RECLAMATION
Managing Water in the West

Environmental Assessment

Green River Canal Fish Screen Project

Western Colorado Area Office
Upper Colorado Region

July 2018

Mission Statements

The mission of the Department of the Interior is to protect and manage the Nation's natural resources and cultural heritage; provide scientific and other information about those resources; and honor its trust responsibilities or special commitments to American Indians, Alaska Natives, and affiliated island communities.

The mission of the Bureau of Reclamation is to manage, develop, and protect water and related resources in an environmentally and economically sound manner in the interest of the American public.

FINDING OF NO SIGNIFICANT IMPACT

United States Department of the Interior
Bureau of Reclamation
Western Colorado Area Office
Grand Junction, Colorado

Green River Canal Fish Screen Project

Introduction

In compliance with the National Environmental Policy Act of 1969, as amended (NEPA), the Bureau of Reclamation (Reclamation) has conducted an environmental assessment (EA) for the proposed action of authorizing the use of Federal funds to construct a fish screen on the Green River Canal Company's (GRCC) Green River Canal. At the direction and under the legislative authority of the Upper Colorado Recovery Implementation Program (UCRIP), Reclamation will provide appropriated funding for construction of the Green River Canal Fish Screen, and is therefore the lead agency for purposes of compliance with the NEPA for this proposed action.

The EA was prepared by Reclamation to address the potential impacts to the human environment due to implementation of the proposed action. The EA is attached to this Finding of No Significant Impact (FONSI) and is incorporated by reference.

Alternatives

The EA described and analyzed the No Action Alternative and the Proposed Action Alternative to fund the Green River Canal Fish Screen Project. The Proposed Action Alternative is fully described in the EA.

Decision and Finding of No Significant Impact

Based upon a review of the EA and supporting documents, Reclamation has determined that implementing the proposed action will not significantly affect the quality of the human environment, individually or cumulatively with other actions in the area. No environmental effects meet the definition of significance in context or intensity as defined at 40 CFR 1508.27. Therefore, an environmental impact statement is not required for this proposed action. This finding is based on consideration of the context and intensity as summarized in the EA. Reclamation's decision is to implement the Proposed Action Alternative.

Context

The project is located in Emery County, Utah. The affected locality is the Green River Canal and the Green River adjacent to the project area. Affected interests include Reclamation, the UCRIP, the GRCC, GRCC shareholders, and adjacent landowners.

Intensity

The following discussion is organized around the 10 significance criteria described in 40 CFR 1508.27. These criteria were incorporated into the resource analyses and issues described in the EA.

1. **Impacts may be both beneficial and adverse.** The proposed action would impact resources as described in the EA. Mitigating measures were incorporated into the design of the action alternative to reduce impacts. The predicted short-term effects of the proposed action include temporary increases in noise during construction; increases in suspended sediment and turbidity in the Green River during construction of the fish return channel and temporary cofferdam; and minor, localized decreases in air quality due to ambient dust generated by construction. Dust suppression best management practices (BMPs) would be implemented to reduce ambient dust in the construction area. Vegetation in the project area would be impacted; however, a revegetation plan would be implemented to return this resource to as near pre-project conditions as practicable. The predicted long-term effects of the proposed action include an adverse effect to a National Register of Historic Places (NRHP)-eligible historic property (the Green River Canal) and temporary and long-term impacts to the Colorado pikeminnow, bonytail chub, razorback sucker, and humpback chub and designated critical habitat for the razorback sucker and Colorado pikeminnow. Adverse effects to the Green River Canal are being mitigated through a Memorandum of Agreement (MOA) with the Utah State Historic Preservation Officer. While the Proposed Action may result in some adverse effects to the four endangered fishes and critical habitat during construction, operation and maintenance, the Proposed Action is expected to provide a long-term benefit which will ultimately reduce fish mortality. Beneficial effects include preventing or reducing the entrainment and eventual mortality of endangered fishes in the Green River Canal, with the intention of aiding in the progress towards establishing self-sustaining populations of the endangered fishes.

   None of the environmental effects discussed in detail in the EA are considered significant. None of the effects from the proposed action, together with other past, current, and reasonably foreseeable actions, rise to a significant cumulative impact.

2. **The degree to which the selected alternative will affect public health or safety or a minority or low-income population.** The proposal will have no significant impacts on public health or safety. No minority or low income populations would be disproportionately affected by the proposed action.

3. **Unique characteristics of the geographic area.** There are no park lands, prime farmlands, wetlands, wild and scenic rivers, or ecologically critical areas that would be negatively affected by the proposal.

4. **The degree to which the effects on the quality of the human environment are likely to be highly controversial.** Reclamation contacted representatives of other federal agencies, state and local governments, public and private organizations, and individuals regarding the proposal and its effects on resources. Based on the responses received, the

effects of the proposal on the quality of the human environment are not highly controversial.

5. **The degree to which the possible effects on the human environment are highly uncertain or involve unique or unknown risks.** There are no predicted effects on the human environment that are considered highly uncertain or that involve unique or unknown risks.

6. **The degree to which the action may establish a precedent for future actions with significant effects or represents a decision in principle about a future consideration.** Implementing the action will not establish a precedent for future actions with significant effects and will not represent a decision in principle about a future consideration.

7. **Whether the action is related to other actions which are individually insignificant but cumulatively significant.** Cumulative impacts are possible when the effects of the proposed action are added to other past, present, and reasonable foreseeable future actions as described under related NEPA documents; however, significant cumulative effects are not predicted, as described in the EA in Sections 3.3 and 3.4.

8. **The degree to which the action may adversely affect sites, districts, buildings, structures, and objects listed in or eligible for listing in the National Register of Historic Places.** The Utah State Historic Preservation Officer has concurred with a determination of adverse effect to the Green River Canal. Reclamation has entered into a Memorandum of Agreement with the U.S. Army Corps of Engineers (Corps) and the Utah State Historic Preservation Officer (SHPO) to mitigate the impacts to the Green River Canal.

9. **The degree to which the action may adversely affect an endangered or threatened species of its habitat that has been determined to be critical under the Endangered Species Act of 1973.** Reclamation consulted with the U.S. Fish and Wildlife Service (FWS) regarding the effects on threatened or endangered species and critical habitat from the Proposed Action, and FWS issued a Biological Opinion on October 13, 2017 (TAILS 06E23000-2017-F-0357). FWS concurred that the Proposed Action may affect, but is not likely to adversely affect, the southwestern willow flycatcher, the western yellow-billed cuckoo, and critical habitat for the humpback chub and bonytail chub. All proposed ground-disturbing (vegetation removal) activities will be conducted outside of breeding and nesting season for both bird species. FWS concurred that the Proposed Action may affect, and is likely to adversely affect, the Colorado pikeminnow, bonytail chub, razorback sucker, and humpback chub, and designated critical habitat for the razorback sucker and Colorado pikeminnow. Reclamation will coordinate with the Utah Division of Wildlife Resources (UDWR) to conduct fish salvage. However, fish could still be injured or killed during the placement of cofferdams or during the salvage efforts. To minimize impacts, work will be conducted between October 1 – March 15, i.e., during low flow conditions and outside of fish sensitive spawning and larval stage time frames. The placement and removal of cofferdams could increase sediment in the river, indirectly causing a temporary minor effect on fishes. Unanticipated contaminant releases during construction could degrade habitat, which may displace fish. Implementation of BMPs will reduce the likelihood of spills and contamination (see Chapter 4). Operation and

maintenance of the fish barrier will have beneficial effects to the endangered Colorado River fishes by reducing entrainment in the Green River Canal. However, the fish barrier could pose a risk to fish from operation or maintenance activities (sediment and debris removal and mechanical, structural, or electrical maintenance). While the Proposed Action would result in some adverse effects from construction, operation, and maintenance, it is expected to provide a long-term benefit by reducing entrainment of Colorado River fishes in the Green River Canal, thus reducing fish mortality.

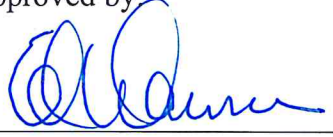
10. **Whether the action threatens a violation of Federal, state, local, or tribal law, regulation or policy imposed for the protection of the environment.** The project does not violate any federal, state, local, or tribal law, regulation, or policy imposed for the protection of the environment. The project will not impact Indian Trust Assets or Indian sacred sites. In addition, this project is consistent with applicable land management plans, policies, and programs. State, local, and interested publics were given the opportunity to participate in the environmental analysis process.

Environmental Commitments

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

- Environmental commitments shall be implemented, as specified in the EA (Chapter 4), to protect water quality and soils; to minimize ground and vegetation disturbance; to protect wildlife resources; and to minimize the spread of weeds.
- Required permits, licenses, clearances, and approvals shall be acquired prior to implementation of the Proposed Action. All permit terms and conditions will be adhered to.
- If previously undiscovered cultural or paleontological resources are discovered during construction, construction activities must immediately cease in the vicinity of the discovery and Reclamation must be notified. In this event, the SHPO shall be consulted, and work shall not be resumed until consultation has been completed, as outlined in the Unanticipated Discovery Plan in the MOA.
- In the event that threatened or endangered species are discovered during construction, construction activities shall halt until consultation is completed with the FWS and protection measures are implemented. Additional surveys shall be required for threatened or endangered species if construction plans or proposed disturbance areas are changed.

Approved by:



7-5-18

Ed Warner
Area Manager, Western Colorado Area Office

Date

Table of Contents

Figures

Tables

Appendices

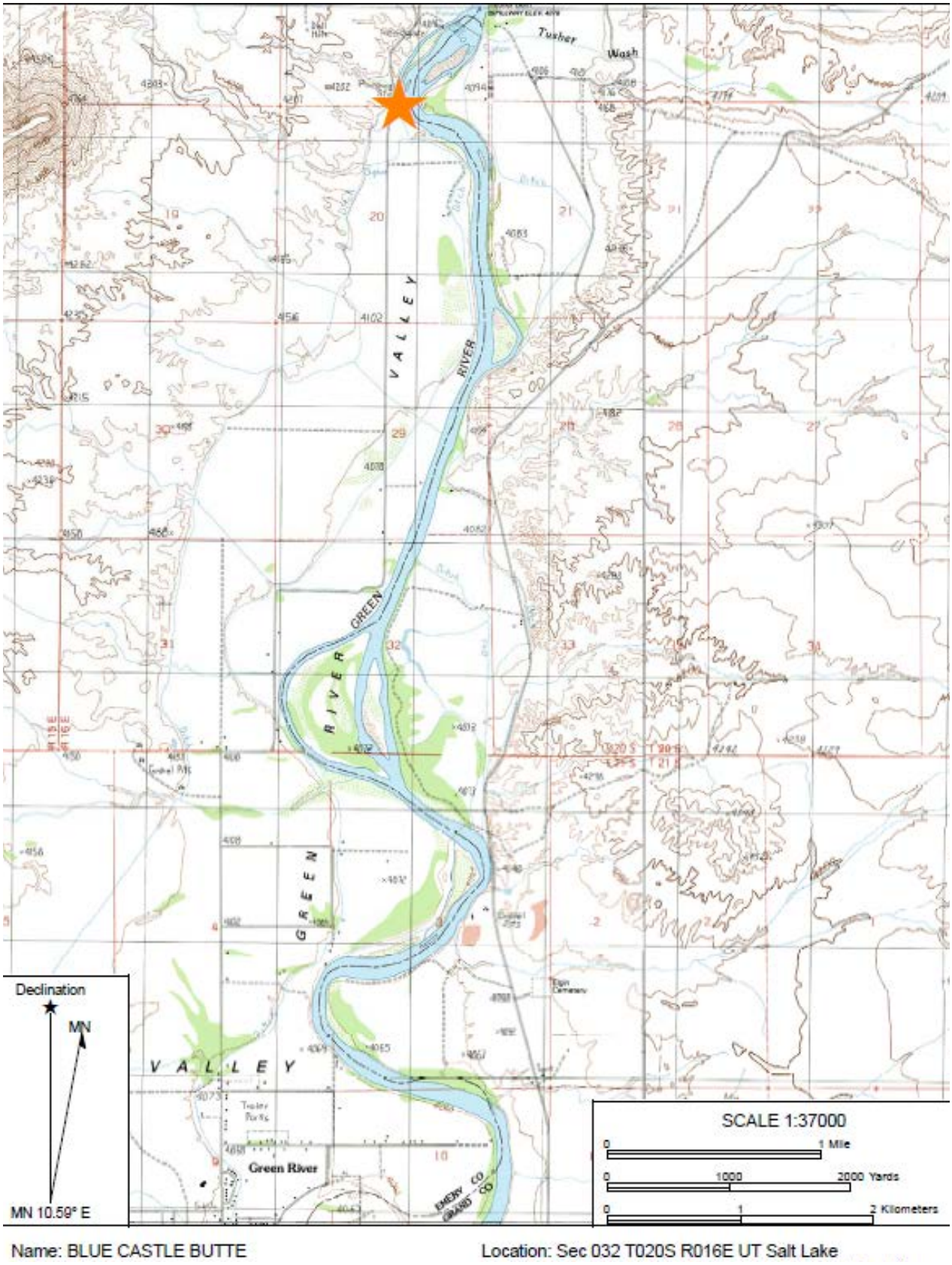


Figure 1. Location of Green River Canal Fish Screen Project

CHAPTER 1 – INTRODUCTION

This Environmental Assessment (EA) has been prepared to disclose and evaluate the potential environmental effects of the Bureau of Reclamation's (Reclamation) proposed Green River Canal Fish Screen Project ("Project" or "Proposed Action"). This project was identified by the Upper Colorado River Endangered Fish Recovery Program to comply with the Upper Colorado River Implementation Program Recovery Action Plan. The Federal action evaluated in this EA is whether Reclamation should provide funding for the construction of a fish screen and associated facilities in and adjacent to the Green River Canal. This document has been prepared in compliance with the National Environmental Policy Act (NEPA), the Council on Environmental Quality (CEQ), and the U.S. Department of the Interior's (Interior) NEPA implementing regulations.

1.1 – Project Location and Legal Description

The project is located in and adjacent to the Green River Canal and the Green River, approximately 5.5 miles north of the Town of Green River, within Sections 17 and 20, Township 20 South, Range 16 East, Salt Lake Principal Meridian, Emery County, Utah. The Green River Canal receives water from the Green River Diversion Dam on the Green River, downstream of the confluence of the Green River and Tusher Wash (see Figure 1).

1.2 – Need for and Purpose of the Proposed Action

The need for the proposed action is to comply with the UCRIP's Recovery Implementation Program Recovery Action Plan. The purpose of the proposed action is to prevent or reduce the entrainment and eventual mortality of endangered fishes in the Green River Canal, with the intention of aiding in the progress towards establishing self-sustaining populations of the endangered fishes.

1.3 – Decision to be Made

Reclamation must decide whether to provide funding for the construction of a fish screen and related facilities in and adjacent to the Green River Canal.

1.4 – Background

1.4.1 – Endangered Fishes

The Upper Colorado River Basin is home to 14 native fish species, including the endangered humpback chub, bonytail, Colorado pikeminnow, and razorback sucker. Critical habitat (habitat which has been determined to be critical to the survival of the listed species) has been designated for the four endangered fishes (see Figure 2).

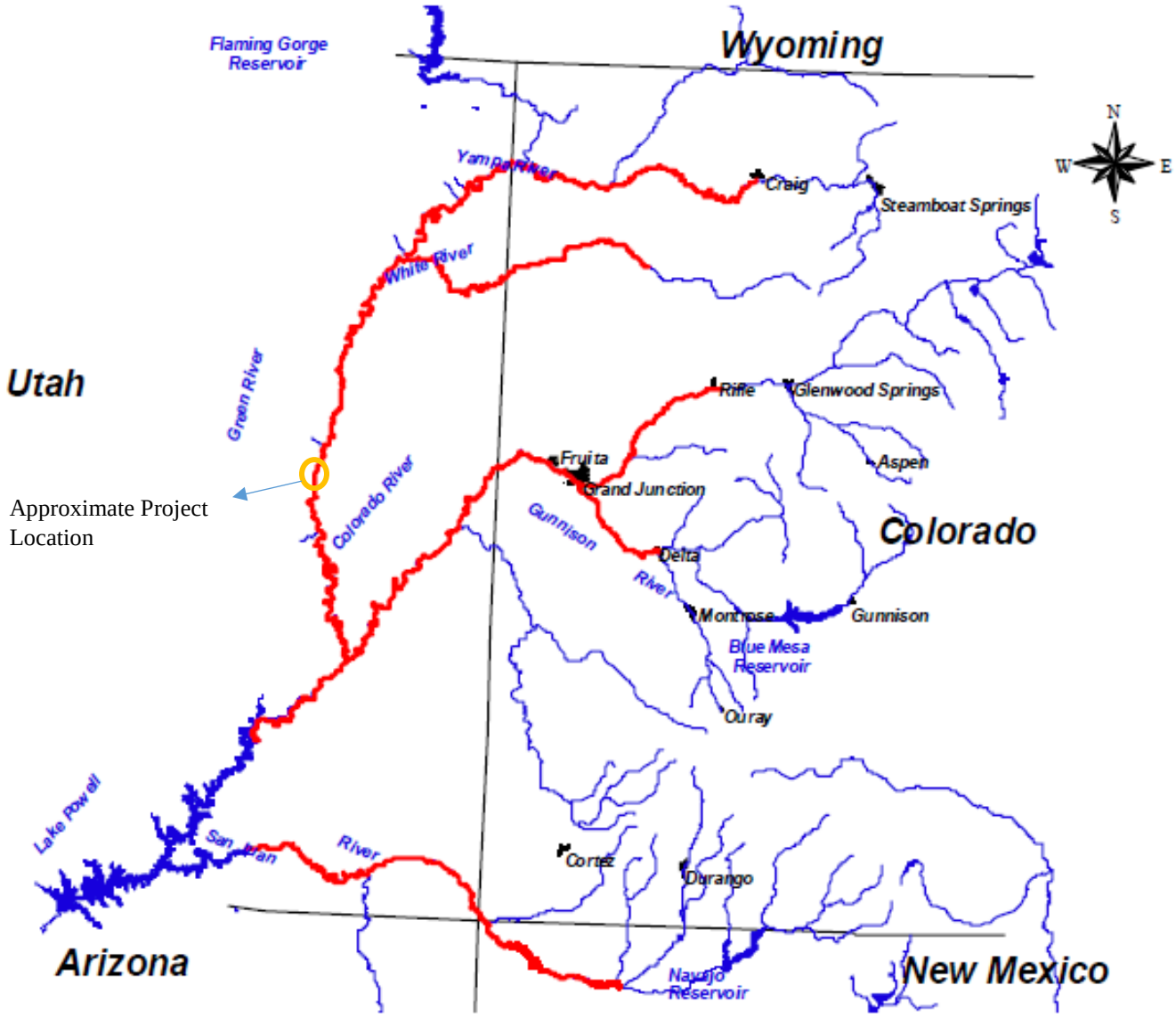


Figure 2. Approximate project location in relation to Upper Colorado River Basin endangered fish critical habitat (shown in red).

The Green River within the proposed action area is critical habitat for the Colorado pikeminnow and razorback sucker. Recent data indicates high levels of fish entrainment and mortality occur in the Green River Canal, impeding the fishes' progress toward recovery.

1.4.2 – Green River Canal Company

The Green River Canal Company (GRCC) was formed in the 1880s to service the needs of farmers in the surrounding area of the city of Green River. The GRCC, together with Thayn Hydropower, owns, operates, and maintains the west side diversion facilities off the Green River Diversion Dam. The GRCC owns and operates the Green River Canal, and has participated in

the development of the project concept and proposed action. The GRCC would be responsible for the operation and maintenance of the fish screen and related infrastructure.

1.5 – Relationship to Other Projects

1.5.1 – Upper Colorado River Endangered Fish Recovery Implementation Program

In 1988, the UCRIP was established to help bring the four species of endangered fish back from the brink of extinction. Recovery goals were developed to help aid the UCRIP in implementing program elements which will help recover the fish, as well as to measure the success of those actions. Program elements which help recover the fish include instream flow identification and protection, habitat restoration, nonnative fish management, propagation and stocking, research and monitoring, information and education, and program management.

The UCRIP has created a Recovery Implementation Program Recovery Action Plan (RIPRAP), which identifies actions to recover the endangered fishes in the most expeditious manner possible. Under the direction of the RIPRAP, the UCRIP has implemented multiple projects, including fish screens, fish passages, and nonnative fish nets, throughout the upper Colorado River basin. Individually, these projects help restore native fish habitat and access to habitat in localized areas. Cumulatively, these projects work towards recovering the four endangered fish species.

1.5.2 – Green River Diversion Rehabilitation Project

In June 2014, the Natural Resources Conservation Service (NRCS) finalized their Environmental Impact Statement (EIS) on the Green River Diversion Rehabilitation Project. The EIS analyzed the effects of rehabilitating the Green River Diversion Dam, which was necessary due to damage caused by past flood events. The Green River Diversion Dam is located approximately 3,000 feet upstream from the proposed location for the Green River Canal Fish Screen, and the dam is utilized by the GRCC to divert water into their canal. Because the NRCS was aware that the Green River Canal Fish Screen Project would be proposed soon, the NRCS included adequate flows to operate the Green River Canal Fish Screen in their EIS analysis to ensure adequate water would be available for the operation of all components of the diversion dam during fish screen operation. This will be discussed in more detail in the Water Rights section of this EA.

1.6 – Scoping

Scoping for this 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 and No Action Alternatives:

- Green River Canal Company, Green River, UT
- Utah Division of Water Rights, Salt Lake City, UT
- Colorado River Water Conservation District, Glenwood Springs, CO
- Utah Division of State History, Salt Lake City, UT

- Utah Division of Wildlife Resources, Southeastern Region, Price, UT
- U.S. Army Corps of Engineers, Bountiful Regulatory Office, Bountiful, UT
- U.S. Fish & Wildlife Service, Ecological Services, West Valley City, UT
- Bureau of Land Management, Price Field Office, Price, UT
- Upper Colorado Recovery Implementation 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

Issues determined to be of potential significance, and therefore appropriate for further impact analysis under this EA, are discussed in Chapter 3. The issues described in Table 1 were determined to be insignificant or not applicable, and are not analyzed in greater detail within this document.

Table 1. Resources Eliminated from Further Analysis

Resource	Rationale for Elimination from Further Analysis
Prime, Unique, and Statewide Important Farmland	There are no farmlands of prime, unique, or statewide importance within the project area.
Solid and Hazardous Waste	There are no known solid or hazardous wastes located within the project area, and the proposed action would not result in the production of solid or hazardous wastes.
Wilderness and Wild and Scenic Rivers	The proposed action would not affect any designated Wilderness or Wild and Scenic Rivers.

Resource	Rationale for Elimination from Further Analysis
Indian Trust Assets and American Indian Sacred Sites	Project notification, along with an invitation to present concerns, was provided in writing to the Ute Indian Tribe–Uintah and Ouray Reservation, Southern Ute Indian Tribe, Ute Mountain Ute Tribe, and Navajo Nation, on July 17, 2017. The Southern Ute Indian Tribe responded by letter dated February 22, 2018, that there are no properties of religious and cultural significance to the Southern Ute Indian Tribe that are listed on the National Register within the area of potential effect or that the proposed project will have no effect on any such properties that may be present (see Appendix G). No responses were received from the other Tribes. The proposed action would not impact ITAs or American Indian Sacred Sites.
Environmental Justice	The proposed action would not involve any relocations, health hazards, hazardous waste, property takings, or substantial economic impacts. The project would not have disproportionately high or adverse human health or environmental effects on minority or low-income populations or Indian Tribes.

CHAPTER 2 – PROPOSED ACTION AND ALTERNATIVES

Alternatives evaluated in this EA include the No Action Alternative and the Proposed Action Alternative.

2.1 – Alternatives Considered but Not Carried Forward

Other alternatives were considered by Reclamation and the UCRIP, but were eliminated from detailed analysis in accordance with 40 CFR 1502.14. Other alternatives considered but eliminated from further consideration included an electric fish barrier at the inlet to the power plant raceway, various configurations of a larger fish screen in the raceway, and various fish screen designs and locations. These alternatives were found to be ineffective or less effective than the Proposed Action Alternative described below.

2.2 – No Action Alternative

Under the No Action Alternative, a fish screen would not be constructed on the Green River Canal. Native and endangered fishes would continue to be entrained in the Green River Canal, resulting in eventual mortality. The UCRIP would not complete a fish recovery action identified in the RIPRAP.

2.3 – Proposed Action

Under the proposed action, Reclamation would authorize the use of Federal funds to implement the Green River Canal Fish Screen Project to minimize canal entrainment of adult, sub-adult and larval Upper Colorado River endangered fishes. The project is part of the habitat restoration element of the UCRIP. The proposed action includes construction of the fish screen, as well as construction of a fish return channel and maintenance road, bank erosion protection upstream and downstream of the fish return channel outlet, modifications of the canal intake gate, replacement of the canal siphon, installation of fish detection antennas, canal lining, and potentially providing partial funding to replace the 8-Gate Structure (Figure 3). During construction, temporary coffer dams would be constructed in the Green River and the Green River Canal, and an existing borrow pit on BLM-administered land would be utilized for fill material. Temporary disturbance areas would be restored after construction.

