 LMP, smallmouth bass larger than 10 inches captured during nonnative removal efforts on the Yampa River were translocated into Elkhead Reservoir (CDOW 2007). These translocations used the fish to improve angling opportunity at Elkhead Reservoir. However, CPW recognized that if relocating smallmouth bass interfered with other management objectives, the practice would be re-evaluated. Therefore, the 2007 LMP provided criteria to regularly reassess smallmouth bass (SMB) translocation into the reservoir (CDOW 2007).

CPW tagged all smallmouth bass that were translocated into Elkhead Reservoir and the downstream fish community was monitored for these tagged fish during nonnative fish control and other sampling efforts. Scientists at Colorado State University analyzed the recapture data for tagged fish found downstream of Elkhead Reservoir while the translocations were taking place (Breton et al 2013). They found that smallmouth bass did escape via the unscreened spillway and that repeat escapement was undermining nonnative removal efforts in the Yampa River. A conservative estimate of escapement covering the period prior to reservoir expansion, large water releases during expansion, and immediately following expansion showed that 1,329 (27%) of the 4,934 translocated smallmouth bass from 2003–2009 escaped back into the Yampa River by the end of 2010 (Breton et al. 2013). Estimated escapement rates for cohorts that were translocated in 2006, 2007, 2008 and 2009 were 0.07, 0.23, 0.10, and 0.02 respectively (Breton et al. 2013). These are conservative estimates of total escapement because they do not estimate numbers of unmarked fish (resident smallmouth bass not translocated) escaping. The authors concluded that the escapement was substantial enough to: 1) offset in-river removal of smallmouth bass undertaken to assist endangered fish; and 2) adequate to re-establish a population of smallmouth bass in the river even if the existing riverine population was completely eradicated. In response, they recommended discontinuing the translocation of smallmouth bass and to further minimize or prevent escapement of smallmouth bass from Elkhead Reservoir. CPW discontinued translocation of smallmouth bass into Elkhead Reservoir beginning in 2013.

Escapement of reservoir sport fish has implications for downstream populations of fish inhabiting rivers. CPW manages Elkhead Creek and the Yampa River

downstream of the confluence with Elkhead Creek to the Highway 13 bridge for native fish species including bluehead sucker (*Catostomus discobolus discobolus*), flannelmouth sucker (*Catostomus latipinnis*), Colorado pikeminnow (*Ptychocheilus lucius*), and roundtail chub (*Gila robusta*), along with nonnative brown trout (*Salmo trutta*) and rainbow (*Oncorhynchus mykiss*) as sport fish populations. The State of Colorado considers the roundtail chub a Species of Special Concern. Lastly, the U.S. Fish and Wildlife Service (USFWS) has designated the entirety of Yampa River (and its 100 year floodplain) downstream of Highway 13 as critical habitat for Colorado pikeminnow (*Ptychocheilus lucius*).

Fish community sampling throughout the 1960's and 1970's documented no smallmouth bass in the Yampa River. However, in 1992, Elkhead Reservoir was drained to facilitate reservoir basin mapping for purchase price establishment based on active storage, causing a major introduction of smallmouth bass into the Yampa River that contributed to the establishment of the current riverine population. Fish community sampling in 1992 documented only 49 total smallmouth bass but by 2003 smallmouth bass represented 18% of the fish community in Little Yampa Canyon and 51% by 2007 (Breton et al. 2013). It is believed that major escapement of smallmouth bass from Elkhead Reservoir also occurred during reservoir drawdowns in 1992, 1994, and 2005. In 2003, the Upper Colorado River Endangered Fish Recovery Program (Recovery Program) began nonnative fish control within the Yampa River via mechanical removals. Other warmwater nonnative sportfish, including largemouth bass, black crappie and bluegill, have also escaped the reservoir during the major water releases detailed above; however, conditions in the Yampa are evidently unfavorable for them, and they have not established populations in the river.

Search for solutions to escapement

In order to support the management goals of both the Yampa River and Elkhead Reservoir, CPW and partners needed to halt the escapement of smallmouth bass from Elkhead Reservoir. A working group was formed in June, 2014 to discuss options for addressing smallmouth bass (and concomitantly northern pike) escapement from Elkhead Reservoir. Various methods of fish control were explored with CPW's preference being a complete renovation of the fish community in the reservoir, because of its speed and effectiveness. This process would require drawdown to 1,000 acre-feet storage and treatment of the reservoir and tributary waters with rotenone to eliminate all fish from the remaining water. CPW would have then managed the water as a sport fishery through stocking of species compatible with the goals for the reservoir as well as downstream fisheries management.

Escapement prevention options, including rotenone reclamation, were discussed in a meeting of principals at Tri-State's Craig Generation Station. As discussion continued in additional meetings, and options were more fully addressed, issues surrounding the implementation of a rotenone treatment were expressed by local

stakeholders and the community. CPW carefully considered these issues, such as:

1. The social and economic impacts in Moffat and Routt Counties following a chemical reclamation were more extensive than originally estimated. These impacts included of the reduction in angling recreation for several years following reclamation while the fishery reestablished and stocked fish grew to desirable size. Following recent improvements and additions, Elkhead State Park has become a focal point for family-based year round recreation and that recreational opportunity would be impacted by the chemical reclamation for multiple years.
2. The discovery of smallmouth bass in private portions of the Elkhead Creek drainage 12 to 20 miles upstream from the reservoir in beaver pond habitat identified a factor that makes reclamation more complicated and larger-scale. Ignoring upstream sources of bass creates the possibility that the treatment would need to be repeated every 3 to 5 years due to smallmouth bass recolonization. Repeated rotenone treatment is not a preferred option for managing a long-term fishery, so CPW would need to treat upstream portions for the Elkhead treatment to be successful.
3. Drawing down the reservoir to 1,000 acre-feet of storage while guaranteeing water delivery for uninterrupted Craig Station operation emerged as a greater challenge than was originally anticipated.