Reclamation would design the fish screen and associated facilities and award a contract for the construction work. The UCRIP would provide annual funding to the GRCC for operation and maintenance (O&M) of the Green River Canal Fish Screen and associated facilities, as well as the fish antennae, fish passage structure, and fish notches associated with the Green River Diversion Dam, through an O&M contract between Reclamation, the UCRIP, and the GRCC. The GRCC would assume ownership, as well as operation and maintenance responsibility, of the Green River Canal Fish Screen and associated facilities.

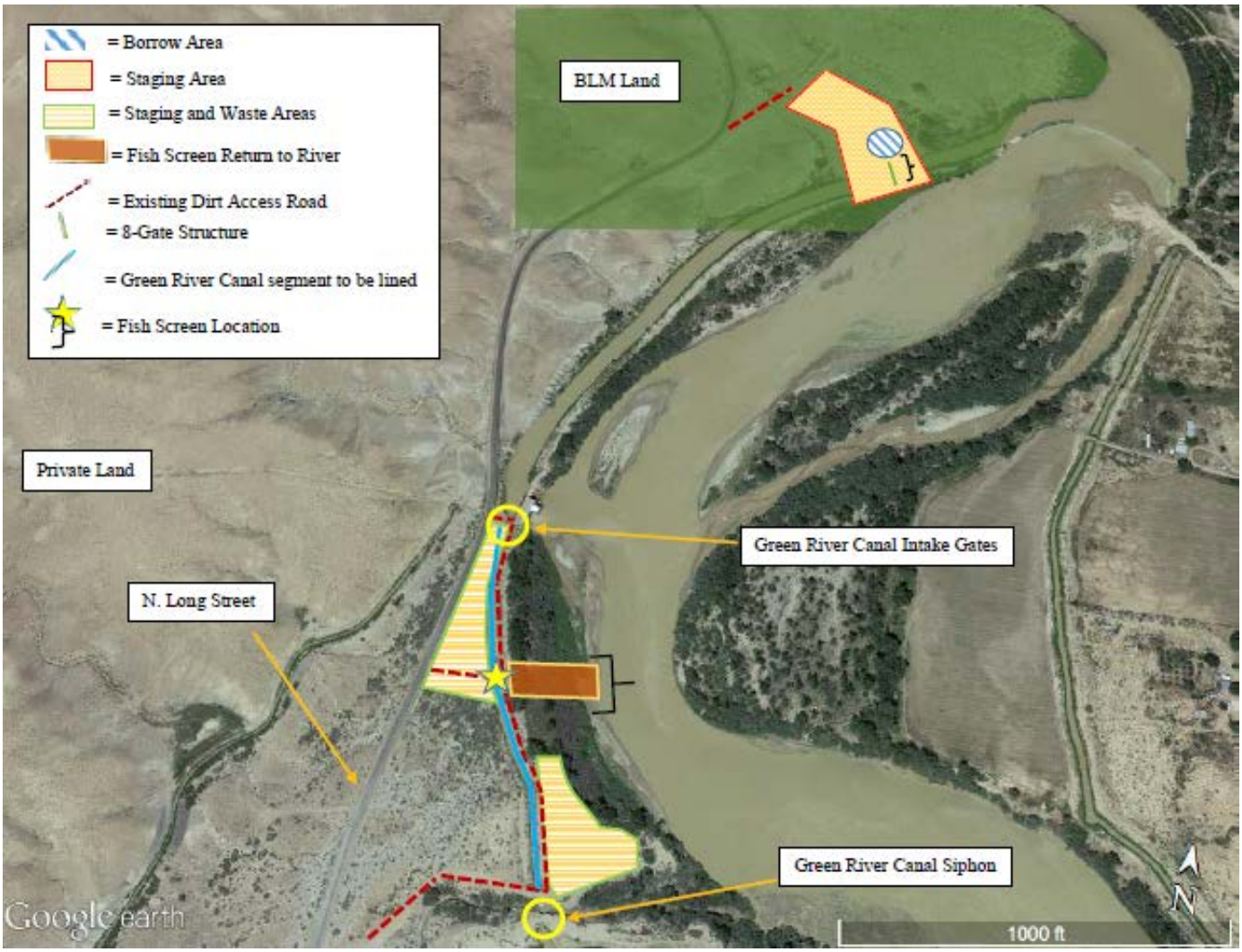


Figure 3. Location of the components of the Proposed Action

The components of the proposed action are described below, in the order of their upstream to downstream locations.

2.3.1 – Green River Canal Intake Gate Modifications

The two existing slide gates and the center pier between the canal intake gates would be removed. The two gates would be replaced by one large slide gate and electric gate opener. Electric service would be installed by trenching. This would be the same electrical service installed for use by the fish screen (see Section 2.3.3). Depending on the extent of the existing damage to the intake channel floor under the bridge, the channel floor would be repaired or replaced by removing and replacing the existing concrete. The existing bridge would not be modified.

2.3.2 – Green River Canal Lining and Maintenance Road

Approximately 1,285 feet of the existing earthen canal would be lined with a protective membrane and concrete. The lining would extend from the canal intake gates downstream to the first canal siphon. The canal would be prepared by clearing vegetation from the banks and removing unsuitable material from the canal. The canal prism within the existing alignment would be reshaped and the side slopes graded to a 2:1 slope. Excess excavated material would be disposed of at an approved disposal site. An operation and maintenance road would be constructed on the west side of the canal using road base material hauled in, and compacting and grading the road surface. The new maintenance road and the existing road on the east side of the canal would each be maintained at about a 12-foot width. Total disturbed area would be from the east edge of the existing maintenance road to 50 feet west of the existing canal centerline.

2.3.3 – Green River Canal Fish Screen and Return Channel

A fish screen would be installed within the Green River Canal (Figure 4), and a fish return channel would be constructed between the canal and the Green River. The fish screen and return channel were designed based on a variety of models to meet endangered fish requirements for flow rates, elevations, and velocities. The proposed fish screen and return channel would be located about 500 feet downstream from the existing Green River Canal gates. The fish screen would consist of an approximately 36-foot long concrete weir wall constructed within the canal alignment. A sloping corrugated metal screen consisting of six screen (approximately six-foot each) punch plate with 3/32-inch openings would be placed on top of the weir wall. This type of screen allows water to flow over and through the screen.

All water diverted to the Green River Canal would pass through the screens. In the event of screen blockage, water would be diverted to the fish return channel. The canal channel upstream of the fish screen structure would be designed to accommodate 120 cubic feet per second (cfs) of water. Approximately 30 cfs would be diverted directly to the fish return channel by the weir wall. Approximately 90 cfs would go over the weir wall. The screens would allow about 80 cfs to fall through and continue into the irrigation canal. The remaining approximately 10 cfs would fall off the end of the screens and flow into a “trough” that flows back to the fish return channel. An automated gate would control flows returning to the Green River via a return channel. The weir wall would guide fish, sediment, and debris that enter the canal to the return channel and back to the Green River. To operate the automated gate, an electrical control cabinet would be installed nearby. Electrical service to this cabinet will be extended from a utility pole on the west side of North Long Street, across from the hydroelectric plant. Electrical service would be installed by trenching.

The fish return channel would be nearly perpendicular to the existing canal alignment. The fish return channel would be an approximately 30-foot wide open channel, constructed with a combination of concrete and geomembrane material, between the canal and the Green River (approximately 225 feet long), with a permanent access road (approximately 12 feet wide) running parallel to the return channel. The fish return channel would tie into the Green River.

The river bank would be stabilized in the vicinity of the return channel outlet to minimize erosion.

To continue monitoring fish entrainment and the success of the fish barrier, fish detection antenna pairs would be installed above and below the fish barrier, as well as within the fish return channel. Monitoring efforts associated with the antennas are managed and funded through the UCRIP. Currently, the UCRIP anticipates monitoring the effectiveness of the fish screen for two to three seasons after completion of construction.

To perform work in the canal, a temporary cofferdam would be constructed just upstream of the 8-gate structure to dewater the canal downstream for project work. Vegetation would be cleared and local material from the BLM borrow pit would be hauled and gradually added and compacted into the canal until it spans its entire width. The cofferdam would then be utilized to dewater the Project area and to transport equipment to the other side of the canal.

Additionally, a second temporary cofferdam would be constructed within the Green River to construct the fish return channel outlet. The cofferdam berm would be approximately 200 feet long and about 10 feet wide at the crest with 2:1 side slopes. The cofferdam would be comprised of native material excavated from the fish return channel alignment and/or native material from the BLM borrow pit. The material would be placed in a horseshoe shape that ties into the river banks. Upon completion of construction, the temporary cofferdams would be removed and the material returned to upland locations within the project area and/or the BLM borrow pit.

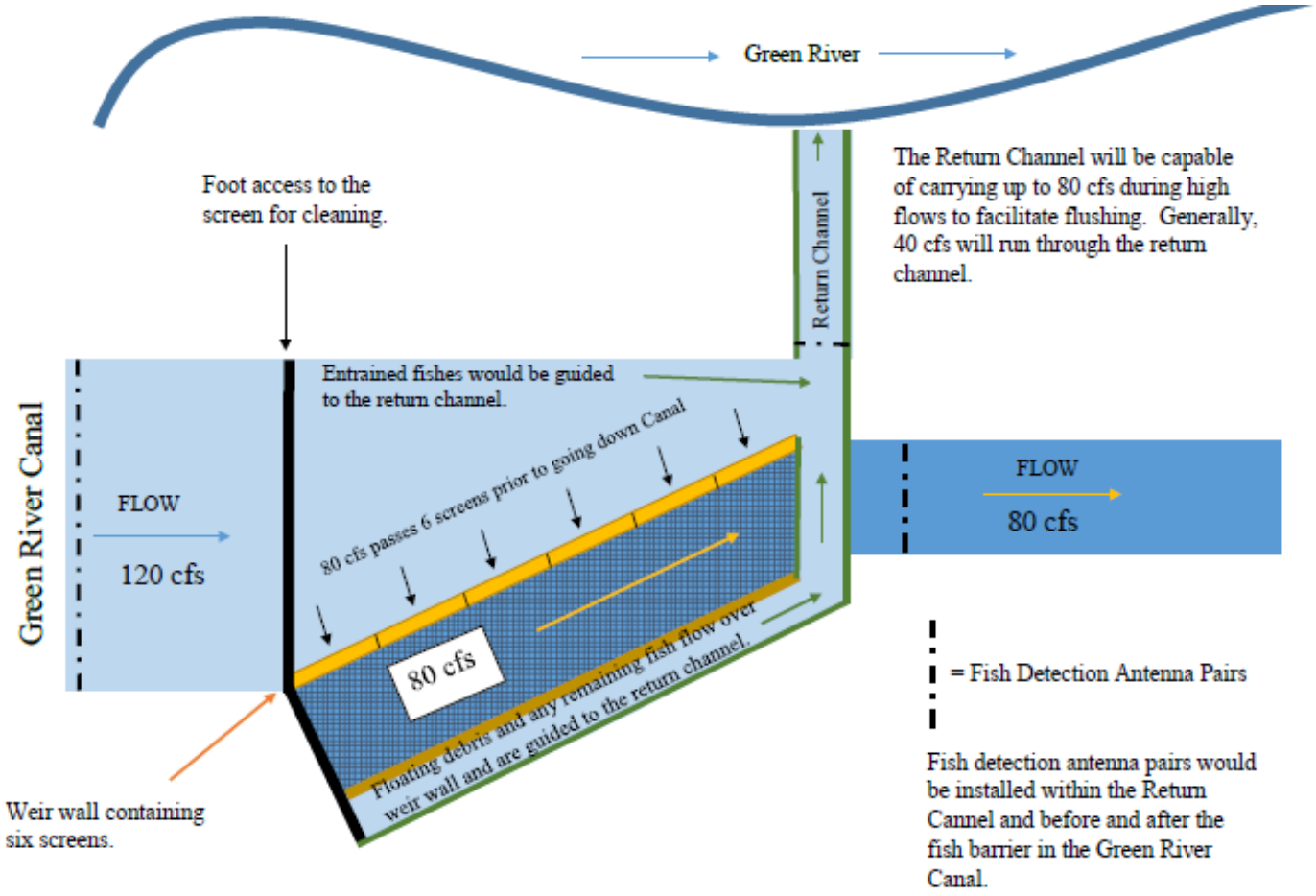


Figure 4. Conceptual diagram of Green River Canal Fish Screen and Return Channel

2.3.4 – Siphon

Replacement of the canal siphon would require excavation of an open trench across an ephemeral stream. The depth of excavation would be approximately five feet below the channel bed. Grouted rock and rock riprap would be installed within the channel to protect the buried siphon. A 20-foot wing wall would be constructed in the canal at the siphon outlet and riprap would be installed within the canal for about 30 feet downstream of the outlet.

2.3.5 – O&M Contract

The UCRIP would enter into an O&M contract with the GRCC. Under the contract, the UCRIP would reimburse the GRCC for the operation and maintenance of the Green River Canal fish screen and fish return channel, as well as the fish screen, fish antennae, fish passage structure, and fish notches associated with the Green River Diversion Dam.

2.3.6 – 8-Gate Structure

Concurrent with construction of the Proposed Action, the GRCC is proposing to repair and modify the 8-gate structure and raceway in the immediate vicinity of the structure. The GRCC's

proposed activities are independent of the Project activities, but it would be more economical and result in less overall environmental impact if designed and constructed concurrently with the Proposed Action because the same temporary cofferdam could be utilized to construct both projects. Activities associated with GRCC's proposed work include replacing and/or repairing portions of the 8-gate structure, and installing a new wingwall and riprap downstream of the structure. Removal of the structure would require cutting or breaking up the concrete and hauling it to a landfill. Ready mix concrete and riprap would be installed after the canal is repaired and reshaped. The footprint of the removal and repair work would be confined to the staging areas adjacent to the raceway and the existing BLM borrow pit. Federal funding may be provided for work on the 8-gate structure.

2.4 – Construction

2.4.1 – Equipment

Equipment would include heavy machinery, such as a track hoe, back hoe, skid steer, loader, trencher, compactor, concrete truck, various mechanized hand tools, and workers' vehicles.

2.4.2 – Access

The project area would be accessed from North Long Street in Green River, Utah. Access for all construction equipment and personnel would be from existing roads and disturbed areas (Figure 3). Access by heavy machinery into the raceway to construct the temporary cofferdam and implement work on the 8-gate structure would be accomplished by constructing a temporary ramp from fill material from the BLM borrow pit on both sides of the canal. For the construction phase of the return channel, an approximately 100-foot wide corridor would be disturbed for construction equipment to access both sides of the channel. In addition, a temporary dirt ramp would be constructed into the Green River Canal on the right bank upstream of the existing bridge for equipment access, and removed upon completion of construction.

2.4.3 – Staging Areas

Staging areas for equipment and materials would be predominantly located in disturbed areas, except for the staging area directly across from the proposed fish screen, which appears to have not been disturbed since the original construction of the Green River Canal and North Long Street (see Figure 2).

2.4.5 – Construction Timeframe

Construction would take place during the non-irrigation season. The Green River Canal would be dewatered between approximately November 1 and April 1.

2.5 – Permits and Authorizations

If the proposed action is approved, the following permits would be required prior to project implementation:

- Corps Regional General Permit (RGP) No. 4
- BLM Temporary Right-of-Way Permit

- State of Utah Stream Alteration Permit
- Utah Sovereign Lands Permit
- Authorization from the Utah Division of Forestry, Fire & Lands
- Utah Pollutant Discharge Elimination System (UPDES) Permit

Compliance with the following laws and Executive Orders (E.O.) are required prior to and during project implementation:

2.5.1 – Natural Resource Protection Laws

- Endangered Species Act (ESA) of 1973 as amended (16 U.S.C. 1531-1544, 87 Stat. 884)
- Clean Water Act (CWA) of 1972 as amended (33 U.S.C. 1251 et seq.)
- Migratory Bird Treaty Act (MBTA) of 1918 (16 U.S.C. 703-712)
- Bald and Golden Eagle Protection Act (BGEPA) of 1940 (16 U.S.C. 668- 668c)

2.5.2 – Cultural Resource Laws

- National Historic Preservation Act (NHPA) of 1966 (16 U.S.C. 470 et seq.)
- Archaeological Resources Protection Act (ARPA) of 1979 (16 U.S.C. 470aa-470mm et seq.)
- Native American Graves Protection and Repatriation Act (NAGPRA) of 1990 (25 U.S.C. 3001 et seq.)
- Archaeology and Historic Preservation: Secretary of the Interior's Standards and Guidelines (48 FR 44716)
- American Indian Religious Freedom Act (AIRF) of 1978 (42 U.S.C. Public Law 95-341)

2.5.3 – Paleontological Resource Laws

- Paleontological Resources Preservation Act (PRPA) of 2009 [Section 6301-6312 of the Omnibus Land Management Act of 2009 (Public Law 111-11 123 Stat. 991-1456)]

CHAPTER 3 – AFFECTED ENVIRONMENT & ENVIRONMENTAL CONSEQUENCES

3.1 - Introduction

This chapter discusses resources that may be affected by the Proposed Action Alternative and the No Action Alternative. For each resource, the potentially affected area and/or interests are identified, existing conditions described, and potential impacts predicted under the No Action and Proposed Action Alternatives. This section is concluded with a summary of impacts and a list of environmental commitments.

3.2 – Affected Environment and Environmental Consequences

3.2.1 – Water Resources

3.2.1.1 – Irrigation Water

The Green River watershed is situated within the Colorado River watershed, which serves about 27 million people and irrigates nearly 4 million acres of land across several of the western states. The Green River Canal provides irrigation water to local farmers, and irrigated cropland represents over 90% of the farmland in the vicinity of the project.

No Action Alternative: Under the No Action Alternative, there would be no change in irrigation water delivery in the project area.

Proposed Action: Under the Proposed Action Alternative, irrigation water flowing through the Green River Canal would pass through the fish screen. Screening the irrigation water would have the beneficial effect of removing debris and some sediment from the Green River Canal and downstream irrigation systems. Construction of the fish screen would occur outside of the irrigation season. There would be no interruption in irrigation water delivery as a result of implementation of the proposed action.

3.2.1.2 – Water Rights

Numerous water rights exist on the Green River near the project location. Some of these rights are approved, while others have been perfected. A perfected water right is a right that has been both approved and consummated, i.e., the water right has been put to beneficial use. In their June 2014 EIS for the Green River Diversion Rehabilitation Project (NRCS EIS), the NRCS analyzed flow allocations associated with their proposed action of rehabilitating the Green River Diversion Dam. The flow allocations take into consideration all water rights in the area (819 cfs for hydropower and irrigation) (NRCS 2014) (Table 2).

Table 2. Flow allocations associated with the Green River Diversion Dam

Use	Flow Allocation
Hydropower	600 cfs
Irrigation	219 cfs
Downstream Boat Passage	147 cfs
Fish Barrier Return Flow[1]	50 cfs
Downstream Fish Passage	40 cfs
Upstream Fish Passage	30 cfs
Fish Screen Return Flow	20 cfs
TOTAL	**1106 cfs**

[1] The "Fish Barrier Return Flow" refers to the return flow required to operate the Green River Canal Fish Screen analyzed in this EA.

No Action Alternative: Under the No Action Alternative, there would be no change in water rights. Flow allocations described in the NRCS EIS would continue to serve their identified purposes, with the exception of the 50 cfs allocated to the Fish Barrier Return Flow (aka the Green River Canal Fish Screen Return Flow). Under the No Action Alternative, 50 cfs would remain in the Green River for approximately 3,000 feet between the Green River Diversion Dam and the proposed location for the Green River Canal Fish Screen return passage.

Proposed Action: Under the Proposed Action Alternative, there would be no change in water rights. The GRCC would continue to divert its combined 80 cfs water right into the Green River Canal. Up to an additional 50 cfs could be diverted into the extreme upper reach of the Green River Canal to facilitate operation of the Green River Canal Fish Screen; however, it is anticipated only 40 cfs would typically be required to operate the fish screen. This water was identified as a flow allocation in the NRCS EIS. The water would be utilized to operate the Green River Canal Fish Screen, and then be immediately returned to the Green River in a location approximately 3,000 feet downstream of its diversion point at the Green River Diversion Dam.

Figure 5 shows the range of Green River flows at Green River, Utah, based on the average daily flow from 1981 – 2016. The average daily flow during this 20-year period is portrayed by the blue line. The red line portrays the 1,106 cfs of total allocated flows associated with the Green River Diversion Dam. At all times of the year, the Green River on average carries a minimum of approximately 1,400 cfs in addition to the flows which are associated with the Green River Diversion Dam. This demonstrates the availability of Green River water to operate the Green River Canal Fish Screen (USGS 2017).

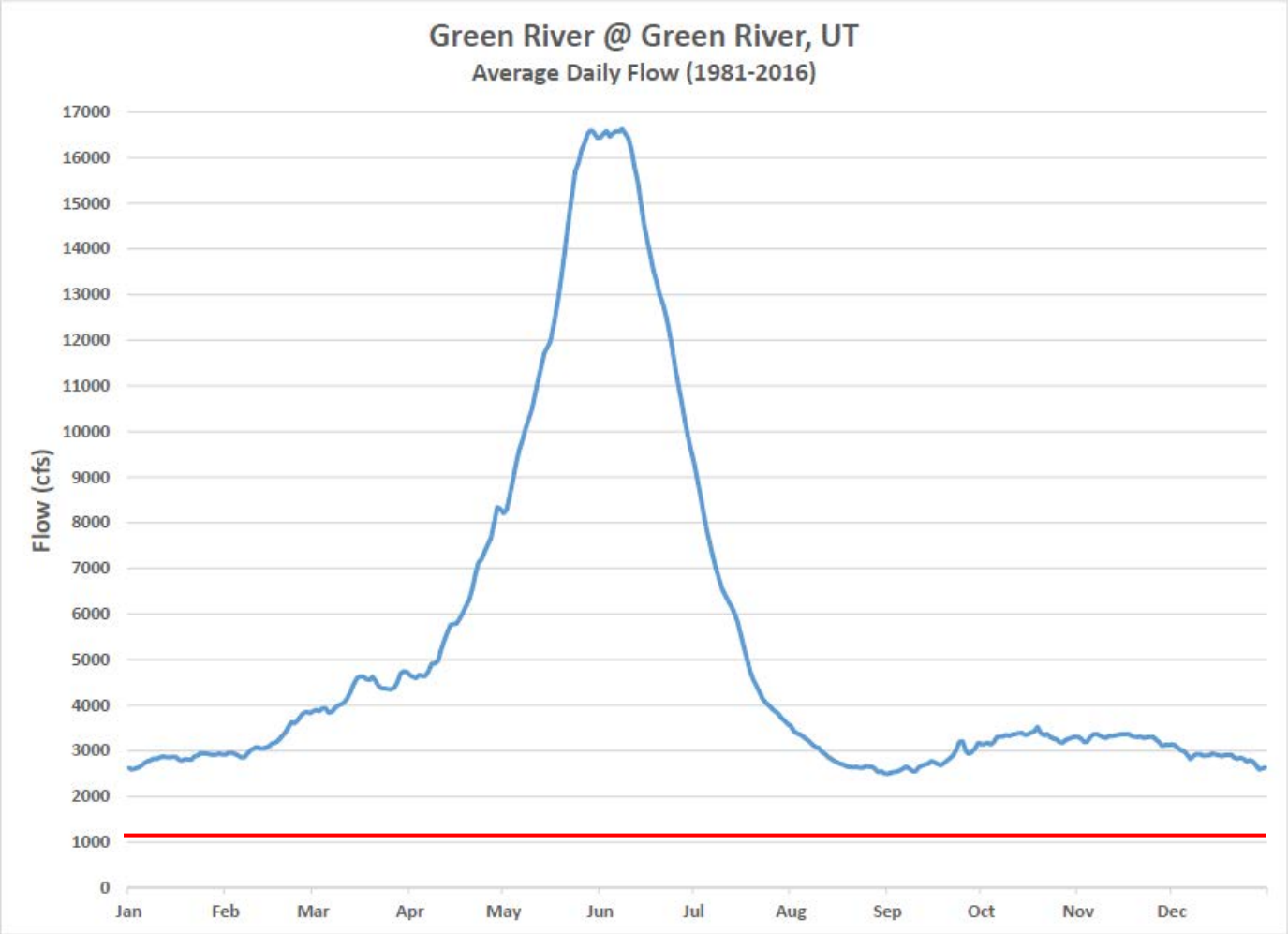


Figure 5. Average flows in the Green River at Green River, Utah.