The working group then considered other methods to prevent escapement of smallmouth bass and northern pike from Elkhead Reservoir. All parties agreed that if treatment was a last resort option, escapement prevention must include both: 1) population reduction to reduce the number that may escape; and 2) physical barriers options to make it less likely for fish to escape.

After considering all potential physical containment options, netting of the spillway channel was identified as the most feasible and effective physical solution. This decision was largely based on the existing anchoring points set into the reservoir basin during the 2006 reservoir enlargement project. Preliminary cost estimates for net engineering, construction and installation were about \$850,000. The principal parties agreed this was an expensive solution, but decided that a combination of population management and net installation was the prudent first option for escapement prevention.

Therefore, the group agreed to further explore engineering options and funding sources for a possible spillway netting project. However, all agreed that if the net option failed to truly prevent escapement, a rotenone treatment would be needed to accomplish the fundamental objective of escapement prevention. CPW and Colorado Water Conservation Board (CWCB) offered a large amount of Species Conservation Trust Fund dollars toward funding for the net (~\$500,000). The Recovery Program agreed to fund the remainder of the costs (estimated at ~\$350,000) to the project.

All parties consented to several facts concerning the decision to procure and install a spillway net at Elkhead Reservoir:

1. The expected usable life of the net is approximately seven years, as extrapolated from our experience with the Highline Lake net which uses similar materials (Dyneema net fabric).
2. Recovery Program funding is fixed and specified for the first net only.
3. CPW will be responsible for the first \$10,000 of operational and maintenance costs per annum. Expenditures exceeding \$10,000 will be shared on a 50:50 basis with the Recovery Program unless (in the case of extreme damage) the net is deemed unreparable.
4. There is no guarantee of Recovery Program funding for a subsequent net at the end of the first net's life cycle.
5. CPW needs to achieve a substantial reduction in reservoir smallmouth bass populations within the life cycle of the first net.

In regard to statement #5 above, all parties understand that nets are not a perfect solution for escapement prevention because they can rip, be overwhelmed, or become clogged and over top. Therefore, high densities of smallmouth bass and northern pike in Elkhead Reservoir represent an unacceptable risk for downstream fish management. Funding participants agreed that a net should only be installed if substantial population management actions were undertaken to significantly reduce the existing populations of smallmouth bass and northern pike.

Due to the economic and social importance that Elkhead Reservoir provides to the region, the lake will be managed for suitable species that both provide quality angling opportunity and are compatible with downstream fisheries management. Several species, including bluegill, black crappie, and largemouth bass, currently present in the lake will continue to be managed for angler opportunity through regulated harvest and an appropriate stocking strategy. Additional angling opportunity may be provided through stocking of new sterile fish species, and seasonal stocking of catchable rainbow trout.

II. Elkhead Reservoir Fish Stocking and Management History

Elkhead Reservoir is primarily a cool-warmwater fishery that includes smallmouth bass, largemouth bass, northern pike, black crappie, and bluegill. The reservoir was stocked in 1977 with 580 northern pike fingerlings as a biological control measure targeting white sucker. Channel catfish (*Ictalurus punctatus*) were stocked from 1981-1985 with very few, if any, catfish still inhabiting the reservoir. Bluegill were initially stocked in Elkhead Reservoir in 1986 and have maintained a completely naturally reproducing population except for stocking following reservoir enlargement in 2007. Largemouth bass were introduced by the CDOW in 1984 and 1985 and have maintained a small self-sustaining population with no additional stocking. Black crappie were first introduced into Elkhead Reservoir by illicit stocking (they first appeared in

CDOW fishery sampling data in 1989), but were later stocked under the approved 2007 LMP. Smallmouth bass were illicitly introduced into Elkhead in the late 1970's or early 1980's as they were documented during the first CDOW fishery sampling in 1982.

Elkhead Reservoir currently provides fishing for northern pike, largemouth bass, smallmouth bass, black crappie and bluegill. Rainbow trout, of various strains and sizes, have been stocked in the past but their performance has always been poor. Following reservoir enlargement, from 2007 through 2010, 10,000 catchable sized (≥ 10 inch) rainbow trout were stocked annually. Rainbow trout have not been stocked in Elkhead Reservoir since 2011 due to a low return to creel caused by high levels of northern pike predation and limited habitat suitability.

A. Management categories and physical parameters:

1. Management category – 505 (Coldwater subcatchable and catchable lakes > 500 acres). Category 510 may be applicable (warm water mixed stocking lakes > 500 acres)
2. Water Code: 66438.
3. Location – 8 miles NE of Craig; T7N, R89W, Sec. 16.
4. Drainage – Elkhead Creek, Yampa River.
5. Size – 718 surface acres.
6. Maximum depth – 84 feet.
7. Elevation – 6,388 feet.
8. Volume – 24,778 acre feet

B. Physical Description: Elkhead Reservoir is a large main-stem impoundment situated on Elkhead Creek, a tributary to the Yampa River upstream from the City of Craig (Figure 1).

C. Existing fish community (as of 2015): Based on the most recent sampling efforts, northern pike, largemouth bass, smallmouth bass, black crappie, bluegill, white sucker, speckled dace, fathead minnow, and sand shiner are all present in the reservoir. A single, large, channel catfish (681 mm) was collected during the 2013 standard sampling. This is the only catfish sampled in the reservoir since 2007. Such a large fish is likely a rare remnant of either stocking or past recruitment in the reservoir. Rainbow trout were last sampled in 2011, however that survey took place one week following stocking of catchable trout. No trout have been either stocked or sampled since that time. Native fishes including roundtail chub, flannelmouth sucker, and bluehead sucker were sampled in the reservoir as recently as 2001, but are not currently considered viable components of the assemblage.

D. Current use of the sport fishery: Significant angling pressure exists at the reservoir, with the majority of anglers fishing from boats. The most

popular species among anglers are smallmouth bass, black crappie, northern pike, and bluegill. The highest quality habitat for those species is at the north end of the reservoir near the inlet. Boating regulations at Elkhead State Park require only wakeless speeds north of Cottonwood Cove which helps preserve fishing opportunity during periods of heavy use by other recreational boaters. Shore fishing is largely restricted by limited foot or vehicle access to the inlet area. Additional information regarding the current and future angler use of the reservoir will be collected using creel census techniques.

III. Management strategies

CPW will initially manage Elkhead Reservoir as a largemouth bass / black crappie / bluegill fishery, along with a seasonal put and take rainbow trout fishery. CPW will manage against the existing populations of smallmouth bass and northern pike to limit these species' impacts on the preferred species and to limit their escapement into downstream habitats. Following the design and installation of a functional spillway net, plans will be made to expand recreational angling opportunity through stocking of new sterile varieties of sport fish. The primary means of assessing the sportfish populations in Elkhead reservoir will be to use relative weight (W_r) and the proportional stock density (PSD) for each species. The relative weight measures the condition of the individual fish in a population by comparing the measured weight against a previously-calculated standard weight. Higher W_r values are indicative of higher quality fish, with a value of 100 being equal to the standard and values above and below representing high and low quality fish, respectively. The proportional stock density (PSD) quantifies the size distribution of the population by comparing aggregate measured lengths against a "preferred length" as well as a "stock length". The PSD values generated gauge the relative abundance of larger and smaller fish in the population. Generally, a value somewhere between 30 and 70 will indicate a balanced population with both larger and smaller fish present, in sufficient numbers.

- A. Manage as a largemouth bass / black crappie / bluegill fishery using stocking and harvest restrictions as necessary. Largemouth bass, black crappie, and bluegill are included on the current Recovery Program "compatible" list (Martinez et al 2014, Table C-1) of "non-native aquatic species compatible with recovery and preservation of endangered native, non-salmonid aquatic species within critical habitat of the upper Colorado River basin (UCRB)" (USFWS 2009).
 - 1. Largemouth bass are a desirable component of the sport fishery in Elkhead Reservoir because they maintain a higher body condition, grow larger than smallmouth bass, and are compatible with downstream endangered species recovery. It is hoped that the continued presence of the species will keep angler satisfaction high while the population of smallmouth bass decreases. The existing

largemouth bass population originated from stocking in 1984 and 1985, and has maintained itself, at a low density, without additional stocking. CPW will retain the current bag limit of two largemouth bass longer than 15 inches to restrict harvest. The largemouth bass population will be monitored to evaluate the effects of smallmouth bass and northern pike population reduction in the reservoir. The need for supplemental stocking in order to provide sufficient angler catch rates will be determined as smallmouth bass numbers are reduced. In order to prevent accidental harvest of largemouth bass, informational signs will be developed and installed to help anglers differentiate largemouth bass from smallmouth bass, which will be subjected to unlimited harvest and new harvest incentives. The population goals for the largemouth bass population will be a Wr of at least 90 and a PSD (RSD-12 inches) range of 40-70. A PSD larger than 80 would indicate a population composed mostly of larger fish that could be experiencing recruitment failure, a cause for concern if found across two successive years.

2. Black crappie and bluegill provide both a sport fishery and forage base for largemouth bass. Harvest at Elkhead reservoir will be subject to harvest limits of 10 black crappie and 20 bluegill. The black crappie harvest regulation is water-specific and differs from statewide black crappie harvest regulations. Hatchery-reared black crappie and bluegill will be stocked, as needed, to maintain viable populations for sport fishing. The fishery parameter goals for the black crappie population will be a Wr above 85 and a PSD (RSD-8 inches) of not less than 10. The same parameters for the bluegill population will be a Wr above 90 and a PSD (RSD-6 inches) of not less than 20. Stocking of either or both species will be considered if PSD values exceed 70 for two successive years. Stocking of either or both species will also be considered to provide forage in case the Wr values drop below 85 for smallmouth bass and 90 for largemouth bass.

4. Stocking strategy: stock largemouth bass, black crappie, and bluegill as needed and based on availability from the State hatchery system. Reinstate seasonal stocking of catchable rainbow trout following effective reduction of the northern pike population. Do not stock when the reservoir is spilling, or likely to start spilling, and do not stock at the dam. Marking of the stocked warm water fish by fin mutilation is problematic as fin regeneration is likely, the small size of stocked fingerlings would reduce the rate of Floy tag retention, and any marking of large numbers of fish stocked is unlikely to be cost effective.

- B. Assess the need and benefits to be gained from stocking additional varieties of sport fish that are either compatible with the recovery of

endangered fish, (see table 1), are produced by a method rendering them 100% sterile, or are intrinsically sterile hybrids.

It is the intention of CPW to provide the highest quality and most diverse fishing experience possible at Elkhead Reservoir. Following the successful implementation of a spillway net, CPW will be allowed to stock species compatible with endangered species recovery as well as sterile piscivorous fishes into the reservoir. Additional species that may be stocked following spillway screening include tiger musky (northern pike × muskellunge hybrid), wipers (white bass × striped bass hybrid) and sterile triploid walleye. Although these species are considered suitable for stocking following spillway screening, CPW will ultimately decide the optimum combination of species that will provide a high-quality, cost-effective, and sustainable fishery.