3.2.1.3 Floodplains

Portions of the project area are located within the 100-year floodplain of the Green River. Executive Order 11988, Floodplain Management (May 24, 1977), establishes federal policy to "avoid to the extent possible the long- and short-term adverse impacts associated with the occupancy and modification of floodplains and to avoid direct or indirect support of floodplain development wherever there is a practicable alternative."

No Action Alternative: Under the No Action Alternative, there would be no change in floodplains along the Project Area.

Proposed Action: The fish return channel and return channel maintenance road, would be within the 100-year floodplain. Locating these facilities within the 100-year floodplain is unavoidable, due to the intent of the project to channel fish from the Green River Canal back to the Green

River. However, given the minimal amount of fill that would be placed within the floodplain, any potential effects to the floodplain or floodway would be de minimis and indiscernible.

3.2.2 – Water Quality

The Utah Department of Environmental Quality (UDEQ), Division of Water Quality, under the authority of federal and Utah statutes, administers state programs which implement the federal CWA. The CWA establishes the basic structure for protection of the quality of Utah's ambient water bodies, which include rivers, streams, lakes, reservoirs, and ground waters.

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

Proposed Action: Under the Proposed Action Alternative, there would be no long-term direct or indirect impacts on water quality. There is the potential for a minor, short-term increase in sediment in the Green River near the project area during construction of the fish return channel.

3.2.3 – Waters of the United States

Under Section 404 of the Clean Water Act, authorization from the U.S. Army Corps of Engineers (Corps) is required prior to the discharge of dredged or fill material into waters of the United States. In addition, Section 73-3-29 of the Utah Code requires that written authorization from the State Engineer be obtained prior to altering the bed or banks of a natural stream.

No Action Alternative: Under the No Action Alternative, there would be no impacts to waters of the U.S.

Proposed Action: The proposed project area was evaluated for the presence of waters of the United States, including wetlands. Waters of the U.S. within and adjacent to the project area consist of the Green River, wetlands, ephemeral washes, and irrigation-related canals.

Under the proposed action, impacts to waters of the U.S. would occur as a result of:

- Installation and removal of a temporary coffer dam in the canal raceway
- Installation and removal of a temporary coffer dam in the Green River
- Construction of a fish return channel outlet in the Green River
- Replacement of a buried siphon under an unnamed, ephemeral wash
- Bank and bed stabilization on the Green River and the unnamed ephemeral wash
- Construction of a fish screen in the Green River Canal
- Lining of the Green River Canal

Reclamation staff met on-site with personnel from the Corps and the Utah Division of Water Rights on June 6, 2017. Applications for a CWA Section 404 Permit (Regional General Permit 4) and a State of Utah Stream Alteration Permit were submitted to the Corps and the Utah Division of Water Rights, respectively. Permits from both agencies have been received and are included in Appendix A.

The proposed action would temporarily impact approximately 200 linear feet of the Green River, 75 linear feet of the Green River Canal, and 0.14 acre of riverine wetlands. Approximately 192 linear feet of the Green River, 1200 linear feet of the Green River Canal, 115 linear feet of an unnamed ephemeral stream, and 0.03 acre of riverine wetlands would be permanently impacted.

3.2.4 – Air Quality

Air quality in the State of Utah is regulated by the U.S. Environmental Protection Agency (EPA) and the UDEQ Division of Air Quality. The National Ambient Air Quality Standards (NAAQS) established by the EPA under the Clean Air Act (CAA) specify limits of air pollutants levels for several criteria pollutants: carbon monoxide, particulate matter (PM) 10, PM 2.5, ozone, sulfur dioxide, lead, and nitrogen. When an area exceeds the specified pollutant limits, that area is identified as a non-attainment area.

Air quality is generally excellent in the project area, and there are no air quality non-attainment areas in the vicinity (EPA 2017a).

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

Proposed Action: Under the Proposed Action Alternative, there would be a temporary, short-term adverse effect on air quality in the immediate vicinity of the project area as a result of dust and vehicle emissions from construction activities. There would be no long-term impacts on air quality from the proposed action. Dust control measures, such as watering disturbed areas, would be implemented during construction as appropriate to reduce dust emissions.

3.2.5 – Vegetation

The project area is characterized by disturbed uplands, upland shrubland, and narrow, intermittent riparian corridors along the Green River and the Green River Canal. Most of the uplands and portions of the riparian vegetation communities within the project area have been previously disturbed by human development associated with the Thayn Hydropower Plant, construction, operation, and maintenance of irrigation facilities including access roads and staging areas, and areas disturbed during re-construction of the Green River Diversion Dam.

Vegetation within the Proposed Action area was assessed on-site by ERO Resources Corporation (May 2017). Four vegetation communities were identified within the project area: disturbed uplands, upland shrubland, fringe wetlands, and riparian woodland (Appendix B). In the disturbed uplands, the vegetation is very sparse (between 0 and 20 percent cover). This vegetation type makes up approximately 11 acres of the project area. In the approximately 1.8 acres of upland shrubland, the dominant vegetation consists of sand sagebrush (*Artemisia filifolia*) and rubber rabbitbrush (*Ericameria nauseosa*) with an understory of cheatgrass (*Bromus tectorum*), saltgrass (*Distichilis spicata*), Russian thistle (*Salsola kali*), flixweed (*Descurainia sophia*), and sand dropseed (*Sporobolus cryptandrus*). Sporadic wetland vegetation (less than 0.1 acre) occurs along the banks of the Green River Canal and below the ordinary high water mark of the Green River. Dominant plant species within the wetland fringes consist of saltgrass, sandbar willow, common reed (*Phragmites australis*), and streambank

wheatgrass (*Elymus lanceolatus*). Riparian woodland occurs in a 60- to 200-foot wide corridor between the canal and the Green River, totaling approximately 0.7 acre. The riparian woodland area is dominated by tamarisk (*Tamarix* sp.) with some plains cottonwood (*Populus deltoides*) and sandbar willow (*Salix exigua*) saplings (less than 4 feet tall) establishing on sandbanks abutting the Green River.

Executive Order 13122 instructs each federal agency whose action may affect the status of an invasive species to not authorize, fund or carry out actions that it believes are likely to cause or promote the introduction or spread of invasive species. Plant species classified by the state of Utah as noxious weeds (synonymous with invasive species) occur in the project area. The canal, river, and travel routes provide vectors for transporting and spreading seeds from these undesirable species. The most prevalent noxious weed species in the project area are Russian knapweed (*Centaurea repens*) which occurs mainly in the disturbed upland sites, and tamarisk (*Tamarisk* spp.) which occur in the riparian woodland.

No Action Alternative: There would be no change in vegetation under the No Action Alternative.

Proposed Action: The Proposed Action would impact vegetation in the project area. Vegetation would be cleared for staging areas, canal lining activities, access roads, and construction of the fish return channel. To minimize impacts to vegetation, construction activities would be confined to previously disturbed areas where possible and vegetation disturbance would be minimized as much as practicable. To reduce the establishment or spread of noxious weeds, equipment would be cleaned prior to moving on-site. After construction, all areas that were disturbed for construction purposes would be graded and rehabilitated to as near their pre-project construction condition as practicable. The upland disturbed areas would be seeded or planted at appropriate times with weed-free, BLM-approved seed mixes. The riparian area would be revegetated by seeding and plantings of riparian species, such as cottonwood and willow (see Appendix C for Restoration Plan). The Proposed Action would result in a permanent loss of approximately 0.25 acre of riparian woodland due to the installation of the fish return channel.

3.2.6 – Aquatic and Terrestrial Wildlife

Aquatic and terrestrial wildlife in the project area includes a variety of native and non-native fish, birds, mammals, amphibians, and reptiles. Fish populations in the lower Green River are dominated by nonnative channel catfish and common carp as well as native bluehead and flannelmouth suckers. The canal provides unsuitable aquatic habitat; however, numerous fish have been found in the canal, including federally listed species (see Section 3.3.7.1). Some fish are unable to escape the canal and perish.

On-line data from the Utah Department of Wildlife Resources shows the project area provides year-round range for pronghorn and mule deer, and habitat for game birds, such as turkey, chukar, and quail. Other common mammals in the project area include coyote, fox, rabbits, raccoons, small rodents, and skunks. Snakes, lizards, toads, and other amphibians and reptiles

are common near the river. The waterways and their margins provide habitat for a variety of waterfowl. Numerous migratory and resident birds utilize the area.

The riparian woodland area along the Green River provides habitat for the greatest number of wildlife. Most of the project area consists of disturbed uplands which provides poor quality wildlife habitat. Furthermore, the project area is adjacent to the hydropower plant, a road, and an irrigation canal, all of which are subject to frequent human presence creating recurrent disturbances to the area and any wildlife present.

No Action Alternative: Under the No Action Alternative, terrestrial and aquatic wildlife habitat would remain in its current condition, and no displacement of wildlife beyond current levels would occur. Fish species would continue to perish in the canal.

Proposed Action: Construction work would create a short-term increase in disturbance to the area, creating minor temporary impacts to wildlife species. Small animals, such as burrowing amphibians, reptiles, and small mammals, as well as fish species, could suffer direct mortality or permanent displacement due to construction activities, but these would be isolated occurrences and would not result in local population level impacts. Vegetation removal would result in a loss of nesting habitat, cover, and forage on approximately 2.5 acres. With the exception of areas where new, permanent structures would be installed, all disturbed areas would be revegetated following construction, and wildlife habitat would eventually return to pre-project conditions. Installation of the fish return channel from the canal to the Green River would result in a permanent loss of approximately 0.25 acre of riparian woodland habitat but reduce fish mortality in the canal.

3.2.7 – Special Status Species

3.2.7.1 – Threatened and Endangered Species

The Endangered Species Act (ESA) of 1973 protects federally listed endangered, threatened and candidate plant and animal species and their critical habitats. A Biological Assessment (BA) was completed for the project and was submitted to the United States Fish and Wildlife Service (USFWS) in June 2017 to comply with Section 7 of the Endangered Species Act (ESA). USFWS issued a Biological Opinion (BO) on October 13, 2017. This section summarizes the information from the BO (Appendix D).

Table 3 summarizes the federally-listed species with potential to occur in or near the project area, including habitat requirements, and the effects determination for each species and their critical habitats.

Table 3. Federally-listed species occurring in or near the project area

Species	*Status*	*Habitat Description*	*Species Effects Determination*	*Critical Habitat Effects Determination*
Southwestern willow flycatcher (*Empidonax traillii*	E	Requires dense riparian habitat (cottonwoods with willow/tamarisk understory) with microclimatic conditions.	Not likely to adversely affect	No effect- project area outside of critical habitat

Species	*Status*	*Habitat Description*	*Species Effects Determination*	*Critical Habitat Effects Determination*
extimus)		Saturated soils, standing water, or nearby streams, pools, or cienegas also influence the microclimate and density vegetation component.		
Yellow-billed cuckoo (*Coccyzus americanus*)	E	Breeds in low elevation river corridors with fairly extensive mature cottonwood galleries with dense shrub understory.	Not likely to adversely affect	No effect- project area outside of proposed critical habitat
Bonytail (*Gila elegans*)	E	This species occurs in the Green River and has been detected in the Green River Canal; designated critical habitat occurs approximately 3.25 miles upstream of the project area and downstream on the Colorado River.	Likely to adversely affect; not likely to result in jeopardy	Not likely to adversely modify
Colorado pikeminnow (*Ptychocheilus lucius*)	E	This species occurs in the Green River and has been detected in the Green River Canal; designated critical habitat occurs within the project area.	Likely to adversely affect; not likely to result in jeopardy	Not likely to adversely modify
Humpback chub (*Gila cypha*)	E	This species occurs in the Green River and has been detected in the Green River Canal; designated critical habitat occurs approximately 3.25 miles upstream of the project area and downstream on the Colorado River.	Likely to adversely affect; not likely to result in jeopardy	Not likely to adversely modify
Razorback sucker (*Xyrauchen texanus*)	E	This species occurs in the Green River and has been detected in the Green River Canal; designated critical habitat occurs within the project area.	Likely to adversely affect; not likely to result in jeopardy	Not likely to adversely modify

The project area includes a wild, robust population of Colorado pikeminnow, active migratory routes for spawning pikeminnow and razorback sucker, critical habitat for the pikeminnow and razorback sucker, and occupied habitat for the four endangered fish (bonytail, humpback chub, Colorado pikeminnow, razorback sucker). Entrainment risk of the endangered fish within the Green River Canal has been investigated since 2013. Analysis of the detection data shows that a substantial number of endangered fish become entrained in the Green River Canal, but that entrainment mortality is not certain. The detection data show that permanent entrainment is much more likely if fish pass through the siphon.

The project area does not contain designated or proposed critical habitat or suitable nesting habitat for the western yellow-billed cuckoo or the southwestern willow flycatcher. The riparian woodland habitat in the project area is fragmented and subject to frequent human disturbances. Use of this area is likely migratory in nature.

No Action Alternative: Under the No Action Alternative, endangered fish would continue to be entrained in the Green River Canal.

Proposed Action: Consultation with USFWS was completed for the Proposed Action, and a Biological Opinion was issued by USFWS on October 13, 2017. The results of the consultation are summarized as follows.

The Proposed Action may affect but is not likely to adversely affect the southwestern willow flycatcher or the western yellow-billed cuckoo because habitat for these species in the area is migratory in nature and all proposed ground-disturbing (vegetation removal) activities would be conducted outside of breeding and nesting season for both species.

The Proposed Action would have adverse effects on the endangered Colorado River fishes. During construction activities, the Colorado River fishes would have the potential to be impacted from dewatering the construction areas. Reclamation would coordinate with the Utah Division of Wildlife Resources (UDWR) to conduct fish clearance and salvage surveys. However, fish could still be injured or killed during the placement of cofferdams or during the salvage efforts. To minimize impacts, work would be conducted between October 1 – March 15, i.e., during low flow conditions and outside of sensitive spawning and larval stage time frames. The placement and removal of cofferdams could increase sediment in the river, indirectly causing a temporary minor effect on fishes. Unanticipated contaminant releases during construction could degrade habitat, which may displace fish. Environmental commitments would reduce the likelihood of spills and contamination (see Chapter 4). Alteration of the canal and riverbed would result in permanent and temporary disturbances to critical habitat.

Operation and maintenance of the fish barrier would have beneficial effects to the endangered Colorado River fishes by reducing entrainment in the Green River Canal. However, the fish barrier could pose a risk to fish from operation or maintenance activities (sediment and debris removal and mechanical, structural, or electrical maintenance). While the Proposed Action would result in some adverse effects from construction, operation, and maintenance, it is expected to provide a long-term benefit by reducing entrainment of Colorado River fishes in the Green River Canal, thus reducing fish mortality.

3.2.7.2 – Migratory Birds & Raptors

Certain birds are protected under the Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act. These Acts prohibit any activity that would result in the take (to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct) of migratory birds or eagles unless authorized by the USFWS.

The 1988 amendment to the Fish and Wildlife Conservation Act mandates the USFWS to "identify species, subspecies, and populations of all migratory nongame birds that, without additional conservation actions, are likely to become candidates for listing under the Endangered Species Act (ESA) of 1973." The "*Birds of Conservation Concern 2008"* (FWS 2008) is the most recent effort to carry out this mandate. Birds of conservation concern protected under the Migratory Bird Treaty Act or the Bald and Golden Eagle Protection Act that are likely to occur in the project area or in the immediate vicinity include the following: brewer's sparrow (breeding), golden eagle (year round), gray vireo (breeding), lesser yellowlegs (migrating), long-eared owl (year round), marbled godwit (migrating), olive-sided flycatcher (breeding), pinyon jay (year round), rufous hummingbird (migrating), and Virginia's warbler (breeding) [USFWS 2017; Sullivan, et al 2009; NatureServe 2017; Cornell Lab of Ornithology 2017]. The primary nesting season for birds of conservation concern in the project area occurs from April through August. Pinyon jays nest from February 15 through July 15 in pinyon-juniper woodlands; this vegetation community does not occur in the project area.

No Action Alternative: Under the No Action Alternative, the environment for migratory birds and raptors would not change from current conditions.

Proposed Action: The Proposed Action would cause temporary disturbance to and displacement of resident, migrating, and wintering migratory birds due to construction work. Since the Proposed Action would occur during the months of October 1 through March 15, which is outside of the primary nesting season, impacts to breeding and nesting birds of conservation concern are not anticipated.

3.2.8 – Noise

The proposed project is located in a rural area with limited noise sources, including but not limited to vehicle use of North Long Street, operation and maintenance of the Thayne Power Plant, and operation and maintenance of the Green River Canal.

No Action Alternative: Under the No Action Alternative, there would be no change in noise levels at the project area.

Proposed Action: There would be no long-term increases to the ambient noise levels from the implementation of the proposed action. Short-term and temporary increases in noise levels would occur during construction. Noise impacts would be minimized by limiting construction activities to daylight hours.

3.2.9 – Public Safety, Access, and Transportation

The major transportation route in the general vicinity of the project area is North Long Street. There are existing dirt access roads to the project area and all staging areas (Figure 3, above). The northern two staging areas are located on BLM Land, and the project area and southern staging area are located on private land.

No Action Alternative: Under the No Action Alternative, there would be no change in public safety, access, and transportation.

Proposed Action: Equipment necessary for project construction would be transported along Interstate 70, through the town of Green River, and north on North Long Street. The equipment would be hauled away along the same route. Equipment and vehicles would be staged and parked at the project area during construction. The equipment and worker vehicles would be parked and staged at the project site at identified areas on both BLM and private land. Reclamation would be authorized to utilize the borrow pit and northern access areas on BLM land via a Right-of-Way Grant from BLM (Appendix E). There would be minimal effects to transportation associated with equipment hauling and construction personnel's vehicles.

The project area is located predominantly on private land and on BLM land. Transportation along North Long Street would not be impeded, and there would be no effects on public safety or existing access routes as a result of implementation of the proposed action.

3.2.10 – Cultural Resources

Cultural resources are defined as physical or other expressions of human activity or occupation. Section 106 of the NHPA requires Federal agencies to take into account the potential effects of a proposed Federal undertaking on historic properties. Historic properties are any prehistoric or historic district, site, building, structure, or object included, or eligible for inclusion, in the NRHP.

Montgomery Archaeological Consultants, Inc. (Montgomery) conducted a cultural resource inventory (including literature searches and a site survey) of areas proposed for disturbance in the Proposed Action area of potential effect (Montgomery 2017). Reclamation also utilized the cultural resources inventory report prepared for the NRCS' Green River Diversion Rehabilitation EIS (NRCS 2013). The inventories concluded that the Green River Canal is eligible for inclusion on the NRHP.

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

Proposed Action: In consultation with the Utah State Historic Preservation Officer (SHPO), Reclamation determined that the Proposed Action would have an adverse effect on the Green River Canal. Reclamation recommended archival quality photographic documentation of the affected resource (Level I Documentation) be prepared prior to implementation of the Proposed Action. A Memorandum of Agreement (MOA) has been executed between Reclamation, the Corps, and the SHPO to mitigate the adverse effects of the Proposed Action (Appendix F). The MOA requires that any unanticipated discoveries of potential cultural resources trigger an Unanticipated Discovery Plan (UDP). The UDP outlines procedures that would be followed to protect potential archaeological materials or cultural resources discovered during implementation of the Proposed Action.

3.3 – Cumulative Impacts

NEPA requires federal agencies to consider the cumulative effects of proposals under their review. Cumulative effects are defined in the CEQ regulations 40 CFR §1508.7 as "…the impact

on the environment that results from the incremental impact of the action when added to other past, present, and reasonably foreseeable actions regardless of what agency…or person undertakes such other actions." The CEQ states that the "cumulative effects analyses should be conducted on the scale of human communities, landscapes, watersheds, or airsheds" using the concept of "project impact zone" or more simply put, the area that might be affected by the proposed action.

Effects of past actions are reflected in the current condition described in the affected environment for each of the resource topics in Chapter 3. The four Colorado River endangered fishes have the potential to be affected from the incremental impact of the Proposed Action when added to other present and reasonably foreseeable future actions. The four endangered fishes will continue to be affected in the future by water depletions, water resource development, and the implementation of UCRIP activities. The endangered fishes are currently adversely affected in the proposed project area by the Green River Canal diversion. The Proposed Action serves as a recovery measure to alleviate and prevent adverse effects to the endangered fishes within the proposed project area. Within the Colorado River Basin, when added to other UCRIP actions already occurring and expected to continue to occur, implementation of the Proposed Action aids in the cumulative UCRIP efforts and progress towards establishing self-sustaining populations of the endangered fishes. No other cumulative effects are anticipated as a result of implementation of the Proposed Action.

3.4 – Summary

Table 4 provides a summary of environmental consequences for the resources evaluated in this EA. Resource impacts are outlined for both the No Action and the Proposed Action Alternatives. Mitigation, if required, is also described.

Table 4. Summary of Impacts for the No Action Alternative and Proposed Action Alternative.

Resource	Impacts: No Action Alternative	Impacts: Proposed Action Alternative
Water Resources	There would be no change in water rights. The 50 cfs of water identified in the NRCS EIS for the Fish Barrier Return Flow would not be diverted into the Green River Canal, and would continue to remain in the Green River for the 3,000-foot stretch between the Green River Diversion Dam and the proposed location for the Green River Canal Fish Screen return channel.	Up to an additional 50 cfs would be diverted into the extreme upper reach of the Green River Canal to facilitate operation of the Green River Canal Fish Screen. The water would be utilized to operate the Green River Canal Fish Screen, and then immediately returned to the Green River in a location approximately 3,000 feet downstream of its diversion point at the Green River Diversion Dam. Any potential effects to the floodplain or floodway would be de minimis and indiscernible.
Water Quality	No change.	There would be no long-term direct or indirect impacts on the water quality of the Green River. There is the potential for a minor, short-term increase in sediment in the Green River near the project area during construction of the temporary coffer dam and construction of the fish return channel.
Waters of the United States	No change.	Temporary and permanent impacts to waters of the U.S. would occur. A CWA Section 404 permit (RGP 4) from the Corps and a Stream Alteration Permit from the Utah Division of Water Rights have been obtained (Appendix A).
Air Quality	No change.	There would be a minor, short-term effect on air quality in the immediate vicinity of the project area as a result of dust and exhaust emissions from construction equipment. There would be no long-term impacts on air quality from the proposed action.
Vegetation	No change.	Vegetation would be cleared for staging areas, canal lining, access roads, and the fish return channel. There would be a permanent loss of approximately 0.25 acre of riparian woodland due to the installation of the fish return channel. Disturbed upland and riparian areas would be seeded and/or planted at appropriate times with weed-free, BLM-approved seed mixes and plantings.

Resource	Impacts: No Action Alternative	Impacts: Proposed Action Alternative
Aquatic and Terrestrial Wildlife	Fish species will continue to perish in the canal.	There would be a short-term increase in disturbance to the area, creating minor temporary impacts to wildlife species. Rare instances of small animal or fish mortality could occur from construction. Vegetation removal would result in a temporary loss of nesting habitat, cover, and forage. Installation of the fish return channel from the canal to the Green River would result in a permanent loss of 0.25 acre of riparian woodland habitat and reduce fish mortality in the canal.
Special Status Species	Endangered fish would continue to be entrained in the Green River Canal.	There would be adverse effects from construction, operation, and maintenance to endangered Colorado River fishes, but a long-term benefit is expected by reducing entrainment and mortality in the Green River Canal. The project may affect but is not likely to adversely affect the southwestern willow flycatcher and the western yellow-billed cuckoo because habitat for these species in the area is migratory in nature and all proposed ground-disturbing (vegetation removal) activities would be conducted outside of breeding and nesting season for both species.
Noise	No change.	Short-term and temporary increases in noise levels would occur during construction. No long-term increases in ambient noise levels.
Public Safety, Access, and Transportation	No change.	The project area will not impede transportation along North Long Street. There would be no effects on public safety as a result of implementation of the proposed action. There would be no impacts to existing access routes as a result of implementation of the proposed action.
Cultural Resources	No effects.	Implementation of the Proposed Action would have an adverse effect on the NRHP-eligible Green River Canal. Reclamation, the Corps, and the SHPO have entered into an MOA to mitigate adverse effects to the Green River Canal.

Resource	Impacts: No Action Alternative	Impacts: Proposed Action Alternative
Cumulative Impacts	Endangered fish would continue to be entrained in the Green River Canal, which could hinder the cumulative UCRIP efforts towards establishing self-sustaining populations of the endangered fishes.	The Proposed Action serves as a recovery measure to alleviate and prevent adverse effects to the endangered fishes within the proposed project area. Within the Colorado River Basin, when added to other UCRIP actions already occurring and expected to continue to occur, implementation of the Proposed Action aids in the cumulative UCRIP efforts and progress towards establishing self-sustaining populations of the endangered fishes. No other cumulative effects are anticipated as a result of implementation of the Proposed Action.

CHAPTER 4 – ENVIRONMENTAL COMMITMENTS

This section discusses the environmental commitments developed to protect resources and mitigate adverse impacts to a non-significant level. The environmental commitments will be implemented by Reclamation if the proposed action is implemented. The environmental commitments will also be included in the contractor bid specifications.