Given a potential spillway net life cycle of approximately seven years, CPW must decide how to manage introduced fish species when the net fails or is being replaced. There is no guarantee that external funding will be available for net replacement into the future, either for the second or subsequent nets. The potential suite of options for a catastrophic net failure or inability to secure funding for a second net are limited to managing water releases to limit spillway use during runoff or applying rotenone to remove all fish species from the reservoir. Colonization of upstream reaches by introduced fish species is possible and would contribute to existing nonnative populations, decreasing the long term efficacy of chemical reclamation.

- C. Provide seasonal rainbow trout fishing opportunities. CPW wishes to provide a “put and take” fishery that supports shoreline anglers, boating anglers, and ice-fishing anglers. Whirling disease free rainbow trout provide this opportunity at a reasonable cost for CPW hatcheries. To meet these goals, CPW will undertake the following management actions:
1. Stock only whirling disease negative trout.
 2. Stock at least 10,000 catchable-sized trout annually for “put-and-take” fishing. Stock one half of the fish in late June, after runoff and when the reservoir water is less turbid, to provide summer fishing opportunity. Stock the other half in late September to provide autumn and winter fishing.
 3. Periodically evaluate the stocking rate, timing of plants and the harvest rates of trout by standard lake inventory methods, surveys, and protocols. All salmonid species, including rainbow trout, are considered compatible with endangered species recovery.

- D. Manage against northern pike and smallmouth bass. In order for the preceding stocking goals to be effective, and in order to limit escapement into downstream habitats, CPW will pursue actions and regulations to increase harvest of smallmouth bass and northern pike with the goal of causing a substantial population decline. For example, stocking of rainbow trout under the current conditions at Elkhead Reservoir is ineffective because the stocked fish are consumed by pike before they contribute to angler harvest. Similarly, any stocked largemouth bass, bluegill, and black crappie will be potential pike forage as well. Reducing the northern pike and smallmouth bass populations will reduce interspecific competition and will open up habitat and resources for preferred species. In order to reduce the smallmouth bass and northern pike populations, CPW will undertake the following management actions:
1. Eliminate bag and possession limits on smallmouth bass at Elkhead Reservoir and preserve the existing unlimited bag and possession limits on northern pike.
 2. End all population supplementation for northern pike and smallmouth bass. Smallmouth bass translocations into Elkhead Reservoir were discontinued in 2013. No stocking or translocation of northern pike or smallmouth bass will take place at Elkhead Reservoir in the future. Public education, outreach, inspection of live wells on incoming boats, and enforcement of existing regulations will be used to prevent illegal stocking of those species.
 3. Implement education and incentive programs to promote harvest of northern pike and smallmouth bass. Angling contests and tournaments provide anglers with prizes for successful participation. These events draw large public interest and can be structured in ways that promote harvest of multiple age classes of the target species. These events attract visitors from outside the region and even from other states. By establishing and promoting these events, CPW can increase the benefits of angling to the economies of Moffat and Routt counties. CPW has hosted contests at other reservoirs in the Colorado River Basin and had great success using them as removal and control efforts for undesirable species. This experience will be invaluable when implementing new efforts at Elkhead Reservoir.
- E. Tentative management actions. Additional actions may be necessary to adequately manage the resources at Elkhead Reservoir. Data collected during annual sampling, harvest incentive tournaments, creel surveys, Yampa River nonnative control projects, and other sampling will be used to guide future management actions through decisions guided by adaptive management practices.

1. Fisheries inventory work will be conducted annually to determine composition of the fish community. Upon evaluation of incentivized angler removal efforts, additional sampling at ice off may take place targeting northern pike staging for the spawn. If this sampling is deemed necessary, all pike taken will be lethally removed. Northern portions of the lake including the inlet area will be targeted initially until experience can guide future sampling locations.
2. Opportunistically remove smallmouth bass and northern pike. Except as detailed below, all northern pike and smallmouth bass collected during all sampling efforts will be lethally removed. Current monitoring efforts include standardized sampling at established electrofishing and gill net stations. A small subset of smallmouth bass will be marked annually with Floy tags for a mark-recapture population estimate. An even smaller number, approximately 10, will be marked with passive integrated transponder (PIT) tags. Bass marked with PIT tags will be used during incentive tournaments, where anglers who catch one of them will receive a special prize. Tournament rules and operating procedures will be developed outside of this LMP.
3. Evaluate abundance and escapement of northern pike and smallmouth bass in Elkhead Reservoir. The catch per unit effort in standardized sampling efforts as well as mark-recapture population estimates will provide insight into the population size and abundance of northern pike and smallmouth bass in the reservoir. If the estimated population size and catch rates do not decrease sufficiently to indicate a substantial reduction in the population, additional incentive programs and other mechanical removal methods may be considered at the discretion of CPW biologists.
4. Evaluate the effectiveness of the spillway net. Sampling will take place post-reservoir spilling to detect escapement through the spillway net. If escapement is detected, the spillway net will be inspected and repaired as needed.

IV. Stocking purpose and need

A. Rationale/justification for species selection

1. Maintain or increase angler participation and satisfaction.
2. Implement the Aquatic Wildlife Management Plan for the Yampa River Basin as it pertains to the following Fish Management Units: Middle Yampa River YP-5, Elkhead Creek YP-6, and Lower Yampa River YP-12 (CDOW 2010).