- Reclamation will coordinate with the UDWR to conduct fish clearance and salvage surveys.
- Reclamation and its contractor shall comply with all terms and conditions of the Corps Section 404 CWA Permit and the State of Utah Stream Alteration Permit (Appendix A).
- The Green River Canal Company will obtain a Utah Sovereign Lands permit and shall comply with all terms and conditions of the permit.
- Conservation measures identified in the BA and Reasonable and Prudent Measures identified in the BO are incorporated by reference (Appendix D).
- Terms and Conditions of the BLM ROW permit (Appendix E) are incorporated by reference.
- Stipulations in the Memorandum of Agreement with the SHPO (Appendix F) are incorporated by reference.
- All construction activities will be confined to Reclamation's right-of-way on BLM land, and within identified areas on private land.
- Existing roads will be used to access the construction and staging areas.

- Straw wattles, silt curtains, cofferdams, dikes, straw bales, or other suitable erosion control measures will be used to prevent or minimize erosion into water bodies during construction.
- Fuels, lubricants, hydraulic fluids, and other petrochemicals will be stored and dispensed in an approved staging area.
- All construction equipment will be power-washed and free of soil and debris prior to entering the project site to reduce the spread of noxious and invasive weeds.
- Equipment will be inspected daily and immediately repaired as necessary to ensure equipment is free of petrochemical leaks.
- Construction equipment will be parked, stored, and serviced only at approved staging areas.
- A spill response plan will be prepared by the contractor in advance of construction for areas of work where spilled contaminants could flow into water bodies. All employees and workers will be briefed and made familiar with this plan.
- A spill response kit, which includes appropriately-sized spill blankets, will be easily accessible onsite at all times.
- Onsite supervisors and equipment operators will be trained and knowledgeable in the use of spill containment equipment.
- Appropriate federal and Utah authorities (including BLM and FWS) will be immediately notified in the event of any contaminant spill.
- To minimize noise impacts near the construction area, construction activities will occur during the daylight hours.
- Vegetation removal will be confined to the smallest portion of the Project Area necessary for completion of work.
- Following construction, all disturbed areas will be smoothed, shaped, contoured and reseeded to as near to their pre-project conditions as practicable. Disturbed areas will be revegetated in accordance with the attached Restoration Plan (Appendix C).
- Vegetation disturbing activities shall not be conducted during the primary nesting season of migratory birds protected under the Migratory Bird Treaty Act (April 1 through July 15).
- If previously undiscovered cultural or paleontological resources are discovered during construction, construction activities must immediately cease in the vicinity of the discovery and Reclamation must be notified. The SHPO will be consulted, and work will not be resumed until consultation has been completed, as outlined in the Unanticipated Discovery Plan in the attached MOA. Additional surveys and evaluation will be required for cultural resourced if construction plans or proposed disturbance areas are changed.
- In the event that threatened or endangered species are discovered during construction, construction activities will halt until consultation is completed with the U.S. Fish and Wildlife Service and protection measures are implemented. Additional surveys and evaluation will be required for threatened or endangered species if construction plans or proposed disturbance areas are changed.

CHAPTER 5 – CONSULTATION AND COORDINATION

5.1 – Introduction

Reclamation's public involvement process presents the public with opportunities to obtain information about a given project, and allows interested parties to participate in the project through written comments. This chapter discusses public involvement activities taken to date for the proposed action.

5.2 – Public Involvement

News Releases were issued announcing the availability of the EA and draft FONSI, and the documents were placed on Reclamation's website at: www.usbr.gov/uc/envdocs. The EA and draft FONSI were also announced with request for comments in a distribution letter mailed or emailed to agencies, ditch companies, stakeholders, and landowners adjacent to the project area, including, but not limited to, those listed below:

- State Representative Rob Bishop
- State Representative Chris Stewart
- State Representative John Curtis
- State Representative Mia Love
- State Senator Orrin Hatch
- State Senator Mike Lee
- U.S. Fish and Wildlife Service, West Valley City, UT
- U.S. Bureau of Land Management, Price, UT
- U.S. Army Corps of Engineers, Bountiful, UT
- Natural Resources Conservation Service, Salt Lake City, UT
- Ute Indian Tribe of the Uintah & Ouray Reservation, Ft. Duchesne, UT
- Southern Ute Indian Tribe, Ignacio, CO
- Ute Mountain Ute Tribe, Towaoc, CO
- Navajo Nation, Window Rock, AZ
- Upper Colorado River Endangered Fish Recovery Program, Lakewood, CO
- State of Utah – Office of the Governor, Salt Lake City, UT
- Utah Department of Environmental Quality, Salt Lake City, UT
- Utah Division of Wildlife Resources, Salt Lake City, UT
- Utah Association of Conservation Districts, Castle Dale, UT
- Utah Department of Public Safety, Salt Lake City, UT
- Utah School and Institutional Trust Lands Administration, Salt Lake City, UT
- Utah Department of Natural Resources, Salt Lake City, UT
- Utah Department of Agriculture, Salt Lake City, UT
- Utah Division of Forestry, Fire and State Lands, Salt Lake City, UT

- Utah Division of Drinking Water, Salt Lake City, UT
- Utah Reclamation Mitigation & Conservation Commission, Salt Lake City, UT
- Utah Department of Agriculture and Food, Salt Lake City, UT
- Utah National Heritage Program, Salt Lake City, UT
- Utah Division of State History, Salt Lake City, UT
- Utah Fish and Wildlife Conservation Office, Vernal, UT
- Green River State Park, Green River, UT
- Emery County Commissioners, Castle Dale, UT
- Emery County Planning & Zoning, Castle Dale, UT
- Emery County Road Department, Castle Dale, UT
- Grand County Sheriff, Moab, UT
- Grand County Council, Moab, UT
- City of Green River, Green River, UT
- 38 Members of the UCRIP Management Committee
- 9 Adjacent Landowners

5.3 – EA Comments

The Draft EA was released for a 30-day public review period beginning January 26, 2018, and ending February 23, 2018. During this period, Reclamation received two letters from State and Tribal entities. The following is a summary of Reclamation's responses to comment received on the Draft EA. The original comment letters are provided in Appendix G.

Comment Letter from Southern Ute Indian Tribe:

Comment 1: The Southern Ute Indian Tribe Cultural Department's NAGPRA Coordinator has reviewed the project, and determined that there are no properties of religious or cultural significance to the Southern Ute Indian Tribe that are listed on the National Register within the area of potential effect or that the proposed project will have no effect on any such properties that may be present.

Response 1: Acknowledged.

Comment Letter from the State of Utah's Public Lands Policy Coordinating Office:

Comment 1: The subject portion of the bed of the Green River is considered Sovereign Land of the State of Utah and is managed by the Utah Division of Forestry, Fire & State Lands (FFSL). In addition to obtaining a stream alteration permit, this action will require prior authorization from FFSL.

Response 1: Obtaining authorization from FFSL has been added to Section 2.5 – Permits and Authorizations in the Final EA.

5.4 – Utah Division of State History

Reclamation submitted a consultation letter to the SHPO on June 8, 2017, with a determination of historic properties affected by the proposed action. SHPO concurred on the finding of adverse

effect to the Green River Canal. Reclamation, the Corps, and the SHPO have entered into an MOA to mitigate adverse effects to historic properties as a result of the proposed action.

5.5 – U.S. Army Corps of Engineers, Utah Division of Water Rights, and Utah Division of Forestry, Fire, & State Lands

Reclamation coordinated with the Corps, the Utah Division of Water Rights, and the Utah Division of Forestry, Fire, & State Lands (FFSL) to determine permitting requirements for the Proposed Action. The Corps determined a CWA Section 404 permit (RGP 4) is required for the Proposed Action, and designated Reclamation as the lead Federal agency for purposes of complying with the NEPA, ESA, and NHPA. In addition, a Stream Alteration Permit is required from the Utah Division of Water Rights, and a Utah Sovereign Lands Permit is required from the Utah FFSL. Permits from the Corps and the State of Utah are attached (Appendix A).

5.6 – U.S. Fish and Wildlife Service

Reclamation formally consulted with the FWS, and submitted a BA to the FWS on June 16, 2017. The FWS issued a Biological Opinion (BO) on October 13, 2017 (Appendix D).

5.7 – Utah Department of Wildlife Resources

Fish clearance and salvage surveys during cofferdam work and canal dewatering are a requirement in the BO. Reclamation coordinated with the UDWR to determine the necessary points of contact for planning the fish clearance and salvage surveys. Reclamation has contacted the appropriate UDWR personnel to inform them of the project and the future coordination needed for surveys.

CHAPTER 6 – PREPARERS

The following list contains the Reclamation employees who participated in the preparation of this EA.

Name	Title	Areas of Responsibility
Jenny Ward	Environmental Protection Specialist	Cultural Resources, Native American Religious Concerns, Soils, Air Quality, Water Resources, Water Quality, Land Use, Environmental Justice
Amanda Ewing	Biologist	T&E Species, Migratory Bird Treaty Act, Terrestrial & Aquatic Wildlife, Vegetation, Recreation
Lesley McWhirter	Environmental and Planning Group Chief	NEPA Coordinator and Editor, Clean Water Act and State of Utah Permitting
Bob Norman	Civil Engineer	Operations, Construction Procedures, Review

CHAPTER 7 – REFERENCES

CDC 2017. Centers for Disease Control and Prevention. National Center for Environmental Health, Environmental Health Tracking Branch. Environmental Public Health Tracking – Info by Location. [Online]. Available at https://ephtracking.cdc.gov/InfoByLocation/. Accessed on: February 15, 2017.

Cornell Lab of Ornithology. 159 Sapsucker Woods Rd, Ithaca, NY 14850. https://www.allaboutbirds.org/guide/ . Accessed November 16, 2017.

EPA 2017a. U.S. Environmental Protection Agency. Criteria Pollutant Nonattainment Summary Report. [Online]. February 13, 2017. Available at https://www3.epa.gov/airquality/greenbook/ancl3.html. Accessed on: February 14, 2017.

EPA 2017b. U.S. Environmental Protection Agency. Environmental Justice Screening and Mapping Tool. [Online]. https://www.epa.gov/ejscreen. Generated February 15, 2017.

Montgomery 2017. Montgomery Archaeological Consultants, Inc. Cultural Resource Inventory of Green River Canal Company's Proposed Fish Screen Project, Emery County, Utah. May 17, 2017.

NatureServe. 2017. NatureServe Explorer: An online encyclopedia of life [web application]. Version 7.1. NatureServe, Arlington, Virginia. Available http://explorer.natureserve.org. (Accessed: November 16, 2017).

NRCS 2013. U.S. Department of Agriculture, Natural Resources Conservation Service. Cultural Resources Survey for the Green River Diversion Rehabilitation, Grand and Emery Counties, Utah. October 1, 2013.

NRCS 2014. U.S. Department of Agriculture, Natural Resources Conservation Service. Final Environmental Impact Statement, Green River Diversion Rehabilitation Project. June 2014. [Online version https://www.nrcs.usda.gov/wps/PA_NRCSConsumption/download?cid=stelprdb1256193&ext=pdf].

Sullivan, B.L., C.L. Wood, M.J. Iliff, R.E. Bonney, D. Fink, and S. Kelling. 2009. eBird: a citizen-based bird observation network in the biological sciences. Biological Conservation 142: 2282-2292.

UDEQ 2016. Utah Department of Environmental Quality, Division of Water Quality. Utah's Final 2016 Integrated Report. December 7, 2016. [Online version http://www.deq.utah.gov/ProgramsServices/programs/water/wqmanagement/assessment/docs/2016/full-print-ready-final2016ir-v2-1.pdf].

UDEQ 2017. Utah Department of Environmental Quality, Division of Water Quality. Water Quality Assessment Map. [Online]. Available at http://mapserv.utah.gov/surfacewaterquality/. Accessed on: February 14, 2017.

USFWS 2017. U.S. Fish and Wildlife Service. Endangered Species Act Species List. [Online]. Available at https://ecos.fws.gov/ipac/location/N3CT3FZFIBA6ZBPZ3MTPVBXH5E/resources. Accessed on: February 16, 2017.

USGS 2017. U.S. Geological Survey. National Water Information System: Web Interface; USGS 09315000 Green River at Green River, UT. Available at: https://waterdata.usgs.gov/nwis/inventory?agency_code=USGS&site_no=09315000. Accessed on: March 24, 2017.

CHAPTER 8 – ABBREVIATIONS AND ACRONYMS

Abbreviation or Acronym	Definition
AIRF	American Indian Religious Freedom Act
ARPA	Archaeological Resources Protection Act
BA	Biological Assessment
BGEPA	Bald and Golden Eagle Protection Act
BO	Biological Opinion
CAA	Clean Air Act
CEQ	Council on Environmental Quality
Corps	U.S. Army Corps of Engineers
CWA	Clean Water Act
EA	Environmental Assessment
E.O.	Executive Order
EPA	Environmental Protection Agency
ESA	Endangered Species Act
FONSI	Finding of No Significant Impact
FWS	Fish and Wildlife Service
GRCC	Green River Canal Company
Interior	U.S. Department of the Interior
ITA	Indian Trust Asset
MBTA	Migratory Bird Species Act
MOA	Memorandum of Agreement
NAAQS	National Ambient Air Quality Standards
NAGPRA	Native American Graves Protection and Repatriation Act
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NRHP	National Register of Historic Places
PM	Particulate Matter
Project or Proposed Action	Green River Canal Fish Screen Project
Reclamation	U.S. Bureau of Reclamation
RGP	Regional General Permit
SHPO	State Historic Preservation Officer
UDP	Unanticipated Discovery Plan
UDWR	Utah Division of Wildlife Resources

DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS, SACRAMENTO DISTRICT
1325 J STREET
SACRAMENTO CA 95814-2922

March 22, 2018

Regulatory Division (SPK-2017-00459)

United States Bureau of Reclamation
Attn: Mr. Louis Warner
445 West Gunnison Avenue, Suite 221
Grand Junction, Colorado 81501

Dear Mr. Warner:

We are responding to your January 22, 2018 request for a Department of the Army permit for the Green River Fish Screen project. This approximately 10-acre project involves activities, including discharges of dredged or fill material, in waters of the United States to install a fish barrier and ancillary facilities in the Green River Canal, the Green River, and an unnamed wash, in order to reduce the entrainment of federally-listed fishes in the Green River Canal, subject to Section 10 of the Rivers and Harbors Act of 1899 (33 USC 403) and Section 404 of the Clean Water Act (33 USC 1344). The project site is located on the Green River, approximately 5.5 miles north of the town of Green River, Latitude 39.07834°, Longitude -110.14555°, Emery County, Utah (enclosure 1).

Based on the information you provided, the proposed activity, resulting in temporary impacts to 0.09 acre/200 linear feet of the Green River, 0.09 acre/75 linear feet of the Green River Canal, and 0.14 acre of riverine wetlands, as well as permanent impacts to 0.22 acre/192 linear feet of the Green River, 1.98 acres/1200 linear feet of the Green River Canal, and 0.2 acre/115 linear feet of an unnamed wash, and 0.03 acre of riverine wetlands, is authorized by Regional General Permit 4. The work would be completed in accordance with the attached project plans (enclosure 2). Your work must comply with the general terms and conditions listed on the enclosed Regional General Permit information sheets (enclosure 3) and the following special conditions:

Special Conditions

1. All temporary fills must be removed in their entirety and the affected areas returned to pre-construction elevations. The affected areas must be revegetated, as appropriate. The permittee shall fully implement the "RGP-4 Pre-Construction Notification Restoration Plan" (enclosure 4) to re-contour and revegetate all temporarily disturbed areas.

2. This Corps permit does not authorize you to take an endangered species, in particular bonytail (*Gila elegans*), Colorado pikeminnow (*Ptychocheilus lucinus*), humpback chub (*Gila cypha*), or razorback sucker (*Xyrauchen texanus*). In order to legally take a listed species, you must have separate authorization under the

Endangered Species Act (ESA) (e.g., an ESA Section 10 permit, or a Biological Opinion (BO) under ESA Section 7, with "incidental take" provisions with which you must comply). The enclosed U.S. Fish and Wildlife Service (USFWS) BO (Number FWS/R6ES/UT06E23000-2017- F-0357), dated October 13, 2017) (enclosure 5), contains mandatory terms and conditions to implement the reasonable and prudent measures that are associated with "incidental take" that is also specified in the BO. Your authorization under this Corps permit is conditional upon your compliance with all of the mandatory terms and conditions associated with "incidental take" of the attached BO, which terms and conditions are incorporated by reference in this permit. Failure to comply with the terms and conditions associated with incidental take of the BO, where a take of the listed species occurs, would constitute an unauthorized take, and it would also constitute non-compliance with your Corps permit. The USFWS is the appropriate authority to determine compliance with the terms and conditions of its BO, and with the ESA.

3. You shall implement the enclosed Memorandum of Agreement (MOA), entitled *Memorandum of Agreement Among The Western Colorado Area Office, Bureau of Reclamation, The U.S. Army Corps of Engineers, Sacramento District, And the Utah State Historic Preservation Officer Regarding the Green River Canal Fish Barrier Project, Upper Colorado River Endangered Fish Recovery Implementation Program, Emery County, Utah* (enclosure 6), and signed by these entities, in its entirety. The U.S. Bureau of Reclamation has been designated the lead federal agency responsible for implementing and enforcing the MOA as signed. If you fail to comply with the implementation and associated enforcement of the MOA, this office may determine that you are out of compliance with the conditions of your permit verification and suspend the permit verification. Suspension may result in modification or revocation of the authorized work.

4. You shall comply with all terms and conditions of the Section 401 Water Quality Certification from the State of Utah Department of Environmental Quality, Division of Water Quality, attached to the RGP 4.

5. You must sign the enclosed Compliance Certification (enclosure 7) and return it to this office within 30 days after completion of the authorized work.

This verification is valid for two years from the date of this letter or until the Regional General Permit is modified, reissued, or revoked, whichever comes first. Failure to comply with the General Conditions of this Regional General Permit, or the project-specific Special Conditions of this authorization, may result in the suspension or revocation of your authorization.

We appreciate feedback, especially about interaction with our staff and our processes. For information about our program or to complete our Customer Survey, visit our website at www.spk.usace.army.mil/Missions/Regulatory.aspx.

Please refer to identification number SPK-2017-00459 in any correspondence concerning this project. If you have any questions, please contact me at the Bountiful Regulatory Office, 533 West 2600 South, Suite 150, Bountiful, Utah 84010-7744, by email at *Matthew.S.Wilson@usace.army.mil*, or telephone at (801) 295-8380, ext. 8311.

Sincerely,

Matt Wilson
Senior Project Manager
Nevada-Utah Section

Enclosures

cc:

Lesley McWhirter – Bureau of Reclamation (lmcwhirter@usbr.gov)

GARY R. HERBERT
Governor
SPENCER J. COX
Lieutenant Governor

State of Utah
DEPARTMENT OF NATURAL RESOURCES
MICHAEL R. STYLER
Executive Director
Division of Water Rights
KENT L. JONES
State Engineer/Division Director

ORDER OF THE STATE ENGINEER

FOR STREAM ALTERATION APPLICATION NUMBER **18-91-02SA**
IN THE NAME OF BOR – BUREAU OF RECLAMATION FOR ALTERATION TO
GREEN RIVER & EPHEMERAL WASH TRIBUTARY IN EMERY COUNTY, UTAH

This **ORDER** is issued pursuant to statute and in accord with the statutory criteria for approval of a stream alteration application that are described at UTAH CODE ANN. § 73-3-29. The State Engineer has determined that this application does meet the necessary legal criteria to **ORDER** the approval of the application based upon the following information and reasoning set forth in the Findings of Fact and Discussion.

FINDINGS OF FACT

1. The application was received by the Division of Water Rights ("Division") on January 23, 2018, and made available for comment on the Division's webpage, provided to pertinent governmental agencies, and to other entities as warranted, for a period of 20 calendar days, said period concluding prior to February 12, 2018.

2. The application contains the following information:
   - The stated description of the proposed project is: Modification of diversion and related work to improve fish screen operation associated with Green River & ephemeral wash tributary in Emery County.
   - The stated purpose of the proposed project is: To improve fish screen operation.

3. The Division received comments or objections on the proposed project from:
   - State Floodplain Manager - Kathy Holder
   - USACE – U.S. Army Corps of Engineers (Corps) - Michael Pectol

   The comments or objections received by the Division are summarized as follows:
   - Kathy Holder has asked that the applicant must be compliant with all rules and regulations of the Federal Floodplain Insurance Program as administrated by the local city or county floodplain administrator.
   - The Corps has indicated that this project will require separate permitting from the Corps. Michael Pectol can be contacted at 801-295-8380 for more information.

DISCUSSION

1. Based on a review of the Division's water rights records and/or a review of the application by personnel of the Division's regional office, it is the opinion of the State Engineer that the project will not impair vested water rights.

1594 West North Temple, Suite 220, PO Box 146300, Salt Lake City, UT 84114-6300
telephone (801) 538-7240 • facsimile (801) 538-7467 • TTY (801) 538-7458 • www.waterrights.utah.gov

2. It is the opinion of the State Engineer that the project will not unreasonably or unnecessarily affect recreational use or the natural stream environment.

3. It is the opinion of the State Engineer that the project will not unreasonably or unnecessarily endanger aquatic wildlife.

4. It is the opinion of the State Engineer that the project will not unreasonably or unnecessarily diminish the natural channel's ability to conduct high flows.

5. Other comments or concerns submitted by interested persons or parties are not believed to be within the purview of the State Engineer in evaluating an Application to Alter a Natural Stream.

ORDER

Stream Alteration Application No. **18-91-02SA**, submitted in the name of BOR – Bureau of Reclamation, applicant, in order to complete modification of diversion and related work to improve fish screen operation associated with Green River & ephemeral wash tributary, a natural stream located in Emery County, Utah, is hereby APPROVED, as a STATE ONLY PERMIT, contingent upon the conditions outlined in this **ORDER**. The applicant is hereby authorized to conduct the work detailed in the application and supporting documentation, as described in this **ORDER**. Any modification or addition to the work may require additional authorization and/or application resubmittal.

1. The expiration date of this order is **February 13, 2020**. Work affecting the bed and/or banks of the stream may not be conducted after the expiration date. A request for extension must be submitted in writing to the Division and include an explanation for project delay. The request must be submitted at least 30 days prior to expiration of the order.

2. A copy of this order must be kept onsite at any time the work authorized under this order is in progress.

3. We suggest that you coordinate with potentially impacted landowners.

4. Photos must be taken before and after project construction and submitted to this office.

5. Disturbed areas must be planted with a variety of appropriate vegetation (especially woody vegetation where feasible) to help hold the soil around riprap, prevent excessive erosion, and to help maintain other riverine functions. Successful revegetation efforts must be monitored and reported to this office.

6. Best Management Practices should be implemented and maintained during any streamside or instream work to minimize sedimentation, temporary erosion of stream banks, and needless damage or alteration to the streambed.

7. Approval of this application does not authorize trespass, easements, rights-of-way, or any other access and land use permits. It is the responsibility of the applicant to obtain any such authorizations as may be necessary for this proposal.

8. Excavated material and construction debris may not be wasted in any stream channel or placed in flowing waters, this will include material such as grease, oil, joint coating, or any other possible pollutant. Excess materials must be wasted at an upland site well away from any channel. Construction materials, bedding material, excavated material, etc. may not be stockpiled in riparian or channel areas.

9. Erosion control, revegetation, and noxious weed control must be implemented and monitored until revegetation becomes well established. Success of these measures must also be reported prior to the compliance inspection. This is especially important for all disturbed areas, including fill, in order to prevent sediments from entering flowing water. Particular attention is required to assure that silt fencing is properly installed and left in place until after revegetation becomes established at which time the silt fence can then be carefully removed.

10. Ingress and egress access should be kept to a minimum.

11. Work must be accomplished during a period of low flow. Sediment introduced into stream flows during construction must be controlled to prevent increases in turbidity downstream. Flows must be diverted away from the construction area using a non-erodible cofferdam or other means of bypass.

12. Machinery must be properly cleaned and fueled offsite.

13. Riprap must consist of only clean, properly sized angular rock, which must be keyed deeply into the streambed to prevent undercutting. A filter must be placed behind if necessary (i.e., if soils are fine grained, non-cohesive, and/or erodible). Demolition debris or refuse will not be allowed, nor material such as bricks, concrete, asphaltic material [either natural (tar sand, oil shale, etc.) or man-made].

14. Disturbed riparian areas must be planted with naturally occurring vegetation. Plantings shall be protected from grazing animals by fencing. If beaver or other rodent damage should occur, other methods such as metal collars placed around the trees must be included.

15. Assure that all Water Rights are in order.

Your contact with the Division is Daren Rasmussen, who can be reached at telephone number 801-538-7377.

This **ORDER** is subject to the provisions of UTAH ADMIN. CODE R. 655-6-17 of the Division of Water Rights and to UTAH CODE ANN. §§ 63G-4-302 and 73-3-14, which provide for persons or parties with legal standing to file either a Request for Reconsideration with the State Engineer or an appeal with the appropriate District Court. A Request for Reconsideration must be filed with the State Engineer within 20 days of the date of this **ORDER**. However, a Request for Reconsideration is not a prerequisite to filing a court appeal. A court appeal must be filed within 30 days after the date of this **ORDER**, or if a Request for Reconsideration has been filed, within 30 days after the date the Request for Reconsideration is denied. A Request for Reconsideration is considered denied when no action is taken within 20 days after the Request is filed.

Dated this 13th day of February, 2018.

David K. Marble, P.E.
Assistant State Engineer

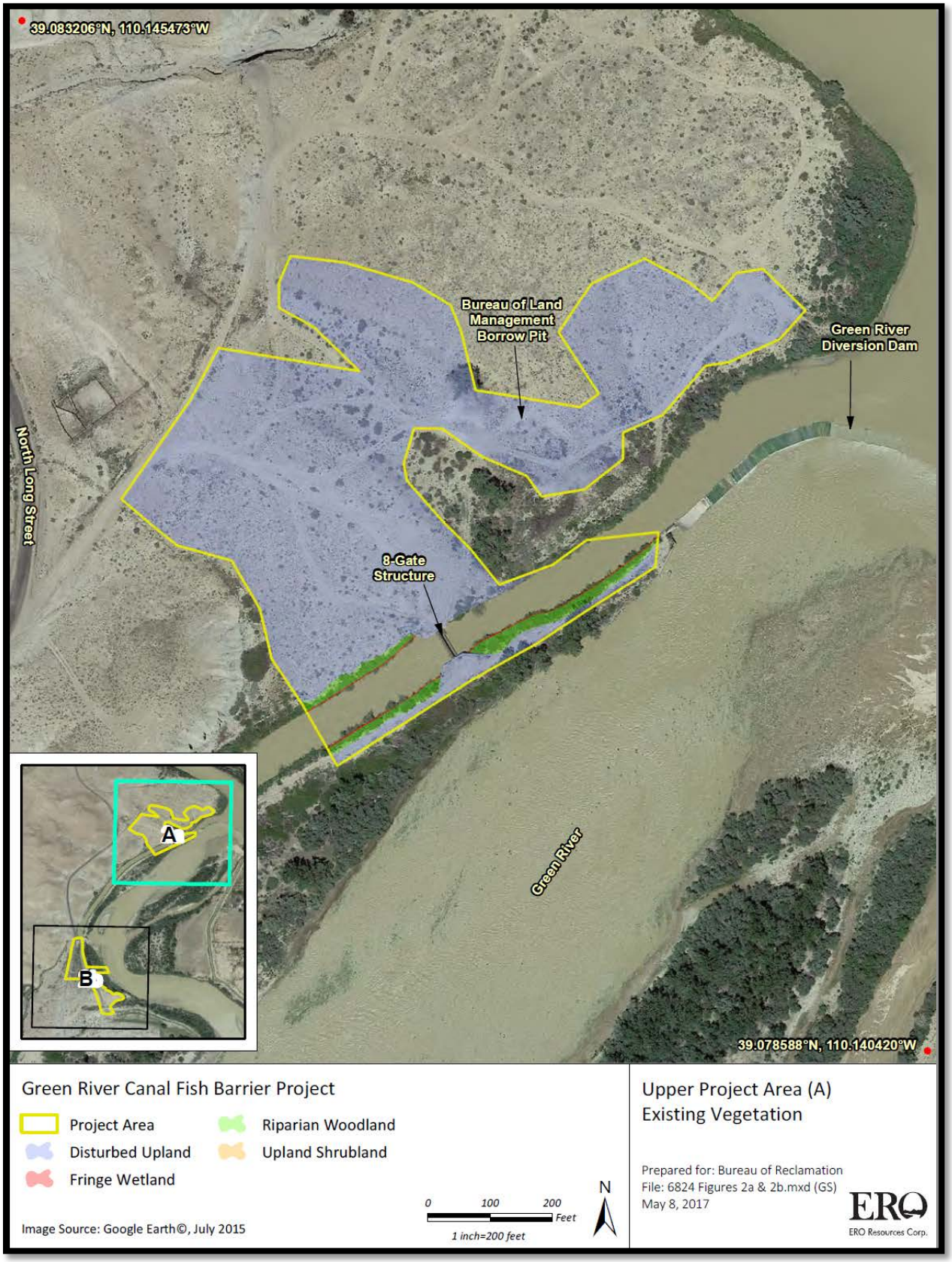
Mailed a copy of the foregoing Order this 13th day of February, 2018, to:

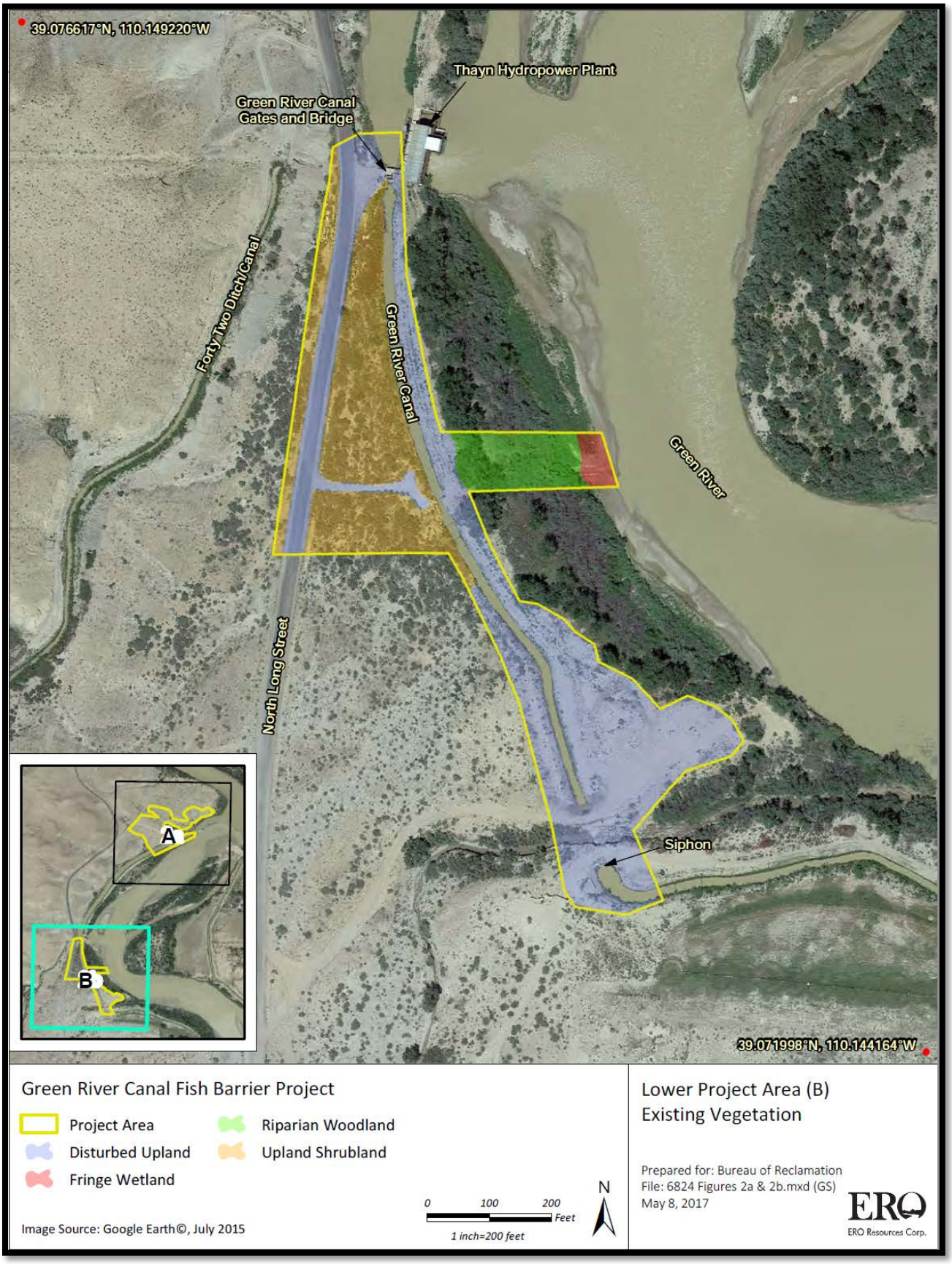
BUREAU OF RECLAMATION
WESTERN COLORADO AREA OFFICE
445 WEST GUNNISON AVENUE, SUITE 221
GRAND JUNCTION CO 81501

Kathleen Anderson - Corps of Engineers, Kathleen.Anderson@usace.army.mil
Marc Stilson - Regional Engineer
Richard Clark - EPA
Chris Wood - Regional Wildlife Habitat Manager
Kathy Holder - Division of Emergency Management, kcholder@utah.gov
Leslie McWhirter, lmcwhirter@usbr.gov

By: Tiffany Gonzales
Tiffany Gonzales
Secretary

APPENDIX B – Vegetation Community Maps




39.076617°N, 110.149220°W
Thayn Hydropower Plant
Green River Canal Gates and Bridge
Forty Two Ditch/Canal
Green River Canal
Green River
North Long Street
Siphon
A
B
39.071998°N, 110.144164°W
Green River Canal Fish Barrier Project
Project Area
Disturbed Upland
Fringe Wetland
Riparian Woodland
Upland Shrubland
Image Source: Google Earth©, July 2015
0 100 200 Feet
1 inch=200 feet
N
Lower Project Area (B)
Existing Vegetation
Prepared for: Bureau of Reclamation
File: 6824 Figures 2a & 2b.mxd (GS)
May 8, 2017
ERO
ERO Resources Corp.

APPENDIX C – Restoration Plan

RESTORATION PLAN

The following are restoration measures to be applied to all areas disturbed as a result of the project, and will be implemented in compliance with the US Fish and Wildlife Service Biological Opinion and the Army Corps of Engineers Section 404 Clean Water Act Permit. Engineering drawings and contract specifications will be provided to contract awardee to identify specific locations of activities and acceptable methodologies.

- All disturbed areas resulting from the project will be graded and rehabilitated to as near their pre-project construction condition as practicable.

- Bank erosion protection in the Green River will be constructed to minimize voids in riprap in excess of 2-3 feet above the existing river bed to minimize potential nonnative fish species refuges (i.e. interstitial spaces).

- Riparian restoration will consist of dormant season pole plantings of coyote willow (*Salix exigua*), Fremont cottonwood (*Populus fremontii*), Goodings willow (*Salix goodingii*), and/or seepwillow (*Baccharis salicifolia*), in the areas where sufficient water appears available, at a planting rate of 1,210 poles per acre. Pole plantings will utilize multiple stems that are planted into holes excavated by an auger (chainsaw or equipment mounted) to ensure cuttings are buried no less than 4 feet into the ground to reach the lowest water table of the year. Pole plantings for coyote willow and seepwillow will have 3 cuttings of the same species per hole and will be spaced 12 feet on center. Multiple rows will be staggered. Good soil-to-stem contact promotes root development, so holes will be filled with a mud-water slurry. Once buried, stems will be cut to leave about 6-8 inches of stem above the ground surface. Goodings willow and cottonwood cuttings will be planted adjacent to the toe of the bank stabilization, with willow plantings closer to the stream, from the toe up to bank full, and cottonwoods planted above bank full elevation. These species may be planted as single poles with 1-2 coyote willow stems in the hole as well. These poles will be planted 12 feet apart. Longer cottonwood poles (3-4 feet longer than the depth to water surface) will be planted behind bank stabilization areas.

- Riparian zone seeding will be seeded with weed-free, BLM-approved seed mix, sourced within 500 miles of the project area. The seed mix will consist of saltgrass (*Distichlis spicata*), alkali sacaton (*Sporobolus airoides*), skunkbrush sumac (*Rhus trilobata*), scarlet globemallow (*Penstemon palmeri*), winterfat (*Krascheninnikovia lanata*), and forage kochia (*Bassia prostrata*).

- High terrace and upland areas will be seeded with weed-free, BLM-supplied seed mixes, sourced within 500 miles of the project area. The seed mix will consist of: Indian ricegrass (*Achnatherum hymenoides*), alkali sacaton, crested wheatgrass (*Agropyron cristatum*), scarlet globemallow, winterfat, shadscale (*Atriplex confertifolia*), and forage kochia.

- Preparation and application measures will be required to aid in revegetation success. Site preparation measures will include, scarifying areas, filling and smoothing topsoil with track equipment, soil testing, and fertilizer application, as needed. Seeding may occur via drill seeding or hyroseeding. Mulching will be required.

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-Ewing
ENV-7.00

JUN 16 2017

MEMORANDUM

To: Utah Field Supervisor, Ecological Services, U.S. Fish and Wildlife Service,
West Valley City, Utah
Attn: Larry Crist

From: Ed Warner
Area Manager, Western Colorado Area Office, U.S. Bureau of Reclamation,
Grand Junction, Colorado

Subject: Request for Consultation under Section 7 of the Endangered Species Act for the Green River Canal Fish Barrier Project

The Bureau of Reclamation, as a partner in and under the authority of the Upper Colorado River Recovery Implementation Program (Recovery Program), is requesting consultation pursuant to Section 7 of the Endangered Species Act for the installation of a fish barrier and ancillary facilities in and adjacent to the Green River Canal.

Additionally, the U.S. Army Corps of Engineers (USACE) requires issuance of a permit for the project, pursuant to Section 404 of the Clean Water Act. Reclamation is the lead federal agency for the project, and is including the USACE's action in this Section 7 consultation. A copy of the USACE letter designating Reclamation as the lead federal agency to act on their behalf for purposes of Section 7 compliance is enclosed.

The proposed Green River Fish Barrier Project is located approximately 8 miles north of the City of Green River in eastern Emery County, Utah. The enclosed Biological Assessment (BA) provides information regarding federally-listed species and critical habitat to support Reclamation's determinations of effect.

Proposed activities include installation of the fish barrier, fish return channel, and fish detection antennas, construction of two temporary cofferdams, canal gate modification, lining a portion of the Green River Canal, siphon replacement, and improvements to and creation of operation and maintenance roads. This Project also includes the operation and maintenance activities required for the Recovery Program facilities (fish barrier and associated structures, plus fish screens and passages located on the east end of the Green River Diversion). Additionally, the Green River Canal Company may repair the existing 8 gate structure including construction of new wingwalls and installation of riprap in the canal, and that work is included as part of this consultation, provided the work is conducted simultaneously with the fish barrier project.

Based on the information contained in the enclosed BA and summarized below, Reclamation requests the Service's concurrence with the following effects determinations for the Green River Fish Barrier Project:

1) The proposed action may affect, but is not likely to adversely affect, the Southwestern willow flycatcher, and will have no effect on its designated critical habitat. Habitat in the area is defined as migratory in nature and ground disturbing activities would occur during a timeframe when the species is not present.

2) The proposed action may affect, but is not likely to adversely affect, the western yellow-billed cuckoo, and proposed critical habitat is not expected to be altered or modified. Habitat in the area is defined as migratory in nature and ground disturbing activities would occur during a timeframe when the species is not present.

3) The proposed action may affect, and is likely to adversely affect, the Colorado pikeminnow, bonytail chub, razorback sucker, and humpback chub and designated critical habitat for the razorback sucker and Colorado pikeminnow. The Project may affect, but is not likely to adversely affect, humpback chub and bonytail chub critical habitat. The Project would reduce canal entrainment and the potential for incidental take of endangered Colorado River fish; however, project construction and regular operation and maintenance activities of the fish barrier and return channel have the potential to adversely affect these species. Larval fish and eggs may still become entrained in the canal downstream of the fish barrier resulting in incidental take. There is also potential for adult, sub-adult, and larval fish to be injured by the fish barrier or debris removal resulting in death or injury. Critical habitat for the razorback sucker and Colorado pikeminnow will be permanently disturbed due to the placement of the return channel. Due to the small scale impacts to the Green River from construction activities, humpback chub and bonytail chub critical habitat downstream are not likely to be adversely affected.

Reclamation has also determined that the proposed action will have no effect on the Utah prairie dog, California condor, Mexican spotted owl, Barneby reed-mustard, Jones cycladenia, Last chance townsendia, San Rafael cactus, Winkler cactus, or the Wright fishhook cactus.

If you have any questions or need additional information, please contact Amanda Ewing at 970-248-0631 or by email at aewing@usbr.gov.

Enclosure

cc: Mr. Michael Pectol (w/encl) (attn sent via e-mail)

DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS, SACRAMENTO DISTRICT
1325 J STREET
SACRAMENTO CA 95814-2922

June 7, 2017

Regulatory Division (SPK-2017-00459)

Bureau of Reclamation
Attn: Ms. Lesley McWhirter
445 West Gunnison Avenue, Suite 221
Grand Junction, Colorado 81501

Dear Ms. McWhirter:

This letter concerns our designation of lead Federal agency for the proposed Green River Fish Screen project. The approximately 10-acre project site is located on the Green River, 5.5 miles north of the town of Green River, Latitude 39.07834°, Longitude -110.1455°, Emery County, Utah.

Following early coordination with your agency on May 17, 2017, we hereby designate the U.S. Bureau of Reclamation (BOR) as the lead Federal agency to act on our behalf for purposes of compliance with the Section 7 of the Endangered Species Act (ESA) and Section 106 of the National Historic Preservation Act (NHPA) for Department of the Army authorization required for the Green River Fish Screen project.

Prior to initiating consultation with the appropriate agency, please coordinate your draft determinations for ESA and NHPA, as well as the information used in making that determination, with our office. Additionally, please include a statement in your consultation letters indicating that we have designated BOR as the lead Federal agency for the proposed action, along with a copy of this letter.

Please refer to identification number SPK-2017-00459 in any correspondence concerning this project. If you have any questions, please contact Michael Pectol at the Bountiful Regulatory Office, 533 West 2600 South, Suite 150, Bountiful, Utah 84010, by email at *Michael.A.Pectol@usace.army.mil*, or telephone at (801) 295-8380.

Sincerely,

Michael A. Pectol
Project Manager, Nevada-Utah Section
Regulatory Division

Biological Assessment
Green River Canal Fish Barrier Project
Green River, Utah

Prepared for—

Bureau of Reclamation
Western Colorado Area Office
445 West Gunnison Avenue, Suite 221
Grand Junction, CO 81501

Prepared by—

ERO Resources Corporation
PO Box 932
Hotchkiss, CO 81419
970-872-3020

June 15, 2017

CONTENTS

TABLES

DIAGRAMS

FIGURES

APPENDICES

PHOTO LOG

Introduction

The Bureau of Reclamation (Reclamation), as a partner in and under the authority of the Upper Colorado River Recovery Implementation Program (Recovery Program), plans to construct the Green River Canal Fish Barrier Project (Project) in and adjacent to the Green River Canal. The Green River Canal is owned, operated and maintained by the Green River Canal Company. The Project is located in Emery County, just north of Green River, Utah (Figure 1). This area contains habitat and/or critical habitat for four federally endangered fish species (bonytail, Colorado pikeminnow, humpback chub, and razorback sucker). Federally threatened and endangered species are protected under the Endangered Species Act (ESA) of 1973, as amended (16 U.S.C. 1531 et seq.). Adverse effects on a federally listed species or its habitat require consultation with the U.S. Fish and Wildlife Service (Service) under Section 7 of the ESA when there is a federal nexus such as issuance of a federal permit, use of federal funds, or if the Project takes place on federal lands.

Recent data indicates high levels of fish entrainment are taking place at the Green River Canal. Reclamation, as a partner in the Recovery Program in the Upper Colorado River Basin, plans to provide funding for installation of a fish barrier and ancillary facilities in the Green River Canal. Proposed activities include installation of the fish barrier and fish return channel, construction and removal of two temporary cofferdams, canal gate modification, lining a portion of the Green River Canal Canal, siphon replacement, and improvements to and creation of operation and maintenance roads. This Project also includes the operation and maintenance activities required for the Recovery Program facilities (fish barrier and associated structures, plus fish screens and passages located on the east side of the Green River Diversion Dam). Additionally, Green River Canal Company proposed work relating to repair of the existing 8 gate structure, including construction of new wingwalls and installation of riprap in the canal, is included as part of this consultation.

Under the ESA, a BA needs to include all areas to be affected directly or indirectly by the federal action (defined as the action area or AA, 50 CFR §402.02), and a description of proposed conservation measures for potential impacts on threatened and endangered species. The Project includes two action areas (AA); AA1 to the north and AA2 to the south (Figure 1). The purpose of this BA is to evaluate the proposed activities in sufficient detail to determine potential effects of the Project on federally listed threatened, endangered, and candidate species, as well as designated and proposed critical habitat. This BA includes a description of the Project, a description of the existing conditions in the Project area, and an analysis of potential Project-related impacts on threatened and endangered species.

Federal Action

The federal action triggering the Section 7 consultation is the federal funding of the Project by Reclamation, as a Recovery Program partner, as part of the habitat restoration element of the Recovery Program.

In addition, the U.S. Army Corps of Engineers (USACE) requires issuance of a permit for the project, pursuant to Section 404 of the Clean Water Act. Reclamation is the lead federal agency for the project, and is including the USACE's action in this Section 7 consultation.

Project Background

The Recovery Program was established in 1988 to address conflicts between the ESA and water development. The Recovery Program is a unique partnership of local, state, and federal agencies, water and power interests, and environmental groups working to recover endangered fish in the Upper Colorado River Basin while water development proceeds in accordance with federal and state laws and interstate compacts. Since 1988, the Recovery Program has been extended twice with signed agreements. The latest agreement was signed in 2013 and extends the Recovery Program to September 30, 2023.

The Recovery Program implements management actions within seven program elements to achieve recovery of the Colorado River endangered fishes. These program elements include:

- Instream Flow Identification and Protection
- Habitat Restoration
- Nonnative Fish Management
- Propagation & Stocking
- Research and Monitoring
- Information and Education
- Program Management

The Proposed Action is included under the Habitat Restoration program element.

On the west side of the river, the Green River Diversion Dam (also known as the Tusher Wash Diversion Dam) diverts water for the Green River Canal Company and Thayn Hydropower. As depicted on Figures 2a and 2b, water is diverted into the Green River raceway and delivered to the Thayn Hydropower facility and into the Green River Canal at the end of the raceway.

Installation of a fish barrier has been deferred for a number of years, initially due to water right litigation between the Green River Canal Company and Thayn Hydropower, which was ultimately resolved in the Utah Supreme Court. Additionally, the State of Utah and the Green River Canal Company were evaluating the feasibility of rehabilitating the diversion dam to address needed repairs and improve operations. In 2012, a partnership was developed between the many local water users, the State of Utah and the Natural Resources Conservation Service (NRCS) to design, permit, and construct the diversion dam rehabilitation project. A final Record of Decision (ROD) and Environmental Impact Statement (EIS) were completed in 2014. Construction of the dam rehabilitation was completed in 2016. As part of the Green River Diversion Rehabilitation project, considerations were made to avoid, minimize, and mitigate for impacts to endangered Colorado River fishes. Implementing an entrainment prevention solution in the Green River Canal to reduce the high levels of entrainment was listed as a reasonable and prudent measure in the Biological Opinion (BO) for the Green River Diversion Rehabilitation project.

In order to address the entrainment of endangered fish, the Green River Canal Fish Barrier Project is undergoing environmental documentation, design, and permitting prior to construction. An Environmental Assessment (EA) will also be prepared for this Project.

Consultation History

Green River Diversion Dam Rehabilitation Project

In 2010 and 2011, flows in the Green River caused severe damage to the Green River diversion structure, compromising its structural integrity. In response, the NRCS granted financial and technical assistance to the project sponsor, Utah Department of Agriculture and Food (UDAF), through the Emergency Watershed Protection (EWP) program, to repair damage that occurred. The Green River Diversion Rehabilitation project consisted of replacing the diversion and ancillary components in place. Various upgrades were incorporated to meet current engineering standards, and Federal, State, and local permitting regulations. The Green River Diversion Rehabilitation project BA was received by the Service on June 16, 2014, and a Final BO was issued by the Service on March 16, 2015.

As part of the Terms and Conditions of the Green River Diversion Rehabilitation project BO, the Service required that the Recovery Program "fund and construct a project that reduces entrainment into the Green River Canal and investigate the effectiveness of the solution" (Service 2015). To meet this requirement the Green River Canal Fish Barrier project (Project) is being planned and designed.