3. Reduce the numbers and abundance of piscivorous nonnative fish species in the Yampa River to support recovery of endangered species and to conserve non-listed native fishes.
4. Habitat in Elkhead Reservoir is better suited for warmwater sportfish than coldwater sportfish. Trout growth and survival is poor in the reservoir. Despite these limitations, a quality trout fishery can be provided by stocking catchable (≥ 10 inches) rainbow trout. The stocking target for rainbow trout is 10,000 fish annually.
5. Help meet local and regional demand for warmwater fishing opportunities, especially largemouth bass, bluegill and black crappie.
6. Increase angler opportunity through stocking of new species in the reservoir. Following successful implantation of the spillway net, the reservoir will be capable of hosting new species of sterile fish that are compatible with the recovery of downstream endangered fish and cannot be found elsewhere in northwestern Colorado.

B. Species, number, and dates

1. Stock black crappie and bluegill in late summer or early autumn, as needed, to maintain forage and sport populations.
2. Stock largemouth bass in late summer, as needed, to maintain populations based on quality criteria defined above, under the conditions as noted.
3. Trout – stock at least 10,000 catchable sized rainbow trout annually, in late spring and autumn to provide coldwater fishing opportunities and to supplement overall angler catch rates.
4. Stocking of new sterile varieties of fish will take place in late summer or early autumn, after the possibility of the reservoir spilling has ended. The exact schedule of stocking will be determined by the production cycle for each variety and biological considerations for the species selected.

V. Escapement factors

- A. Escapement potential** – Elkhead Reservoir releases water to Elkhead Creek and the Yampa River. Reservoir discharges will be managed to release water (up to 540 cfs) primarily through the two screened bottom-release gates and reduce the frequency and duration of water releases over the spillway. Use of the reservoir spillway has been documented to

facilitate fish escapement from Elkhead Reservoir to Elkhead Creek and subsequently the Yampa River (Breton et al. 2013). Installation of the spillway net is expected to reduce escapement to very low levels. Reducing the population sizes of smallmouth bass and northern pike populations within the reservoir will reduce the potential for escapement to the point that it will no longer substantially contribute to nonnative populations in the Yampa River.

B. Survival potential following escapement

1. The survival and reproduction potential for largemouth bass, black crappie, and bluegill in the Yampa River appears poor. These species have been able to escape from Elkhead Reservoir, yet they are rarely encountered in sampling in the Yampa River. During the Interagency Standardized Monitoring Program sympatric fish species sampling in the Yampa River from 1995-2000, only two black crappie were collected and no largemouth bass or bluegill. These species are primarily lacustrine fish and the environment of the Yampa River is likely too harsh for them to survive or reproduce.
2. The survival and reproduction potential for smallmouth bass in the Yampa River is good. Smallmouth bass are presently established in the Yampa River in substantial densities. In environmentally suitable years, smallmouth bass can produce large year classes that dominate the size structure for many years. Success of smallmouth bass spawning is linked to lower flow, warm water years such as 2007 and 2012.
3. The survival and reproduction potential for northern pike in the Yampa River is good. High densities of northern pike are found in many miles of the Yampa River. Northern pike are able to reproduce successfully in most years in the Yampa River, creating year classes that persist many years.
4. The survival potential for trout in warm water stretches of the Yampa River, which is designated critical habitat for endangered fish species, appears to be poor. Few trout are ever encountered in this downstream portion of the Yampa River, below Craig, which is largely unsuitable as trout habitat.

VI. Impact to endangered species

A. Impact

1. Largemouth bass, black crappie, bluegill, and eggs and larvae of these species are expected to have little or no survival in the river.

The impact to endangered fish are minimal based on historic and current sampling evidence.

2. Salmonid species are not expected to establish and maintain populations in the Yampa River below the confluence with Elkhead Creek. Rainbow trout are not highly piscivorous and, even in the unlikely event of escapement, they are not likely to impact the recovery of endangered species.
3. Stocking of sterile varieties of sport fish allows increased opportunity for anglers, while limiting potential impacts to native fishes downstream of the reservoir. When combined with effective barriers on dam outlets and spillways, the impact from these introductions is expected to be negligible.

B. Measures to remedy an impact, including feasibility

1. Design and implement a barrier net across the spillway channel that is designed to prevent escapement at multiple life stages. Insure the effectiveness of the barrier with periodic inspections to detect tears or other defects in the net. Sampling in the stilling basin will take place on the descending limb of reservoir spilling. The sampling will detect fish escaping the reservoir, possibly indicating failure of the spillway net. The sampling will be designed to differentiate escapement from the reservoir from upstream movement from Elkhead Creek.
2. The species proposed for stocking are unlikely to be capable of reproducing outside of the reservoir either in the Yampa River or Elkhead Creek. If escapement of any stocked species is detected during spilling, additional stocking will be halted until the spillway net is inspected and evaluated for effectiveness.
3. Reduce smallmouth bass and northern pike populations in Elkhead Reservoir through angler outreach, unlimited harvest regulations, harvest incentive events and opportunistic removal during existing sampling efforts.

VII. Approvals

- A. _____ Date
Northwest Region Senior Aquatic Biologist
- B. _____ Date
State Aquatic Wildlife Manager (Acting)

Literature Cited

Breton, A. R., J. A. Hawkins, K. R. Bestgen, D. L. Winkelman, and G. C. White. 2013. Escapement rates of translocated smallmouth bass (*Micropterus dolomieu*) from Elkhead Reservoir to the Yampa River. Final report to the Upper Colorado River Endangered Fish Recovery Program, Denver, Colorado. Larval Fish Laboratory Contribution 168.