Green River Canal Fish Barrier Project

Through informal consultation between Reclamation and the Service, it was determined that a BA is required for the Project because the construction, operation and maintenance of the Project will affect the endangered fish species and will be conducted in a portion of the Green River and Green River Canal that is designated critical habitat for the fish. Amanda Ewing (Reclamation biologist), Robert Norman (Reclamation engineer), and Courtney Marne (ERO) met with George Weekley (Service) on March 30, 2017, to review the AAs and proposed project activities. ERO, on behalf of Reclamation, corresponded with the Service via email on April 6, 2017, regarding preliminary effects determinations for federally listed threatened, endangered, and candidate species, and proposed and designated critical habitat occurring in the Project area. On May 2, 2017, Reclamation confirmed the preliminary effects determinations with the Service. In addition, a draft BA was submitted to the Service for review on May 15, 2017, comments were received from the Service on June 2, 2017, and the Service's comments are addressed in this final BA.

Project Location

The Project boundary encompasses two separate action areas (AA1 and AA2). The AAs are in or near the Green River immediately downstream of the Green River Diversion Dam, about 8 miles north of the City of Green River in eastern Utah (Figure 4). The AAs are generally bounded by North Long Street on the west, undeveloped land and agricultural parcels to the north and south, and Green River on the east (Figures 2a and 2b).

The AAs are located in Sections 17 and 20, Township 20 South, Range 16 East, of the Salt Lake Meridian in Emery County, Utah (Figure 1). The UTM coordinates of the approximate center of AA1 are NAD 83, 574103mE, 4326132mN. The latitude/longitude of AA1 is 39.081159°N/110.143253°W. The UTM coordinates of the approximate center of AA2 are NAD 83, 573811mE, 4325371mN. The latitude/longitude of AA2 is 39.074327°N/110.146712°W. The elevation of the AAs ranges between 4,070 and 4,110 feet above sea level.

Baseline Conditions and Biological Setting

On March 30, 2017, Courtney Marne, a biologist with ERO, assessed the AAs (2017 site visit). Both AAs have been previously disturbed by human development and activities associated with the Green River Diversion Dam. From upstream to downstream, existing facilities in and immediately adjacent to the AAs include the Green River Diversion Dam across the Green River, an 8-gate structure, a power canal/raceway (Photos 1 and 2), the Thayn hydropower plant (Photos 3 and 4), irrigation canals (Figures 2a and 2b), and a canal siphon. Gravel access roads and parking areas are also present in the AAs. Pre-existing staging areas and a borrow pit are located on BLM land adjacent to the 8-gate structure and raceway.

The raceway begins immediately downstream of the 8-gate structure. The raceway is approximately 2,500 feet in length and varies in top width from 50 to 70 feet. The raceway typically flows year-round to operate the hydropower plant; however, during periods of prolonged low temperatures, ice in the raceway will cause the hydropower plant to cease operations.

The flow rate of the raceway varies with the demands of the downstream hydropower plant, canals and the flow in the river. The flow in the raceway is typically uncontrolled; however, the existing gate structure, known as the 8-gate structure (Photo 6), (located approximately 400 feet downstream from the diversion dam), can be operated to restrict flow into the raceway and Green River canal. The 8-gate structure is comprised of concrete walls and eight fabricated steel slide gates, each approximately 6-feet wide, which are restrained and guided by railroad rails mounted vertically between each gate. The slide gates are all normally in the open position and secured with chains. Raising and lowering the slide gates is accomplished manually with one winch arrangement that rolls across the width of the structure.

Thayn Hydropower Plant, located at the end of the raceway, is privately owned and operated by Lee Thayn (Photo 3). Immediately downstream of the hydropower plant is an existing headgate structure for the irrigation canal owned and operated by the Green River Canal Company. The headgate structure has two 3.5-foot wide fabricated steel slide gates. The slide gates control the flow into the Green River Canal and are held into position with chains. Raising and lowering the slide gates is accomplished manually. A measuring flume is located approximately 525 feet downstream from the Green River Canal headgates. At approximately 530 feet downstream from the flume is an inverted siphon (Photo 7). The siphon diameter is assumed to be 4.5 feet.

Erosion and slumping is occurring along the slopes of the Green River canal, particularly in AA2. The banks alongside the canal have been highly disturbed from access and are very minimally vegetated, with dirt and sediment piles running alongside each bank (Photos 4 and 5). Sediment from the slumping banks and dirt piles are likely affecting water quality in the canal; however, sediment deposition and impacts to water quality downstream is minimized due to the low velocities in the canal which cause the majority of sediment to be deposited and trapped within the canal.

Landscape and Climate

The landscape and climate surrounding the AAs generally consists of a warm desert basin with plateaus and low hills (NRCS, 2017; desktop review via GoogleEarth) (Figure 4). The climate is

considered semi-arid with a frigid temperature regime (NRCS, 2017). Precipitation is usually less than 10 inches annually.

Elevation in the vicinity of the AAs is 4000 to 4200 feet above sea level. Irrigated farm land is interspersed with a salt-desert shrubland (Figure 4).

According to temperature data (WRCC 2005), the average growing season begins in late March and continues through the end of October. The average amount of precipitation for the year is 6.3 inches, with rainfall greatest during the month of August. The project area receives an average of 7.8 inches of snow in the winter (WRCC 2005). Temperatures in the area range from the low to mid-10^{0}'s Fahrenheit during winter nights to the upper 90^{0}'s in the summertime (WRCC 2005).

The Green River is part of the Lower Green River Basin Watershed (watershed 1406008) that flows south from parts of Wyoming, Utah, and Colorado. According to a USGS streamflow monitoring station at Green River, Utah, last year's average daily discharge in cubic feet per second varied from 25,000 (June) to 2,000 (December) (USGS, 2017). Land ownership adjacent to AA1 is primarily BLM, while land ownership adjacent to AA2 is generally private. The Lower Green River Basin Watershed as a whole contains primarily BLM lands (NRCS 2007).

Soils

Three predominant soil types are present in the AAs: Ferron-Green River-Rafael complex on 1 to 3 percent slopes, Garley-Ravola Huntsman complex on 1 to 6 percent slopes, and Minchey-Stent complex on 1 to 6 percent slopes (NRCS 2017). Ferron-Green River-Rafael complex soils consist of very fine sandy loam between 0 and 8 inches and 20 to 62 inches below the soil surface and loam from 8 to 20 inches. This soil type typically occurs in floodplains (NRCS 2017). Garley-Ravola Huntsman complex consists of loam, clay loam, fine sandy loam, gravelly sandy clay loam, and gravelly fine sandy loam soil layers to a depth of 80 inches. This soil type typically occurs in floodplain steps (NRCS 2017). Minchey-Stent complex soils consist of layers of gravelly loam, sandy clay loam, clay loam, loam, gravelly fine sandy loam, very gravelly fine sandy loam, and very cobbly sandy loam between 0 and 65 inches. Minchey-Stent complex soils typically occur in alluvial fans and fan remnants. Soils observed within the AA during the 2017 site visit revealed gravel, sand, and sandy clay loam soils.

Vegetation

The AAs are characterized primarily by the drainage corridor along the Green River and the Green River Canal, having a narrow, intermittent riparian buffer surrounded by uplands with some narrow wetland fringes located along the waterways. A majority of the uplands and portions of the wetland and riparian vegetation communities within both AAs have been previously disturbed by human development associated with the Thayn Hydropower Plant and construction, operation, and maintenance of irrigation facilities, including access roads and staging areas.

A total of four vegetation communities were identified within the AAs: disturbed uplands, upland shrubland, riparian woodland, and fringe wetlands (Figures 2a and 2b). In the disturbed uplands, the vegetation is very sparse (between 0 and 20 percent cover) (Photo 5). In adjacent areas, the majority of the vegetation consists of upland shrubland dominated by sand sagebrush (*Artemisia filifolia*) and rubber rabbitbrush (*Ericameria nauseosa*) with an understory of

cheatgrass (*Bromus tectorum*), saltgrass (*Distichilis spicata*), Russian thistle (*Salsola kali*), flixweed (*Descurainia sophia*), and sand dropseed (*Sporobolus cryptandrus*). Riparian woodland occurs in a 60 to 200 foot wide corridor between the canal and river (Photo 8). The riparian woodland area is dominated by tamarisk (*Tamarix* sp.) with plains cottonwood (*Populus deltoides*) and some sandbar willow (*Salix exigua*) saplings (less than 4 feet tall) establishing on fringe sandbanks abutting the Green River. Sporadic fringe wetlands also occur within the AAs along the banks of the Green River Canal (Photo 2). Dominant plant species along wetland fringes consist of saltgrass, sandbar willow, common reed (*Phragmites australis*), Kentucky bluegrass (*Poa pratensis*), and streambank wheatgrass (*Elymus lanceolatus*).

The overall AAs are comprised of approximately 11.08 acres of disturbed uplands, 1.77 acres of upland shrubland, 0.71 acre of riparian woodland, and a maximum of 0.11 acre of fringe wetlands (Figures 2a and 2b).

Aquatic Habitat

The AAs include physical or biological features (previously referred to as primary constituent elements (PCEs)) essential for the survival of the four endangered Colorado River fish (Service 2015), including water and biological and physical habitat such as riverbed substrate and vegetation. Areas in and adjacent to the AAs that occur in the 100-year floodplain, when inundated, provide access to spawning, nursery, feeding and rearing habitats. Because the canal is a constructed, channelized structure, the aquatic habitat in the AAs generally lacks variability and complexity such as riffles, runs, pools, and overbank/backwater areas.

The river water is of sufficient quality and quantity to provide spawning, feeding, and nursery habitats, or to serve as corridors between these areas. Low-lying wetlands and bottomlands, as well as oxbow channels that are flooded and ephemerally connected to the main channel, provide favorable aquatic habitat such as warm water temperatures, low-velocity flows, and increased food supply (Service, 2015), and occur near the AAs. As addressed in the Green River Diversion Rehabilitation BO:

> Historically, the Green River produced high spring turbid flows that maintained critical habitat by inundating floodplains, maintaining side channels, flushing fine sediment, and creating backwaters (Muth et al. 2000). However, with the completion of Flaming Gorge Dam in 1962, the mainstem Green River became highly regulated. The dam and reservoir physically altered the Green River and surrounding terrain and modified the pattern of flows downstream (Muth et al. 2000). Most notably, the construction of the dam created a fish passage barrier and transformed miles of riverine habitat into lacustrine habitat. These two changes isolated fish populations and decreased the amount of native habitat. (Service 2015).

Increased water depletion from the Green River due to use for irrigation, for example, decreases native fish habitat and limits the amount of backwater nursery habitat for juvenile fish. Furthermore, increased water supply for agriculture and municipal purposes increases the likelihood of degraded water quality from agricultural runoff (pesticides, fertilizers, etc.) and wastewater inputs.

Documented Aquatic Life

Multiple fish species have been documented in the Green River Canal by the Recovery Program, using passive interrogation array (PIA). The PIA uses antenna located in the canal that can detect individual fish species equipped with passive integrated transponder (PIT) tags. The monitoring efforts are mainly focused on listed fish species. The antenna do not detect individuals with PIT tags at a 100% accuracy rate and individuals equipped with tags can be detected multiple times. Additionally, the PIT tagged fish represent a relatively small percentage of the fish population utilizing the area.

The PIA were installed beginning in 2013 and are used for ongoing monitoring. Table 1 below lists the known PIT tagged species detected within the canal since 2013. All of these species also occur in the main channel Green River in the vicinity of the AAs.

Table 1. PIT Tagged Fish Detection Data in the Green River Canal (Stahli et al. 2016)

Common Name	Scientific Name	Total Detections† (2013-2016)
Bonytail*	*Gila elegans*	118
Colorado pikeminnow*	*Ptychocheilus lucius*	156
Flannelmouth sucker	*Catostomus latipinnis*	15
Flannelmouth sucker razorback sucker hybrid	*Catostomus latipinnis* x *Xyrauchen texanus*	3
Humpback chub*	*Gila cypha*	5
Razorback sucker*	*Xyrauchen texanus*	1,141
Unidentified	N/A	221

* Federally endangered species
†Number of detections do not represent number of fish. Not all fish are detected and individual fish can be detected in multiple years.

Description of the Proposed Action

Reclamation, as a partner in the Recovery Program, will design and provide funding for the installation, operation and maintenance of a fish barrier and ancillary facilities in the Green River Canal to address the entrainment of federally listed fishes in the Green River Canal. The Project is part of the habitat restoration element of the Recovery Program.

Prior to construction of the Proposed Action, issuance of a permit by the USACE is required under Section 404 of the Clean Water Act for the discharge of fill material into waters of the United States. Reclamation, as lead federal agency for the project, is including the USACE's action in this Section 7 consultation.

The Project includes two action areas; AA1 to the north and AA2 to the south (Figure 1). Proposed activities within AA1 include construction of a temporary cofferdam for project dewatering purposes and Green River Canal Company's repair of the 8-gate structure (Figure 3a). AA1 also contains the pre-existing BLM authorized borrow pit (Figure 2a). Proposed activities in AA2 include modifications to the Green River Canal gates, installation of the fish barrier and return channel, construction of a temporary cofferdam in the Green River at the fish return channel outlet, installing riprap upstream and downstream of the return channel outlet, canal lining in the Green River Canal, installation of fish detection antennas (placed upstream of

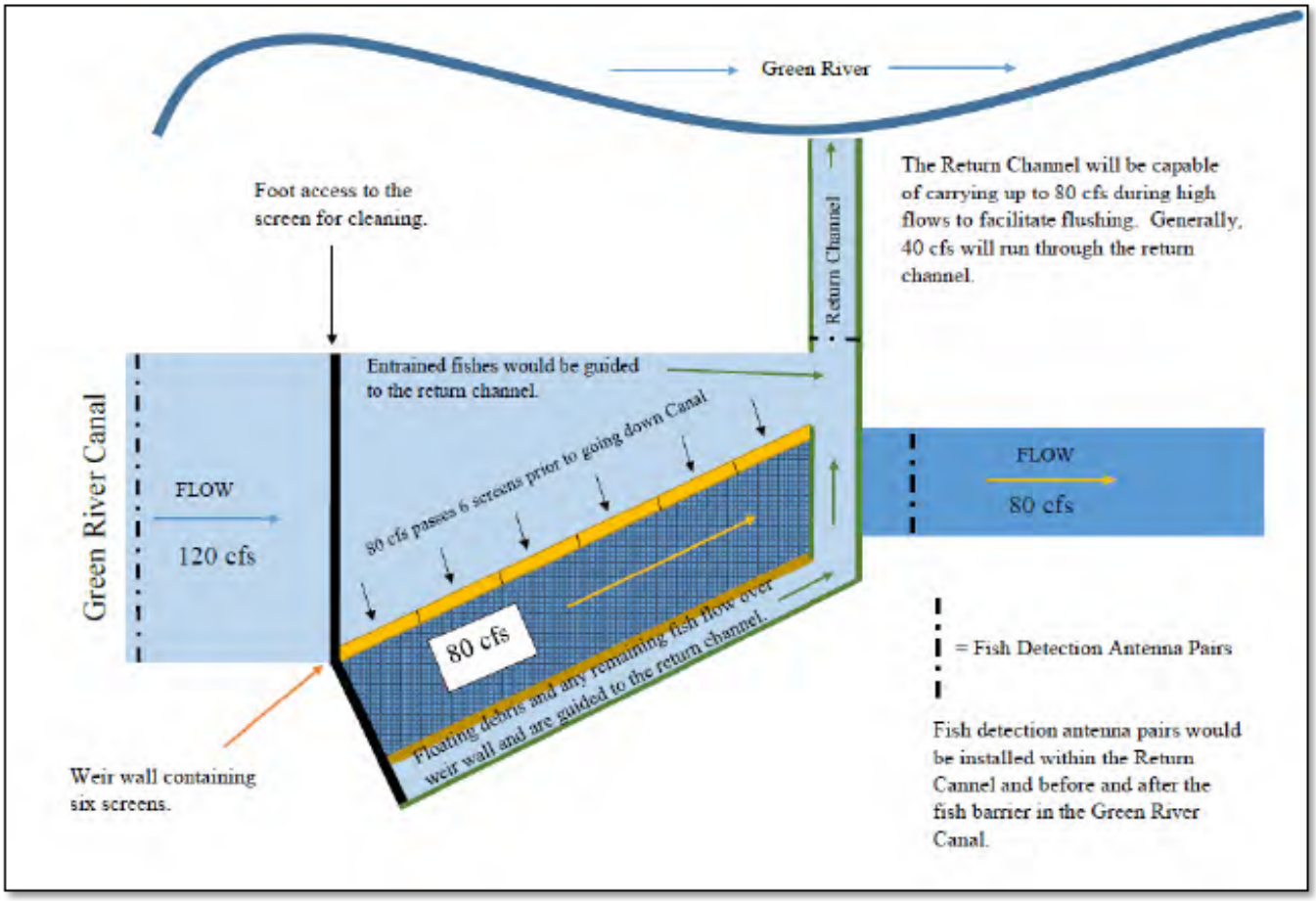
the fish barrier, downstream of the barrier, and in the fish return channel), and siphon replacement (Figure 3b). The purpose of the cofferdam at the return channel outlet is to dewater the fish return channel river outlet during construction. Proposed actions in this BA also include activities associated with the ongoing operation and maintenance of Recovery Program-related facilities, including the canal fish barrier and associated structures plus fish screens and passages located on the east side of the Green River Diversion Dam. Project activities are described in further detail below.

Major construction work for the project is proposed during October 1 through March 15, during low-flow conditions, which also avoids the breeding season for most migratory birds. Final work activities, which would be limited to personnel with hand tools and use of vehicles within staging areas or along established routes, would continue through the following summer. Revegetation activities are proposed to be conducted the following fall.

Fish barrier and fish return channel

The fish barrier and return channel design uses a variety of models in order to analyze and meet endangered fish requirements for flow rates, elevations, and velocities. The proposed fish barrier and return channel would be located about 500 feet downstream from the existing Green River Canal gates (Figure 3b). The fish barrier would consist of an approximate 36-foot long concrete weir wall constructed within the canal alignment. A sloping corrugated metal screen consisting of 6 screens (approximately 6' each) punch plate with 3/32-inch openings would be placed on top of the weir wall. This type of screen allows water to flow over and through the screen. Depending on the amount of diverted flows, the depth of water passing over the weir wall would be approximately 8 inches. Reclamation's Hydraulics Laboratory conducted a study and released a technical memorandum (copy provided to the Service on March 28, 2017) on the effectiveness of the screen that would be used for this project (Reclamation 2016). All water diverted to the Green River Canal would pass through the screens. In the event of screen blockage, water would be diverted back to the return channel. The canal channel upstream of the fish barrier structure would be designed to accommodate 120 cubic feet per second (cfs) of water. Approximately 30 cfs would be diverted directly to the fish return channel by the weir wall. Approximately 90 cfs would go over the weir wall. The screens would allow about 80 cfs to fall through and continue into the irrigation canal. The remaining 10 cfs (roughly) would fall off the end of the screens and flow into a "trough" that flows back to the fish return channel. An automated gate would control flows returning to the Green River via a return channel. The weir wall would guide fish, sediment, and debris that enter the canal to the return channel and back to the Green River (Diagram 1). In order to operate the automated gate, an electrical control cabinet would be located nearby. Electrical service to this cabinet will be extended from a utility pole on the west side of North Long Street, across from the hydroelectric plant.

Diagram 1: Conceptual Layout of Fish Barrier and Return Channel



The return channel would be nearly perpendicular to the existing canal alignment. The fish return channel would be an approximately 30 foot wide open channel, constructed with a combination of concrete and geomembrane material, between the canal and the Green River (approximately 225 feet), with a permanent access road (approx. 12 feet wide) running parallel to the return channel. The fish return channel would tie into the Green River. The river bank would be stabilized approximately 20 feet upstream and 20 feet downstream of the return channel outlet to minimize erosion. See Fish Screen Concept in Appendix A for more information on the engineering layout for the fish barrier and return channel.

In order to continue monitoring fish entrainment and the success of the fish barrier, fish detection antenna pairs would be installed above and below the fish barrier, as well as within the fish return channel. Monitoring efforts associated with the antennas are managed and

funded through the Recovery Program. Currently, the Recovery Program anticipates monitoring the effectiveness of the barrier for two to three seasons post-construction (personal communication David Speas, fish biologist, U.S. Bureau of Reclamation-Upper Colorado Regional Office, May 18, 2017).

For the construction phase of the fish return channel an approximately 100-foot wide corridor would be disturbed in order for construction equipment to access both sides of the channel.

In order to perform work in the canal, a temporary cofferdam would be constructed just upstream of the 8-gate structure to dewater the canal downstream for project work. The cofferdam would have a gradual declining access route to the canal (Figure 3a). Vegetation would be cleared and local material from the BLM borrow pit would be hauled and gradually added and compacted into the canal until it spans its entire width. The cofferdam would then be utilized to dewater the Project area and to transport equipment to the other side of the canal.

Additionally, a second temporary cofferdam would be placed within the Green River at the downstream outlet of the fish return channel. A berm would be created and would be approximately 10 feet wide at the crest with 2:1 side slopes. The berm would be constructed using native material excavated from the fish return channel and/or local material from the BLM borrow pit. The material would be placed in a horseshoe shape that ties into the river bank (hand drawings on attached Fish Screen Concept).

Upon completion of construction, the temporary cofferdams would be removed and the material would be returned to the BLM borrow pit.

Engineering and hydraulic energy considerations will also require upgrades and modifications to existing irrigation facilities to support the operation of the fish barrier and return channel and to maintain current irrigation water deliveries to water users. These ancillary components would consist of the following activities (Figure 3b):

1. **Green River Canal Intake Gate Modifications:** The two existing slide gates and the center pier between the gates would be removed. The two gates would be replaced by one large slide gate and electric gate opener. Electric service would be installed by trenching. This would be the same electrical service installed for use by the fish barrier. Depending on the extent of existing damage to the intake channel floor under the bridge, the channel floor would be repaired or replaced by removing and replacing the existing concrete. Eroded areas will be filled with material from the BLM borrow pit. The existing bridge would not be modified. A temporary dirt ramp would be constructed into the canal on the right bank upstream of the bridge for equipment access, and removed upon completion of construction
2. **Canal Improvements:** Approximately 1,000 feet of the existing earthen canal would be lined with a protective membrane and concrete. The lining would extend from the canal intake gates downstream to the first canal siphon. The canal would be prepped by clearing vegetation from the banks and removing unsuitable material from the canal. The canal prism within the existing alignment would be reshaped and the side slopes would be graded to a 2:1 slope. The excavated material would be disposed of at an existing landfill. An operation and maintenance road would be constructed on the west side of the canal using road base material hauled in and compacting and grading the

road surface. The new maintenance road and the existing road on the east side of the canal would each be maintained at a 12 foot width. Total disturbed area would be from the east edge of the existing maintenance road to 50 feet west of the existing canal centerline.

3. **Siphon Replacement:** Replacement of the siphon is proposed and would require excavation of an open trench across a natural ephemeral channel. The depth of excavation would be approximately 5 feet below the channel bed. Rock riprap would be installed within the channel to protect the buried siphon. A 20 foot wing wall would be constructed in the canal at the siphon outlet and riprap would be installed in the canal for a distance of about 30 feet downstream of the outlet.

Other Activities

Concurrent with construction of the Project, the Green River Canal Company is proposing to repair and modify the 8-gate structure and raceway in the immediate vicinity of the structure (Figures 3a). The Green River Canal Company's proposed activities are independent of the Project activities, but it would be more economical and result in less overall environmental impact if designed and constructed concurrently with the Project because the same cofferdam could be used for both projects. Reclamation has agreed to include the Green River Canal Company activities in this consultation, provided they occur concurrently with the Project Activities associated with the repair and modification of the 8-gate structure modifications would include removal and replacement of about 40 percent of the existing structure and adding a new wing wall and riprap downstream of the structure. Vegetation would be cleared for access and raceway work. Access by heavy machinery (e.g., skid steer, track hoe, loader, back hoe and/or compactor) into the raceway would be accomplished by constructing a temporary ramp on both sides of the canal, with fill material from the BLM borrow pit. Removal of the structure would require cutting or breaking up the concrete and hauling it to a landfill. Ready mix concrete and riprap would be installed after the canal is repaired and reshaped. The footprint of the removal and repair work would be confined to the staging areas adjacent to the raceway and the existing BLM borrow pit (Figure 3a).

Operation and Maintenance of Recovery Program Facilities

The Recovery Program is authorized to enter into contracts to reimburse irrigation entities for the operation and maintenance costs related to Recovery Program improvements. The Green River Canal Company requested Recovery Program funding for the canal company to operate and maintain the Recovery Program-related facilities constructed as part of the Green River Diversion Rehabilitation Project. Those facilities include the east side fish screen, fish antennas associated with PIT tag data collection, the upstream fish passage structure, and the fish notches. The Recovery Program agreed to their request and asked Reclamation to include Operation and Maintenance reimbursement for those facilities as part of the Project Operation and Maintenance contract.