BBC Research and Consulting. 1998. Yampa Valley Water Demand Study. Report prepared for the Upper Colorado River Endangered Fish Recovery Program, Yampa Fish Recovery and Water Management Plan, and the Yampa River Project Management Team. 111 pages.

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Martinez, P., K. Wilson, P. Cavalli, H. Crockett, D. Speas, M. Trammell, B. Albrecht, and D. Ryden. 2014. Upper Colorado River Basin Nonnative and Invasive Aquatic Species Prevention and Control Strategy. Nonnative Fish *ad hoc* Committee. Upper Colorado River Endangered Fish Recovery Program, Denver, Colorado. 125 pages.

U.S. Fish and Wildlife Service. 2009, revised. Procedures for stocking nonnative fish species in the Upper Colorado River Basin. Upper Colorado River Endangered Fish Recovery Program, Denver, Colorado. 15 pages.

Tables

Table 1. Fish species that are compatible or non-compatible with the recovery of endangered fish in the Upper Colorado River Basin. Appendix C. *Adapted From: Martinez et al 2014.*

APPENDIX C

**Lists of Nonnative Aquatic and Riparian Species
that are Considered Compatible or Non-Compatible with Endangered Fish
Recovery in the Upper Colorado River Basin
(Revised May 2015)**

Table C-1. Lists of nonnative aquatic species' compatibility with the recovery and preservation of endangered and native aquatic species within critical habitat of the upper Colorado River basin (UCRB). Judicious management of compatible species must conform to Stocking Procedures signed by the upper basin States of Utah, Colorado, and Wyoming, and the U.S. Fish and Wildlife Service in 2009 (USFWS 2009). These stocking procedures prohibit stocking any nonnative species directly into riverine critical habitat and require that non-salmonid species be managed in isolated or screened ponds or reservoirs to prevent or control their escapement into critical habitat. Non-compatible species should not be further introduced or stocked into any waters in the UCRB. All nonnative species not listed here are initially classified as non-compatible but may be considered on a case by case basis.

Compatible List	Non-Compatible List
Fish	
Salmonids, including, but not limited to:	Smallmouth bass [^] <i>Micropterus dolomieu</i>
Brown trout <i>Salmo trutta</i>	Northern pike <i>Esox lucius</i>
Lake trout <i>Salvelinus namaycush</i>	Walleye <i>Sander vitreus</i>
Arctic char <i>Salvelinus alpinus</i>	White sucker <i>Catostomus commersoni</i>
Brook trout <i>Salvelinus fontinalis</i>	Red shiner <i>Cyprinella lutrensis</i>
Rainbow trout <i>Oncorhynchus mykiss</i>	Burbot <i>Lota lota</i>
Cutthroat trout <i>Oncorhynchus clarkii</i>	Catfish species, including, but not limited to:
Kokanee <i>Oncorhynchus nerka</i>	Channel catfish [^] <i>Ictalurus punctatus</i>
& Arctic grayling <i>Thymallus arcticus</i>	Blue catfish <i>Ictalurus furcatus</i>
Bluegill <i>Lepomis macrochirus</i>	Flathead catfish <i>Pylodictis olivaris</i>
Black crappie <i>Pomoxis nigromaculatus</i>	Black bullhead <i>Ameiurus melas</i>
Largemouth bass <i>Micropterus salmoides</i>	Yellow bullhead <i>Ameiurus natalis</i>
Yellow perch <i>Perca flavescens</i>	
Triploid grass carp <i>Ctenopharyngodon idella</i>	
Fathead minnow <i>Pimephales promelas</i>	
Tiger muskie* <i>Esox masquinongy</i> x <i>E. lucius</i>	
Wiper* <i>Morone saxatilis</i> x <i>M. chrysops</i>	
(Hybrid Striped bass)	
Sterile Walleye* <i>Sander vitreus</i>	
(100% triploidy)	
* In order to be considered compatible, the stocking of sterile predators requires appropriate escapement prevention, such as outlet screens or spillway nets	[^] May be stocked in waters above Flaming Gorge Dam
Compatible List	Non-Compatible List
Crustaceans	
	All crayfish species
	Anchor Worm <i>Lerneia cyprinacea</i>
Molluscs	
	Quagga and Zebra mussel <i>Drissena</i> spp.
	New Zealand mud snail <i>Potamopyrgus antipodarum</i>
Cestodes	
	Asian tapeworm <i>Bothriocephalus acheilognathi</i>

Plants	
Tamarisk	<i>Tamarix</i> spp.
Russian olive	<i>Elaeagnus angustifolia</i>
Didymo	<i>Didymosphenia geminata</i>
Eurasian watermilfoil	<i>Myriophyllum spicatum</i>

Figures

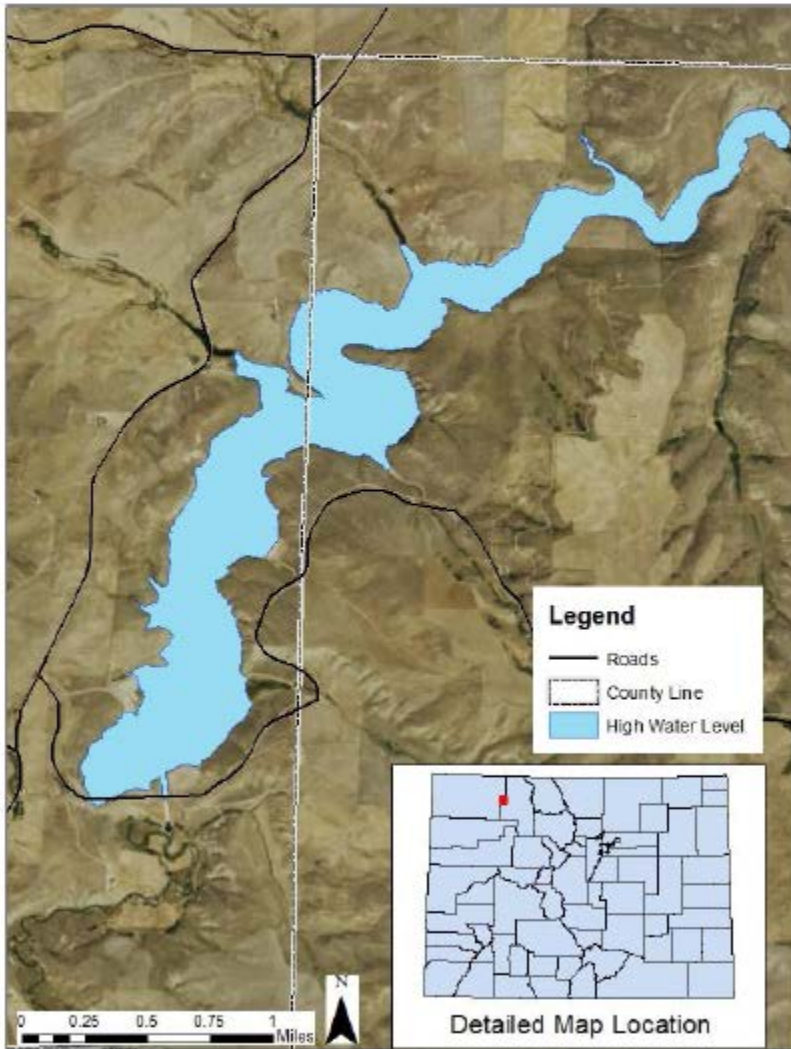
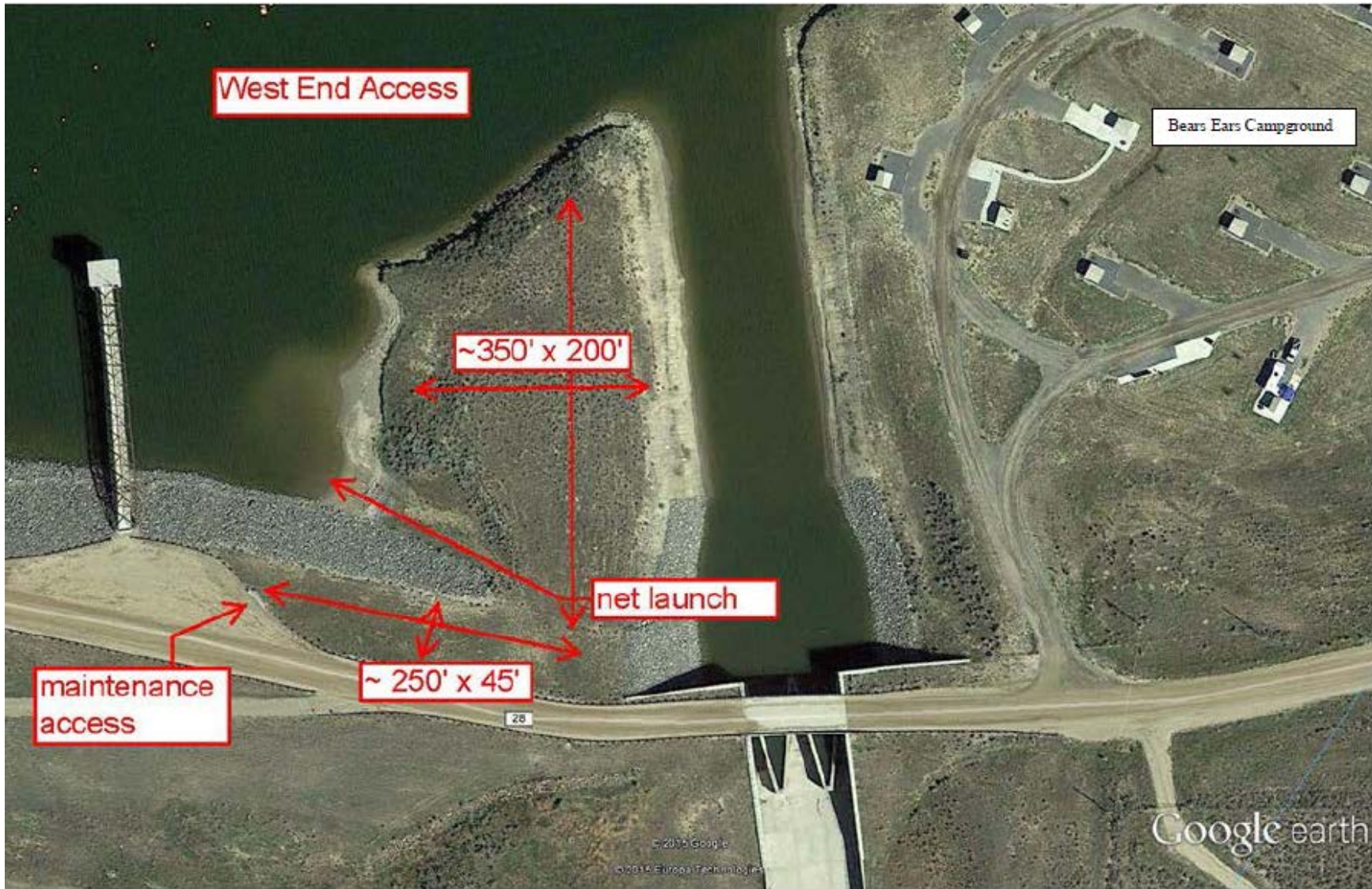


Figure 1. Elkhead Reservoir at full pool showing County roads and county boundaries.