Short and long term operation and maintenance tasks related to Recovery Program facilities in the project area are proposed as part of the Project. These Recovery Program facilities are as follows:

- Green River Canal Fish Barrier, consisting of all components of the fish barrier structure, fish return channel, fish monitoring equipment, and flow measurement structure (excluding flow measurement device)
- Green River Canal inlet gate and canal downstream to the barrier and, in certain instances, downstream of the barrier (specifications described in Reclamation's construction plans)
- Existing fish screen on the canal diversion on the east side of Green River Diversion Dam
- Fish passage structure and fish notches in the crest of the Green River Diversion Dam

Operation and maintenance includes flows to operate the fish screen, timing of the operations, and maintenance of the fish barrier. Operations of the fish passage structure and fish passage notches would be year round and the fish barrier would be activated when Green River Canal is operating. Maintenance activities include removal of sediment and blockages and servicing of mechanical, electrical, or structural issues. Maintenance activities would be conducted into the foreseeable future at an estimated frequency of 6 times per year and following large storm events.

Conservation Measures

Project construction activities will comply with all applicable Federal, State, and local laws and ordinances. Reclamation would commit to the following conservation measures and they are included as part of the proposed action to avoid and minimize impacts to federally-listed species potentially occurring in the action area and to further the recovery of species under review to the greatest extent practicable.

Fish Species

1. Construction activities will be conducted during October 1 - March 15, during low flow conditions, to reduce impacts to seasonal fish movements, spawning activity, and rearing activities;
2. Construction activities will avoid, when feasible, fish habitat such as backwaters and side channels;
3. Construction activities relating to dewatering will minimize impacts to fish:
    a. The construction contractor will coordinate with the Utah Department of Wildlife Resources (UDWR) to have a federally permitted crew on site to translocate fish stranded behind the constructed cofferdams prior to dewatering the work areas;
    b. The construction contractor will contact the UDWR prior to and following removal of the cofferdams;
    c. The contractor along with Reclamation will be responsible for reporting any observed take of fish (stressed or dying) immediately to the Service office;
    d. Pumps will be screened during the initial dewatering process to minimize entrainment of fish; and
    e. The contractor will minimize the time that the cofferdam is in the river; and
4. All non-permanent materials placed in the river will be removed from the river after completion of the in-channel portion of the project.

Operational and Maintenance Conservation Measures

1. Through the Recovery Program, Reclamation in conjunction with the Service, will develop and execute an Operation and Maintenance contract with the Green River Canal company that specifies the duties and responsibilities as they relate to the operation and maintenance of Recovery Program facilities in the project area.

Fish Barrier Design, Operation, and Maintenance Conservation Measures

1. The fish barrier will operate at all times that water is diverted to the Green River Canal;
2. The fish screen will be designed and constructed with 3/32" openings;
3. The fish return channel will be designed and constructed to be centrally draining, allowing all water and fish to return to the river. This will prevent the need for Recovery Program personnel to perform fish salvage in the canal at the end of the irrigation season;
4. Canal maintenance operators will receive training on fish identification in order to be able to identify federally listed fish that may be injured or killed during normal operations; and
5. Canal operators will notify the Service (801-975-3330 x 137) if large numbers of dead fish are observed.

Yellow-billed Cuckoo, Southwestern Willow Flycatcher, Migratory Birds

1. Construction activities will be conducted during October 1 - March 15, to minimize potential impacts to breeding and nesting bird species; and
2. The contractor will not remove any live, mature cottonwood trees or other riparian trees unless it is either a non-native tree or specified in the construction drawings.

General Conservation Measures

1. The contractor will develop a spill prevention, control, and countermeasures (SPCC) plan and a storm water pollution prevention plan (SWPPP) and will follow it during construction;
2. A preconstruction meeting will be held by the Reclamation on-site inspector and Reclamation biologist. The meeting will cover all conservation measures and should be presented to all on-site project implementation staff. A simple handout of the conservation measures will be handed out to all implementation staff;
3. In-stream work will only occur during low flow periods and will not occur if fish are actively spawning and/or larvae are in the water column and/or eggs in the gravels. Care will be taken to minimize sedimentation resulting from bank or stream bed disturbance;
4. Equipment shall be cleaned to remove noxious weeds/seeds and petroleum products prior to moving on site;
5. Construction activities will be confined to previously disturbed areas where possible for such activities as work, staging, and storage; waste areas; and vehicle and equipment parking areas. Vegetation disturbance should be minimized as much as possible;
6. Construction activities and equipment will be confined to the designated construction work areas. These areas will be designated by lathes and flagging. New areas will need prior approval from Reclamation. Sensitive riparian zones and drainages will be

designated by staking and flagging them in order to keep construction crews out of these areas;

7. Fueling areas will be located away from waterways and wetlands;
8. Equipment will work from the top of the bank when allowable, to minimize disturbance to the riparian area and to protect the banks. Heavy equipment will avoid crossing and/or disturbing wetlands;
9. Ingress and egress access to the river will be kept to a minimum;
10. Materials will not be stockpiled in the riparian area;
11. Excavated soils will be sorted into mineral soils and top soils. When backfilling a disturbed site, top soils will be placed on top to provide a seed bed for native plants;
12. Best management practices (BMPs) will be used to limit the release of fine sediment into the Green River during construction in areas adjacent to the river. BMPs include the use of silt fences, straw wattles, and silt barriers;
13. Stream bank stabilization structures will be constructed to minimize voids in riprap or gabion baskets in excess of 2-3 feet above the existing river bed to minimize potential nonnative fish species refuges (i.e. interstitial spaces). Riparian vegetation will also be installed at the foot or toe of newly placed riprap structures;
14. All disturbed areas resulting from the project will be graded and rehabilitated to as near their pre-project construction condition as practicable:
    a. Upland disturbed areas will be seeded or planted at appropriate times with weed-free, BLM supplied or approved seed mixes;
    b. Riparian restoration will consist of dormant season pole plantings of coyote willow (*Salix exigua*), Fremont cottonwood (*Populus fremontii*), Goodings willow (*Salix goodingii*), and/or seepwillow (*Baccharis salicifolia*), in areas where sufficient water appears available at a planting rate of 1,210 poles per acre. Pole plantings utilize multiple stems that are planted into holes excavated by an auger (chainsaw or equipment mounted) to ensure cuttings are buried no less than 4 feet into the ground to reach the lowest water table of the year. Pole plantings for coyote willow and seepwillow will have 3 cuttings of the same species per hole and will be spaced 12 feet on center. Multiple rows will be staggered. Good soil-to-stem contact promotes root development, so holes will be filled with a mud-water slurry. Once buried, stems should be cut to leave about 6-8 inches of stem above the ground surface. Goodings willow and cottonwood cuttings should be planted adjacent to the toe of the bank stabilization, with willow plantings closer to the stream, from the toe up to bank full, and cottonwoods planted above bank full elevation. These species may be planted as single poles with 1-2 coyote willow stems in the hole as well. These poles should be planted 12 feet apart. Longer cottonwood poles (3-4 feet longer than the depth to water surface) can be planted behind bank stabilization areas;
    c. High terrace areas that lack a sufficient water table to support riparian vegetation will be seeded with upland species, focusing on shrub species (such as sumac (*Rhus trilobata*), rose, silver buffaloberry (*Sheperdia argentea*), and other native species already present in the area); and,
15. Reclamation will acquire all necessary permits, including but not limited to the U.S. Army Corps of Engineers (USACE) Section 404 Permit, Utah State Stream Alteration

Permit, and Utah Pollutant Discharge Elimination System Permit. Reclamation and associated contractors will follow all requirements therein.

Federally Threatened, Endangered, and Candidate Species Potentially Affected by the Project

On March 30, 2017, Courtney Marne, a biologist with ERO, assessed the project area (2017 site visit) for suitable habitat for federally listed threatened and endangered species protected under the ESA of 1973, as amended (16 U.S.C. 1531 et seq.) (Service 2017a).

This BA addresses the potential effects of construction, operation and maintenance of the proposed Project on federally listed species potentially occurring within the AAs (Table 1). Because of the association of southwestern willow flycatcher (*Empidonax traillii extimus*) and yellow-billed cuckoo (*Coccyzus americanus occidentalis*) to riparian and woodland communities in Emery County, the potential for these species to occur in the AAs was evaluated. Four endangered fish species (the bonytail, Colorado pikeminnow, humpback chub, and razorback sucker) have habitat and/or critical habitat in in the AAs and have the potential to be both directly and indirectly affected by the proposed project (Figure 5). Each of these species is addressed below in Table 2.

Table 2. Federally listed threatened (T), endangered (E), and candidate (C) species potentially occurring in Emery County.

Common Name	*Scientific Name*	Status	Critical Habitat in the AAs
Mammals			
Utah prairie dog	*Cynomys parvidens*	T	No
Birds			
California condor	*Gymnogyps californianus*	E	No
Mexican spotted owl	*Strix occidentalis lucida*	T	No
Southwestern willow flycatcher	*Empidonax traillii extimus*	E	No
Yellow-billed cuckoo	*Coccyzus americanus*	E	No
Fish			
Bonytail*	*Gila elegans*	E	No
Colorado pikeminnow*	*Ptychocheilus lucius*	E	Yes
Humpback chub*	*Gila cypha*	E	No
Razorback sucker*	*Xyrauchen texanus*	E	Yes
Plants			
Barneby reed-mustard	*Schoenocrambe barnebyi*	E	No
Jones cycladenia	*Cycladenia humilis* var. *jonesii*	T	No
Last chance townsendia	*Townsendia aprica*	T	No

Common Name	*Scientific Name*	Status	Critical Habitat in the AAs
San Rafael cactus	*Pediocactus despainii*	E	No
Winkler cactus	*Pediocactus winkleri*	T	No
Wright fishhook cactus	*Sclerocactus wrightiae*	E	No

*There is designated critical habitat for these species within Emery County. Water depletions in the Upper Colorado River and San Juan River Basins may affect the species and/or critical habitat downstream.
Source: Service 2017.

The proposed project would not affect the Utah prairie dog, California condor, or the Mexican spotted owl because of the lack of potentially suitable habitat in the AAs. Additionally, the AAs are outside of the elevation range for Barneby reed-mustard, Jones cycladenia, Last chance townsendia, San Rafael cactus, and Winkler cactus. These species are unlikely to occur in the project area because of lack of suitable habitat, and are not addressed in this BA.

Southwestern Willow Flycatcher

Species Background, Habitat Requirements and Distribution

The southwestern willow flycatcher is a subspecies of the willow flycatcher (*Empidonax traillii*) and was listed as an Endangered Species in 1995. It is considered an endangered species in the state of Colorado (CNHP 2013). This subspecies has declined due to the removing, thinning, and destroying of riparian vegetation; water diversion and groundwater pumping which alter riparian vegetation; overstocking of livestock, and recreational development. It is also susceptible to parasitism by cowbirds. In 2008, it was estimated that only 1,300 pairs remain, with few populations including more than 50 pairs (Durst et al. 2008).

The breeding range of the southwestern willow flycatcher includes southern California, southern Nevada, southernmost Utah and Colorado, Arizona, New Mexico, and western Texas (Service 2013). Most of the current known population (75% of known territories) is in New Mexico and Arizona (Durst et al. 2008). The northern distributional limit of this subspecies cannot be precisely defined (Service 2017). Habitat of the southwestern willow flycatcher includes riparian and wetland thickets, generally consisting of willow, tamarisk, boxelder or Russian olive (Service 2017).

Environmental Baseline for the Project Area

The AA contains no designated critical habitat. The closest critical habitat is located approximately 130 miles south of the AAs. Vegetation in the AAs consists primarily of disturbed uplands with roughly 0.7 acre of riparian woodlands. The riparian woodlands and associated water source within and immediately adjacent to the AA is fragmented within the landscape and is subjected to continual human disturbances from the operations at the hydropower plant and nearby irrigation facilities. The habitat within and surrounding the AAs provides minimally suitable habitat for nesting. However, the species could be present in or near the AAs on a transient basis during migration.

Direct and Indirect Effects

The proposed project would have no direct or indirect impacts on flycatcher critical habitat because the AAs are located to the north and outside of critical habitat. No large scale removal of riparian vegetation is proposed. Temporary disturbance to riparian habitat would total approximately 0.7 acre, of which less than 0.5 acre would be permanent. Vegetation removal would occur outside of the breeding season for the species. Habitat within the AAs is limited to supporting migratory or foraging behaviors of the species. Additionally, the proposed ground disturbing activities would be conducted outside of the breeding season. Project related activities could displace or discourage use of the AAs by individuals during migration, but given the small scale and timing of the project, impacts are expected to be insignificant and discountable.

Determination

The proposed project may affect but is not likely to adversely affect the southwestern willow flycatcher, and no effect to critical habitat is anticipated.

Yellow-billed Cuckoo

Species Background, Habitat Requirements and Distribution

The yellow-billed cuckoo was listed in 2014 as a federally threatened species (Service 2017). This bird has been split into two separate subspecies (eastern and western), but the validity of this separation has been debated (Banks 1988). Franzreb and Laymon (1993) found small but significant differences between the two groups. Regardless of their taxonomic position, the Service considers the cuckoos that occur west of the Rocky Mountain crest a distinct population segment (Service 2011).

The western subspecies (*C. a. occidentalis*) nest in scattered, isolated areas west of the Rocky Mountains, in California, central and southern Arizona, southern and western New Mexico, and extreme western Texas (Laymon et al. 1987). The cuckoo uses wooded habitat with dense cover and water nearby, including woodlands with low scrub vegetation, overgrown orchards, abandoned farmland and dense thickets along streams and marshes. In the west, nests are often placed in willows along streams and rivers, with nearby cottonwoods serving as foraging sites. The cuckoo winters almost entirely in South America east of the Andes, and migrates through Central America (Service 2016).

Utah's guidelines for suitable habitat are defined as riparian patches ranging from relatively contiguous stands of mixed native/exotic vegetation to irregularly shaped mosaic areas of dense vegetation with open areas. The guidelines provide parameters in identifying suitable breeding and nesting habitat and are as follows:

- Vegetation that is predominantly multi-layered, with riparian canopy trees and at least one layer of understory shrubby vegetation ;
- Patches of multi-layered vegetation that are at least 12 acres or greater in extent and separated from other patches of suitable habitat by at least 300 meters;
- To be deemed suitable, somewhere in the patch it should be 100 meters wide by 100 meters long. This is to avoid patches that may be long enough to meet the minimum area of 12 acres but are so narrow that they are unsuitable; and,
- Open areas, or gaps of multi-layered vegetation within a patch are less than 300 meters.

(Guidelines supplied by George Weekley (Service) via email on June 2, 2017)

Environmental Baseline for the Project Area

The AAs contain no proposed critical habitat. The nearest proposed critical habitat is located over 40 miles south of the project area. UDWR detected cuckoo along the Green River directly north of the town of Green River (personal communication with the Service, May 12, 2017), which is approximately 6 miles south of the project area. As described previously in the vegetation section, approximately 0.7 acre of riparian habitat would be temporarily disturbed within the project boundary. The riparian habitat within, adjacent, and in close proximity to the project area is multi-layered, consisting of tamarisk, willow, Russian olive, sumac, and cottonwood. However, these areas of dense multi-layered vegetation are located linearly along the Green River and measure less than 100 meters wide, making them unsuitable for breeding and nesting habitat as described in the Utah guidelines. Additionally, the riparian habitat in the project area is disjointed and disturbed by human activity. It is directly adjacent to the hydropower plant and parallel to the Green River Canal and N. Long Street, which is subjected to frequent human disturbances. Given that the area provides unsuitable breeding and nesting habitat, it is expected that use of this area by cuckoo would be limited to transient use.

Direct and Indirect Effects

The proposed fish return channel would require the permanent removal of approximately 0.25 acre (approximately 225 feet long x 50 feet wide) of riparian vegetation, in habitat deemed unsuitable for cuckoo breeding and nesting. Temporary disturbance would be approximately 0.5 acre (225 feet long x 100 feet wide). It is anticipated that no live, mature cottonwood trees would be removed. Tamarisk, Russian olive, sumac, and sandbar willow would be removed for the construction of the return channel. Vegetation removal and construction activities would occur during the fall and winter months (October-March) when cuckoos are not expected to be present. Revegetation and monitoring efforts following construction activities would occur, and is expected to result in enhancement of the riparian habitat.

Given that construction activities would occur when migrating cuckoos are not expected to be present, the disturbance is of a small scale (about 0.25 acre), and would occur in an area deemed unsuitable breeding and nesting habitat, the impacts to cuckoo are expected to be insignificant and discountable.

Determination

The proposed project may affect but is not likely to adversely affect the yellow-billed cuckoo. Proposed critical habitat is not expected to be altered or modified by the proposed action.

Endangered Fishes

Species Background, Habitat Requirements and Distribution

Bonytail

The bonytail is the rarest native fish in the Colorado River Basin, and is listed as endangered under the ESA (59 Fed. Reg. 13374 (March 21, 1994)). The bonytail has a streamlined body and typically achieves a maximum size of about 18 inches in length (Behnke and Benson 1980). Historically, the bonytail was abundant and widespread in rivers throughout the Colorado River Basin (59 Fed. Reg. 13374 (March 21, 1994)). The current distribution of the species is limited to

a small population in Lake Mojave and a few records exist from Lake Havasu and from the Yampa, Green, and Colorado rivers (59 Fed. Reg. 13374 (March 21, 1994)). Wild populations consist only of older fish, and recruitment of younger fish has been virtually nonexistent (59 Fed. Reg. 13374 (March 21, 1994)); however, the first documented evidence of successful reproduction of stocked bonytails was recorded in wetlands adjacent to the middle Green River (UT) in 2015 and 2016 (Bestgen et al. 2017).

The optimum habitat for bonytail appears to be open rivers of relatively uniform depth and current velocity (Behnke and Benson 1980). The bonytail requires warm water temperatures of approximately 18 degrees C (64 degrees F) for spawning (59 Fed. Reg. 13374 (March 21, 1994). The cause of decline in this species is thought to be lower water temperatures as a result of construction of reservoirs (Woodling 1985). Hybridization and competition with nonnative fish may also be factors in the decline of this species.

Upper Colorado River basin critical habitat for the bonytail includes:

Colorado, Moffat County: The Yampa River from the boundary of Dinosaur National Monument in T.6N., R.99W., sec. 27 (6th Principal Meridian) to the confluence with the Green River in T.7N., R.103W., sec. 28 (6th Principal Meridian); Utah, Uintah County and Colorado, Moffat County: The Green River from the confluence with the Yampa River in T.7N., R.103W., sec. 28 (6th Principal Meridian) to the boundary of Dinosaur National Monument in T.6N., R24E., sec. 30 (Salt Lake Meridian); Utah, Uintah and Grand Counties: The Green River (Desolation and Gray Canyons) from Sumner's Amphitheater in T.12S.,R.18E.,sec.5(Salt Lake Meridian) to Swasey's Rapid in T.20S., R.16E., sec. 3 (Salt Lake Meridian); Utah, Grand County and Colorado, Mesa County: The Colorado River from Black Rocks in T.10S., R.104W., sec. 25 (6th Principal Meridian) to Fish Ford in T.21S., R.24E., sec. 35 (Salt Lake Meridian); Utah, Garfield and San Juan Counties: The Colorado River from Brown Betty Rapid in T.30S., R.18E., sec. 34 (Salt Lake Meridian) to Imperial Canyon in T.31S., R.17E., sec. 28 (Salt Lake Meridian) (59 Fed. Reg. 13374, March 21, 1994).

Colorado pikeminnow

The Colorado pikeminnow is the largest cyprinid fish (minnow family) native to North America and evolved as the main predator in the Colorado River system. Individuals begin consuming other fish for food at an early age and rarely eat anything else (Sigler and Sigler 1996). It is a long, slender, cylindrical fish with silvery sides, greenish back, and creamy white belly (Sigler and Sigler 1996). Historically, individuals may have grown as large as 6 feet long and weighed up to 100 pounds (estimates based on skeletal remains) (Sigler and Miller 1963), but today individuals rarely exceed 3 feet or weigh more than 18 pounds (Osmundson et al. 1997).

The species is endemic to the Colorado River Basin, where it was once widespread and abundant in warm-water rivers and tributaries from Wyoming, Utah, New Mexico, and Colorado downstream to Arizona, Nevada, and California (multiple citations in U.S. Fish and Wildlife Service 2002c). Currently, wild populations of pikeminnow occur only in the Upper Colorado River Basin (above Lake Powell) and the species occupies only 25 percent of its historic range-wide habitat (U.S. Fish and Wildlife Service 2002b). The Colorado pikeminnow is the largest cyprinid fish (minnow family) native to North America and evolved as the main predator in the Colorado River system. Individuals begin consuming other fish for food at an early age and rarely eat anything else (Sigler and Sigler 1996). It is a long, slender, cylindrical fish with silvery sides, greenish back, and creamy white belly (Sigler and Sigler 1996). Historically, individuals may have

grown as large as 6 feet long and weighed up to 100 pounds (estimates based on skeletal remains) (Sigler and Miller 1963), but today individuals rarely exceed 3 feet or weigh more than 18 pounds (Osmundson et al. 1997).

Critical habitat for Colorado pikeminnow in the upper Colorado River basin was designated in the Yampa River from Craig, CO to the confluence with the Green River; on the White River from Rio Blanco reservoir to the Green River confluence; on the Green River from the Yampa River confluence to the Colorado River confluence; the Colorado River near Rifle (CO) to North Wash on Lake Powell (UT); and the Gunnison River from the Uncompahgre River confluence to the Colorado River confluence.

Humpback chub

The humpback chub is endemic to the Colorado River Basin of the southwestern United States and is listed as endangered under the ESA. The distinguishing feature of this species is a prominent, rounded hump on the body immediately behind the head. The hump is presumably an adaptation to maintain stability on the bottom of a stream in turbulent flow (Behnke and Benson 1980). The historical distribution of this species is not well known, as the humpback chub was not described as a species until 1946. The original distribution of this species was presumably limited to swift, deepwater areas in the Colorado River Basin (Behnke and Benson 1980). Presently, the species is restricted to areas in the Colorado River in Grand Canyon, and in discrete reaches of the Green and Colorado rivers above Lake Powell (Woodling 1985). The humpback chub is found in river canyons, where it uses a wide variety of habitats, including pools, riffles, rocky runs, rapids, and eddies (Service 2002d).

Threats to the humpback chub include reduced peak spring flows, availability of shoreline eddy and deep canyon habitats, and competition and predation by nonnative fish species (59 Fed. Reg. 13374 (March 21, 1994)). Hybridization with other species may also be a threat to the humpback chub (59 Fed. Reg. 13374 (March 21, 1994)).

Critical habitat for the humpback chub was designated in the upper Colorado River basin in the Colorado River from Black Rocks (CO) downstream to Fish Ford River in Utah, the Colorado River between Brown Betty Rapid in Cataract Canyon to Imperial Rapid (UT); the Desolation/Gray Canyon reach of the Green River (UT); the Yampa River in Dinosaur National Monument (CO/UT); and Whirlpool Canyon in the Green River (CO/UT).

(59 Fed. Reg. 13374 (March 21, 1994)).

Razorback sucker

The razorback sucker is endemic to the Colorado River Basin of the southwestern United States, and is listed as endangered under the ESA. Adults reach a maximum size of approximately 3.3 feet in length and 11 pounds in weight (Service 2002e). Historically, razorback suckers were widespread in warm-water reaches of the Colorado River Basin (Service 2002e). Today, razorback suckers occur in small numbers in the Green River, upper Colorado River, San Juan River, lower Colorado River between Lake Havasu and Davis Dam, reservoirs of Lakes Mead and Mojave, Verde River, Salt River, and Fossil Creek (Service 2002e). Razorback suckers inhabit a wide variety of habitats including impounded and riverine habitats, eddies, backwaters, gravel pits, flooded bottoms, flooded mouths of tributary streams, slow runs, sandy riffles, and others (59 Fed. Reg. 13374 (March 21, 1994)).

Dams that changed the flow regime of rivers are thought to be the major cause of decline in populations of razorback suckers (Behnke and Benson 1980). Threats to the razorback sucker include streamflow regulation, habitat modification, predation by nonnative fish species, pesticides, and pollutants (USFWS 2002b). The critical habitat for this species in the upper Colorado River basin includes the Colorado River and its 100-year floodplain from Rifle, Colorado to Lake Powell; in the Yampa River from Cross Mountain to the Green River; in the Green River from the Yampa confluence to the Colorado River confluence (UT); the lower 18 river miles of the White River (UT); the lower 2.5 miles of the Duchesne River (UT); and the Gunnison River from the Uncompahgre River confluence to the Colorado River confluence. (59 Fed. Reg. 13374, (March 21, 1994)).

Environmental Baseline for Endangered Colorado River Fishes

This section of the Green River and the Green River Canal is within designated critical habitat for the Colorado pikeminnow and razorback sucker (Figure 5). Bonytail and humpback chub are also known to occur in the AAs; however, the closest critical habitat for each of these species is approximately 3.25 miles upstream of the AAs (Figure 5).