ATTACHMENT E – Recreational Exclusion Area Changes



ATTACHMENT F – Access to the West End of the Project Area



Google earth



ATTACHMENT G – Fish and Wildlife Service Concurrence



United States Department of the Interior

BUREAU OF RECLAMATION
Upper Colorado Region
Western Colorado Area Office
445 West Gunnison Avenue, Suite 221
Grand Junction, CO 81501

U.S. FISH AND WILDLIFE SERVICE
[] NO CONCERNS
[X] CONCUR NOT LIKELY TO ADVERSELY AFFECT
[] NO COMMENT
Kurt H. Broderdorp 12/31/15
WESTERN COLORADO SUPERVISOR (DATE)

IN REPLY REFER TO:

WCG-LMcWhirter
ENV-3.00

NOV 25 2015

MEMORANDUM For

To: Ann Timberman, Western Colorado Supervisor, Ecological Services, Fish and Wildlife Service, Grand Junction, Colorado
From: Ed Warner, Area Manager, Western Colorado Area Office, Bureau of Reclamation, Grand Junction, Colorado
Subject: Informal Section 7 Consultation for Elkhead Reservoir Fish Barrier Net Project, Moffat County, Colorado

The Bureau of Reclamation (Reclamation) is requesting consultation pursuant to Section 7 of the Endangered Species Act for a nonnative fish barrier net project. Reclamation, on behalf of the Upper Colorado River Endangered Fish Recovery Program (UCRIP), is providing partial funding to the Colorado River Water Conservation District (District) for installation of a net to minimize the escapement of nonnative predatory fish over the Elkhead Reservoir spillway into Elkhead Creek and the Yampa River. Lesley McWhirter discussed the proposed project with Kurt Broderdorp on April 17, 2015.

The proposed project is located in the vicinity of the spillway in Elkhead Reservoir, Moffat County, Colorado. The proposed action includes the installation of a 575-foot long by 25-foot high barrier net made of 1/4-inch mesh to contain gamefish in Elkhead Reservoir during spillway operation. The net will be anchored to micropiles which were installed in the shoreline of Elkhead Reservoir as part of the 2005 Elkhead Reservoir Enlargement Project. Shoreline contact areas which have been eroded by wave action will be restored to allow the net to fit the previously installed anchors. To protect the barrier net from floating debris, an 800-foot long floating debris barrier will be installed in the reservoir upstream of the net. The debris barrier net will require the installation of new concrete anchors at both ends, as well as steel boat anchors along its length. A project location map, aerial photos and descriptions of the project elements, and project area photographs are enclosed.

Portions of the Yampa River downstream of Elkhead Reservoir are designated critical habitat for the Federally endangered Colorado pikeminnow (Ptychocheilus lucius), razorback sucker (Xyrauchen texanus), humpback chub (Gila cypha), and bonytail chub (Gila elegans). Nonnative game fish in Elkhead Reservoir include small mouth bass and northern pike, species which have been demonstrated to compete with and prey on the Federally endangered fishes in the Yampa River. Research has shown escape of these nonnative game fish from Elkhead Reservoir diminishes the efforts of the UCRIP to achieve recovery goals for the listed fishes. The UCRIP has identified Elkhead Reservoir as a high priority site for installation of a fish escapement net.

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Grand Junction, CO

Controlling escapement of nonnative fishes from Elkhead Reservoir is one of the proposed actions analyzed and covered under the Yampa River Programmatic Biological Opinion, ES/GJ-6-C0-04-F-O12 (PBO). Reasonable and Prudent Measure No. 4 of the PBO states that the Recovery Program will continue efforts to minimize the impacts of nonnative fishes on the four listed fish species. As part of the Elkhead Reservoir expansion project evaluated in the PBO, all reservoir outlets have already been screened to minimize escapement of nonnative fishes from the reservoir, and anchors for the fish barrier net were installed when the reservoir was drawn down during construction of the 2006 reservoir expansion project. The potential future installation of a net at Elkhead Reservoir to control escapement of nonnative fishes is specifically acknowledged and described in several locations in the PBO (including pages 14, 58, and 61). Future installation of a net was to be based on results of monitoring of escapement of fish from the spillway. Since that time, the UCRIP has determined that installation of the spillway net at Elkhead Reservoir is prudent to control the escapement of nonnative fish into the Yampa River.

The Service determined in the PBO that the effect of implementation of the recovery actions will be an increase in the populations of all four species of endangered fish. The PBO identified implementation of nonnative fish management to reduce competition and predation with endangered fishes as one of the beneficial effects of the proposed action. Pursuant to the PBO, individual Section 7 consultation is required on all future specific Federal actions, pursuant to the Endangered Species Act, to determine if they fit under the umbrella of this PBO.

Based on the above information, the proposed action may affect and is not likely to adversely affect the Colorado pikeminnow, razorback sucker, bonytail chub, or humpback chub. The installation, operation and maintenance of a fish barrier net will further reduce any take of the four endangered fish species from nonnative fish predation, thereby having a wholly beneficial effect on the listed fish species. There will be no effect on the fishes' critical habitat because the project is not located within designated critical habitat. The project will have no effect on any other federally listed species or designated critical habitat.

We request the Service's concurrence that the proposed action may affect and is not likely to adversely affect the Colorado pikeminnow, razorback sucker, bonytail chub, or humpback chub. Please feel free to contact Lesley McWhirter at 970-248-0608 or by email at lmcwhirter@usbr.gov if you have any questions.

Attachment