The Service has identified water, physical habitat, and the biological environment as the physical or biological features of critical habitat for listed Colorado River fish species (59 FR 13374). Water includes a quantity of water of sufficient quality delivered to a specific location in accordance with a hydrologic regime required for the particular life stage for each species. The physical habitat includes areas of the Colorado River system that are inhabited or potentially habitable for use in spawning and feeding, as a nursery, or serve as corridors between these areas. In addition, oxbows, backwaters, and other areas in the 100-year floodplain, when inundated, provide access to spawning, nursery, feeding, and rearing habitats. Food supply, predation, and competition are important elements of the biological environment (Service 2015).

All of the physical or biological features are present within the AAs. All four federally listed species evolved in desert river hydrology, relying on high spring flows and stable base flows for habitat conditions essential to their survival. In addition to main channel migration corridors, Colorado pikeminnow, bonytail and razorback sucker rely on floodplain and backwater habitats for various stages of their life history. High spring flows also act as spawning queues. In contrast, humpback chub rely more on canyon-bound reaches with swift currents and white water.

Past projects have resulted in depletions and changes in flows that have affected the endangered Colorado River fishes. These native fishes are adversely affected by depletions to water flow at sensitive life-stages. Depletions may reduce high spring flows, resulting in changes to food supply and productivity. Reductions in water flows can reduce spawning habitat availability and adversely affect backwater habitats, resulting in lower habitat quality. Water depletions may also contribute to flow changes that favor nonnative fish species. Competition with nonnative fish species has been identified as a factor in the decline of the endangered Colorado River fishes and nonnative fishes are known occupy the same backwaters that are very important for young Colorado pikeminnow and razorback sucker (Service 2015).

The Green River Diversion Rehabilitation Project BO covered existing depletions and addressed flows associated with the operation of the fish barrier; additional coverages are provided by the

Upper Colorado Endangered Fish Recovery Program. No new depletions would occur in relation to the proposed Green River Canal Fish Barrier Project because the flows diverted from the river to operate the fish barrier and return are considered "fish return flows" The water is temporarily diverted from the river for a short segment. Programs are ongoing to remove bass, walleye and northern pike from this system (Service 2015). Colorado also has an ongoing program to stock Colorado pikeminnow, razorback sucker and bonytail at sites in the Colorado River.

The largest, most productive and most robust population of Colorado pikeminnow occurs in the mainstem Green River (combining the lower Green River, Desolation/Gray Canyon, and middle Green River populations). The Colorado pikeminnow and razorback sucker are migratory spawners whose young emerge as larval fish from spawning locations and drift downstream. Because pikeminnow and razorback sucker spawning locations occur upstream of the AAs and known populations occur downstream of the AAs, adults and larval fish must pass the AAs during reproductive cycles.

Although humpback chub are primarily resident fish, some movement between populations is expected. The AAs are downstream of the Desolation Canyon humpback chub population and upstream of the Cataract Canyon humpback chub population. Therefore any fish that move between these populations must pass the AAs.

To augment natural populations, the Recovery Program produces genetically diverse fish in hatcheries and stocks them in the river system. The stocking program is guided by an integrated stocking plan and utilizes at least seven fish hatcheries for propagation. Razorback sucker and bonytail are stocked into the Green River, both upstream and downstream of the AAs. One major stocking location is Green River State Park, immediately downstream of the AAs. In order for stocked fish to distribute into upstream habitats, they would migrate past the project location.

The Recovery Program has been investigating entrainment risk within the Green River Canal since 2013. Entrainment data is collected by dual-antenna PIA installed in the canal just downstream of the water flume and downstream of the siphon. The PIA can detect fish equipped with a PIT tag. The placement of multiple antennas increases the likelihood of detecting PIT tagged individuals. A preliminary analysis report by researchers with the Recovery Program indicates all four species have been detected in the Green River Canal (J. Stahli et. al.). The total number of PIT tagged endangered fish detected in the canal since 2013 is summarized in Table 3.

Table 3. Total Number of Individual PIT Tagged Fish Recorded in the Green River Canal (J. Stahli et. al.)

Common Name	Scientific Name	Total Number of Individual Fish (2013-2016)
Bonytail	*Gila elegans*	116
Colorado pikeminnow	*Ptychocheilus lucius*	149
Humpback chub	*Gila cypha*	5
Razorback sucker	*Xyrauchen texanus*	1,103

Analysis of the detection data shows that a substantial number of endangered fish become entrained in the Green River Canal, but that entrainment mortality is not certain. Once entrained fish reach the end of the raceway, they have three routes for continued movement: 1) continue down the Green River Canal through the headgate; 2) return to the Green River through the Thayn Hydropower turbines; or 3) swim back upstream via the raceway and return to the river. Larval fish are likely swept passively through either Thayn Hydro or the canal. Investigations by Service personnel determined that adults and juveniles are likely excluded from the possibility of using the second route because the trash racks on the Thayn Hydropower facilities are too narrow for entrainment (Service 2015).

The detection data analysis shows a number of fish are able to escape. However, if fish pass through the siphon, permanent entrainment is much more likely. It is important to note that PIT tagged fish represent a relatively small percentage of the population and the PIA do not detect PIT tagged fish at a 100% accuracy rate. Entrainment in canals is likely greater when a larger percentage of the river is being diverted and fish are more likely to become entrained when swimming downstream rather than up due to the orientation of the raceway entry. It can reasonably be expected that the entrainment of fish in the canal is higher (if not significantly higher) than the representative numbers presented in the J. Stahli et al. Recovery Program report.

Direct and Indirect Effects

Construction

The Project has the potential to directly affect Colorado pikeminnow, razorback sucker, bonytail, and humpback chub of all age classes that are in the AAs during all phases of construction activities. Fish injury may occur if individual fish are struck by equipment or debris during the placement of cofferdams. During the dewatering process, it is possible that some fish may be injured or stranded in remaining pools of water within the canal.

Placement of cofferdams would indirectly affect Colorado River fishes and critical habitat by temporarily increasing sediment in the river. Increased sedimentation would occur during placement and removal of the cofferdams. Natural river cobble materials used in cofferdam construction have a variety of material sizes, ranging from large-diameter rock and cobble to gravel, sand, and silt material. During placement and removal of the material, silt and sand would be mobilized into the water column and would remain suspended for some period of time, depending on the amount of fine material present and the river flow during cofferdam construction. Sediment mobilization would stabilize after a few hours to a few days, again depending on the amount of sediment in the fill material and the flow in the river. The impact of sediment would be minor and temporary.

Indirect effects from the action may also result from a loss or reduction to invertebrates, a primary food source for Colorado River fishes, as well as impacts to water quality in the AA. Heavy equipment likely will crush and kill invertebrates within the stream substrate. However, the area affected by the disturbance is small relative to the upstream river, which provides a continual source of invertebrates that will repopulate the project area after construction. Alterations in the substrate and its embeddedness would not be expected to result in mortality, but it may have minor impacts by altering habitat suitability downstream of the action area.

Habitat characteristics would re-establish over the long term once construction activities have been completed.

Prior to in-stream construction activities, the AAs would be surveyed and fish would be salvaged. While canal construction is occurring, the Green River Canal would be turned off and cofferdams would be installed at the far upstream and downstream end of the AAs to preclude fish from reentering the area. However, the possibility that a fish may be caught and crushed by heavy equipment or injured during fish salvage efforts cannot be ruled out.

No direct impacts to Colorado River fish from placement of the cofferdams and construction work in the river are anticipated. No in-channel work would be conducted between mid-March through September. A majority of the construction is anticipated from October through mid-March during low-flow periods and outside the spawning season (late spring and early summer); therefore, eggs are unlikely to be affected by construction. High flows that trigger spawning normally occur in June and July. Completing construction outside of the sensitive spawning and larval stage time frames would avoid or minimize impacts to spawning fish, and avoid impacts to larval endangered fishes that may be in the project vicinity. Final work activities, which would be limited to personnel with hand tools and use of vehicles within staging areas or along routes, would continue through summer 2018. Revegetation activities are proposed to be conducted in the fall. None of this work would be within the river channel.

Construction activities within the riparian corridor may disturb suitable habitat for fish species through equipment travel and operation and may also create turbid water that may travel downstream potentially affecting fish species. Direct impacts from the project construction include potential temporary disturbance to the canal and water quality by disturbance to bottom sediments.

Permanent disturbances include alteration of the canal and riverbed in designated critical habitat for listed fish species. The proposed permanent impacts associated with construction activities on endangered Colorado River fish habitat in the AAs are approximately 1.02 acres, and are associated with reshaping and lining the canal, adding riprap in specific locations, installing the fish barrier and return channel and replacing the siphon (Figures 3a and 3b). The remaining 0.79 acre of impacts to the AAs would be temporary and are associated with installing the cofferdams, conducting canal gate modifications, construction access, and operation and maintenance activities (Figures 3a and 3b). Table 3 lists the impacts on fish habitat from the proposed project construction activities. For the purpose of calculating impacts in this BA, fish habitat includes all areas where fish are currently known to occur within the AA (Table 1), which include the canal, siphon area, and Green River.

Table 4. Table Permanent and temporary impacts on endangered Colorado River fish habitat in the AAs

Action Area	Impacts in Acres																
	8-gate Structure Repair		Cofferdams		Canal Gate Modifications		Canal Improvements		Fish Barrier and Return Channel		Siphon Replacement		Construction Access and Operations and Maintenance		Total Temp.	Total Perm.	Total Impacts
	Temp.	Perm.	Temp.	Perm.	Temp.	Perm.	Temp.	Perm.	Temp.	Perm.	Temp.	Perm.	Temp.	Perm.			
AA1	0	0.3	0.1	0	0	0	0	0	0	0	0	0	0.6	0	0.7	0.3	1
AA2	0	0	0.1	0	0.01	0	0	0.4	0	0.2	0	0.1	0.1	0	0.2	0.7	0.9
Total	0	0.3	0.2	0	0.01	0	0	0.4	0	0.2	0	0.1	0.7	0	0.9	1	1.9

Conservation Measures, BMPs, and compliance with Section 401 and 404 permit terms and conditions will reduce potential adverse impacts and minimize the temporary impacts of the project during construction (see the *Conservation Measures* section on page 12 and *Construction Methods* section on page 14 within this document). Although these alterations are considered permanent impacts, they are assisting with the overall enhancement to fish habitat in the AAs by creating more stable facilities and reducing sedimentation, which result in better long-term water quality.

Project Operation and Maintenance Activities

Similar to potential direct and indirect effects during construction, operation and maintenance aspects of the Project have the potential to directly affect all age classes of Colorado pikeminnow, razorback sucker, bonytail, and humpback chub in the AAs. Operation of the Green River fish barrier is predicted to be beneficial to the endangered Colorado River fishes. An overall and long-term beneficial effect would occur from installing the fish barrier and fish return channel, which would result in reduced entrainment and mortality of fishes. The fish barrier is designed to return adult and sub-adult fish to the Green River; however, larval fish and eggs may still become entrained in the canal downstream of the fish barrier resulting in incidental take. There is also potential for adult, sub-adult, and larval fish to become injured by the fish barrier or debris or stranded in the fish return resulting in death or injury. The fish barrier has been designed to meet velocity requirements for the fish to minimize the potential for take; however, incidental take may occur.

Ongoing maintenance activities (sediment and debris removal and mechanical, structural, or electrical maintenance) and facility operations activities may result in adverse effects to the endangered Colorado River fishes in the AAs. Compared to current operations of the Green River canal, ongoing future work associated with the facilities would result in lower levels of harm and harassment to the endangered Colorado River fish. Maintenance activities would be conducted periodically. Indirect effects associated with maintenance activities would be of short duration and likely include a reduction of flows and temporary displacement of fish. Reclamation anticipates that the canal company will conduct frequent (about 6 times per year) and necessary maintenance activities to keep the facilities stable and in good condition, which would reduce the magnitude and number of repairs over time. The proposed action would result in minimal disturbance to these species compared to past and current conditions associated with fish entrapment within the Green River Canal. Mitigation measures and conservation measures described in this document would minimize the potential take of individuals in the immediate AAs. Another beneficial effect from the Project includes more stable facilities and stable canal banks which would reduce erosion and turbidity in the waterway. Reduced maintenance activities in the canal would provide a long term benefit to endangered Colorado River fish.

Effects to Designated Critical Habitat

The AAs contain all of the physical or biological features listed above. Effects to designated critical habitat physical or biological features are the same as described in the paragraphs above. The project will directly and permanently impact about 1.02 acres, and temporarily impact about 0.79 acre of habitat. Mitigation measures are described in the *Conservation Measures* section above.

Determination for the Endangered Colorado River Fishes

Although the purpose and need of the proposed Project is to mitigate impacts related to fish entrainment in the Green River Canal, direct and indirect effects to the Green River and canal during construction and regular operation and maintenance activities of the proposed Project have the potential to adversely affect these species. The Project would have 1.02 acres of permanent impacts and 0.79 acre of temporary impacts to existing fish habitat. These impacts would be minor in relation to the amount of available habitat within the AAs and will be completely offset by the long-term benefits of the project to endangered Colorado River fish. Project operations and maintenance would likely result in periodic and temporary adverse effects to the four endangered fish species; however, the overall conditions in the AAs following the completion of the Project would be better than the current environment, and the Project would result in a benefit to the species population.

The Project may affect and is likely to adversely affect the Colorado pikeminnow, bonytail chub, razorback sucker, and humpback chub and designated critical habitat for the razorback sucker and Colorado pikeminnow. The Project may affect, but is not likely to adversely affect, humpback chub and bonytail chub critical habitat.

Other Sensitive Species

In addition to species listed as threatened or endangered, ERO assessed the AAs for potential habitat and the presence of species protected by the Migratory Bird Treaty Act (MBTA). Migratory birds, as well as their eggs and active nests, are protected under the MBTA. Migratory bird habitat typically includes trees and shrubs, but upland grasslands are also used for nesting.

Riparian vegetation, wetlands, and upland grasslands within and adjacent to the AAs are potential nesting habitat for migratory birds. Reclamation would comply with the MBTA by constructing the project, including clearing of any vegetation, outside of the breeding season (during the winter months) or conducting a migratory bird survey prior to starting the project.

Cumulative Effects

Cumulative effects involve future State, local, or private actions that are reasonably certain to occur in the area. Future federal actions requiring separate consultation (unrelated to the proposed action) are not considered in the cumulative effects section" (USFWS 1998).

Cumulative effects identified for the proposed action are:

- Large irrigation projects. Within the action area water development is expected to continue in accordance with Utah State Water Law. A large portion of this development will require federal consultation, but some projects will not.
- Oil and natural gas development. The development of these resources in the general area is increasing as industry expands operations. A limited amount of natural gas exploration and development is expected to occur without federal jurisdiction, such as evaporation pond construction and well drilling. Activities are not expected to occur in the floodplain, but could occur in watersheds that drain to the Green River, such as washes or tributary streams. (Service 2015).

Conclusions

The construction, operation and maintenance of the Green River Fish Barrier Project is predicted to have no effect on the Utah prairie dog, California condor, Mexican spotted owl, Barneby reed-mustard, Jones cycladenia, Last chance townsendia, San Rafael cactus, Winkler cactus, or the Wright fishhook cactus; and is not likely to adversely affect the Southwestern willow flycatcher or the yellow-billed cuckoo because of the lack of suitable habitat in or near the action area (Table 4), and timing of construction.

The Project would reduce canal entrainment and the potential for incidental take of endangered Colorado River fish: bonytail, Colorado pikeminnow, humpback chub, and razorback sucker. Incidental take of these species may still occur; however, the amount of incidental take is expected to be greatly reduced, with the placement of a barrier upstream of the siphon and a return channel back to the Green River. The amount of habitat proposed to be disturbed during construction and regular operations and maintenance activities represents a small fraction of the habitat available for the endangered Colorado River fishes in the vicinity; therefore, the direct effects are expected to be minor, but discernible. Following the project, there would be an overall benefit to the fish because of the barrier to reduce entrapment within the canal and the fish return channel, which gives fish the ability to return to viable habitat in the Green River. In addition, the combination of avoidance and minimization of impacts and conservation measures would reduce the potential for the incidental take of the endangered Colorado River fishes associated with the proposed project.

Specific benefits to the endangered Colorado River fishes include minimizing entrainment of fish in the canal, improved fish passage for both up and downstream movement year round, and mitigation for and avoiding impacts whenever feasible by following proper construction BMPs, work timing, material selection, and de-watering protocols.

Based on the current project plans, including proposed conservation measures, the Project may affect and is likely to adversely affect the Colorado pikeminnow, bonytail chub, razorback sucker, and humpback chub and designated critical habitat for the razorback sucker and Colorado pikeminnow (Table 4). The Project may affect, but is not likely to adversely affect, humpback chub and bonytail chub critical habitat (Table 4).

Table 5. Effects determination for federally threatened, endangered, and candidate species.

Species	Species Effects Determination	Critical Habitat Effects Determination
Utah prairie dog	No effect	No effect
California condor	No effect	No effect
Mexican spotted owl	No effect	No effect
Southwestern willow flycatcher	Not likely to adversely affect	No effect
Yellow-billed cuckoo	Not likely to adversely affect	No effect
Bonytail*	May affect, likely to adversely affect	May affect, but is not likely to adversely affect
Colorado pikeminnow*	May affect, likely to adversely affect	May affect, likely to adversely affect
Humpback chub*	May affect, likely to adversely affect	May affect, but is not likely to adversely affect
Razorback sucker*	May affect, likely to adversely affect	May affect, likely to adversely affect

Species	Species Effects Determination	Critical Habitat Effects Determination
Barneby reed-mustard	No effect	No effect
Jones cycladenia	No effect	No effect
Last chance townsendia	No effect	No effect
San Rafael cactus	No effect	No effect
Winkler cactus	No effect	No effect
Wright fishhook cactus	No effect	No effect

List of Preparers and Contacts Made

Preparers:

Courtney Marne, ERO Resources Corporation
Cassandra Shenk, ERO Resources Corporation
Ronald Beane, ERO Resources Corporation
Amanda Ewing, Bureau of Reclamation, Western Colorado Area Office

Project Description and Plans Provided by:

Amanda Ewing, Bureau of Reclamation, Western Colorado Area Office
Robert Norman, Engineer, Bureau of Reclamation, Western Colorado Area Office

Experts Consulted:

George Weekley, U.S. Fish and Wildlife Service

References

59 FR 13374-13400. Endangered and Threatened Wildlife and Plants; Determination of Critical Habitat for the Colorado River Endangered Fishes: Razorback Sucker, Colorado Squawfish, Humpback Chub, and Bonytail Chub. Federal Register, Vol. 59, No. 54, pages 13374 – 13400. March 21, 1994.

Banks, R.C. 1988. Geographic variation in the Yellow-billed Cuckoo. Condor 90:473-477.

Behnke, R.J., and D.E. Benson. 1980. Endangered and Threatened Fishes of the Upper Colorado River Basin. Colorado State University Cooperative Extension Service, Fort Collins, Colorado.

Kevin R. Bestgen, Robert C. Schelly, Richard R. Staffeldt, Matthew J. Breen, Darrel E. Snyder & M. Tildon Jones. 2017. First Reproduction by Stocked Bonytail in the Upper Colorado River Basin, North American Journal of Fisheries Management, 37:2, 445-455, DOI: 10.1080/02755947.2017.1280571

Colorado Natural Heritage Program. 2017. CNHP Tracked Bird Species. Accessible at : http://www.cnhp.colostate.edu/download/list/birds.asp. Last accessed: April 21, 2017.

Colorado Parks and Widlife. 2017. Conservation and Management- Threatened and Endangered List. Accessible at: http://cpw.state.co.us/learn/Pages/SOC-ThreatenedEndangeredList.aspx. Last accessed: April 21, 2017.

Durst, S. L., M. K. Sogge, S. D. Stump, H. A. Walker, B. E. Kus, and S. J. Sferra. 2008, Southwestern willow flycatcher breeding sites and territory summary-2007. U.S. Geological Survey Open-File Report 2008-1303, 31 pp.

Franzreb, K.E. and S.A. Laymon. 1993. A reassessment of the taxonomic status of the Yellow-billed Cuckoo. Western Birds 24:17-28.

Laymon, S.A. and M.D. Halterman. 1987. Can the western subspecies of the Yellow-billed Cuckoo be saved from extinction? Western Birds 18:19-25.

Muth, Robert T., Larry W. Crist, Kirk E. LaGory, John W. Hayse, Kevin R. Bestgen, Thomas P. Ryan, Joseph K. Lyons & Richard A. Valdez. 2000. Flow and Temperature Recommendations for Endangered Fishes in the Green River Downstream of Flaming Gorge Dam: Upper Colorado River Endangered Fish Recovery Program, Project FG-53.

Osmundson, D. B., R. J. Ryel & T. E. Mourning. 1997. Growth and survival of Colorado squawfish in the Upper Colorado River. Transactions of the American Fisheries Society 126:687-698.

Reclamation. 2016. U.S. Bureau of Reclamation. Technical Service Center, Hydraulic Investigations and Laboratory Services Group. Hydraulic Laboratory Technical Memorandum PAP-1157: Laboratory Tests of a Corrugated Water Screen for Screening Fish from Irrigation Water Diversions. Denver, Colorado. December 2016.

Reclamation. 2017. Upper Colorado Recovery Program Performance Work Statement for the Biological Assessment- Green River Canal Fish Barrier Project. United States Bureau of Reclamation. Provided to ERO Resources. March 2017.

Sigler, William F. & Robert R. Miller. 1963. Fishes of Utah. Salt Lake City, Utah: Utah State Department of Fish and Game.

Sigler, William F. & John W. Sigler. 1996. Fishes of Utah: A Natural History. Salt Lake City, Utah: University of Utah Press.

Stahli, J., McAbee, K., Speas, D., McKinnon, P., and Jones, T. Preliminary Results of Entrainment in the Green River Canal, 2013-2016. Annual Report Project C-28a of the Upper Colorado River Endangered Fish Recovery Program, Lakewood, Colorado.

U.S. Department of Agriculture, NRCS (NRCS). 2016. Web Soil Survey. Available at: http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx. Last accessed: January 2017.

U.S. Fish and Wildlife Service (Service). 1998. Endangered species consultation handbook. Procedures for conducting consultation and conference activities under section 7 of the Endangered Species Act. Final.

U.S. Fish and Wildlife Service (Service). 2002a. Birds of conservation concern 2002. Division of Migratory Bird Management, Arlington, Virginia. 99 pp. [Online version available at http://migratorybirds.fws.gov/reports]

U.S. Fish and Wildlife Service. 2002b. Bonytail (*Gila elegans*) Recovery Goals: amendment and supplement to the Bonytail Chub Recovery Plan. Denver, Colorado: US Fish and Wildlife Service, Mountain-Prairie Region. 97 pages.

U.S. Fish and Wildlife Service. 2002c. Colorado pikeminnow (*Ptychocheilus lucius*) Recovery Goals: amendment and supplement to the Colorado Squawfish Recovery Plan. Denver, Colorado: US Fish and Wildlife Service, Mountain-Prairie Region. 111 pages.

U.S. Fish and Wildlife Service. 2002d. Humpback chub (*Gila cypha*) Recovery Goals: amendment and supplement to the Humpback Chub Recovery Plan. Denver, Colorado: US Fish and Wildlife Service, Mountain-Prairie Region. 107 pages.

U.S. Fish and Wildlife Service. 2002e. Razorback Sucker (*Xyrauchen texanus*) Recovery Goals: amendment and supplement to the Razorback Sucker Recovery Plan. Denver, Colorado: US Fish and Wildlife Service, Mountain-Prairie Region. 113 pages.

U.S. Fish and Wildlife Service. 2011. Species Profile for the Yellow-Billed Cuckoo (*Coccyzus americanus*).

U.S. Fish and Wildlife Service. 2011c. Colorado pikeminnow (*Ptychocheilus lucius*) 5 Year Review: Summary and Evaluation. Denver, Colorado: US Fish and Wildlife Service, Mountain-Prairie Region. 25 pages.

U.S. Fish and Wildlife Service. 2011c. Humpback chub (*Gila cypha*) 5 Year Review: Summary and Evaluation. Denver, Colorado: US Fish and Wildlife Service, Mountain-Prairie Region. 26 pages.

U.S. Fish and Wildlife Service (Service). 2013. Designation of critical habitat for southwestern willow flycatcher. Federal Register 78(2):344-532. 3 January 2013.

U.S. Fish and Wildlife Service (Service). 2015. Biological Opinion for the Green River Diversion Rehabilitation Project, Grand & Emery Counties, Utah. 72 pages.

U.S. Fish and Wildlife Service (Service). 2017. Personal communication from George Weekley, Colorado River Fisheries Project, to Courtney Marne, ERO Resources Corp. March 31 and April 4, 2017.

U.S. Fish and Wildlife Service (Service). 2017a. Endangered, Threatened, Proposed and Candidate Species. Information, Planning, and Conservation System database. Available at: < http://ecos.fws.gov/ipac/ >. Last updated: April 21, 2017.

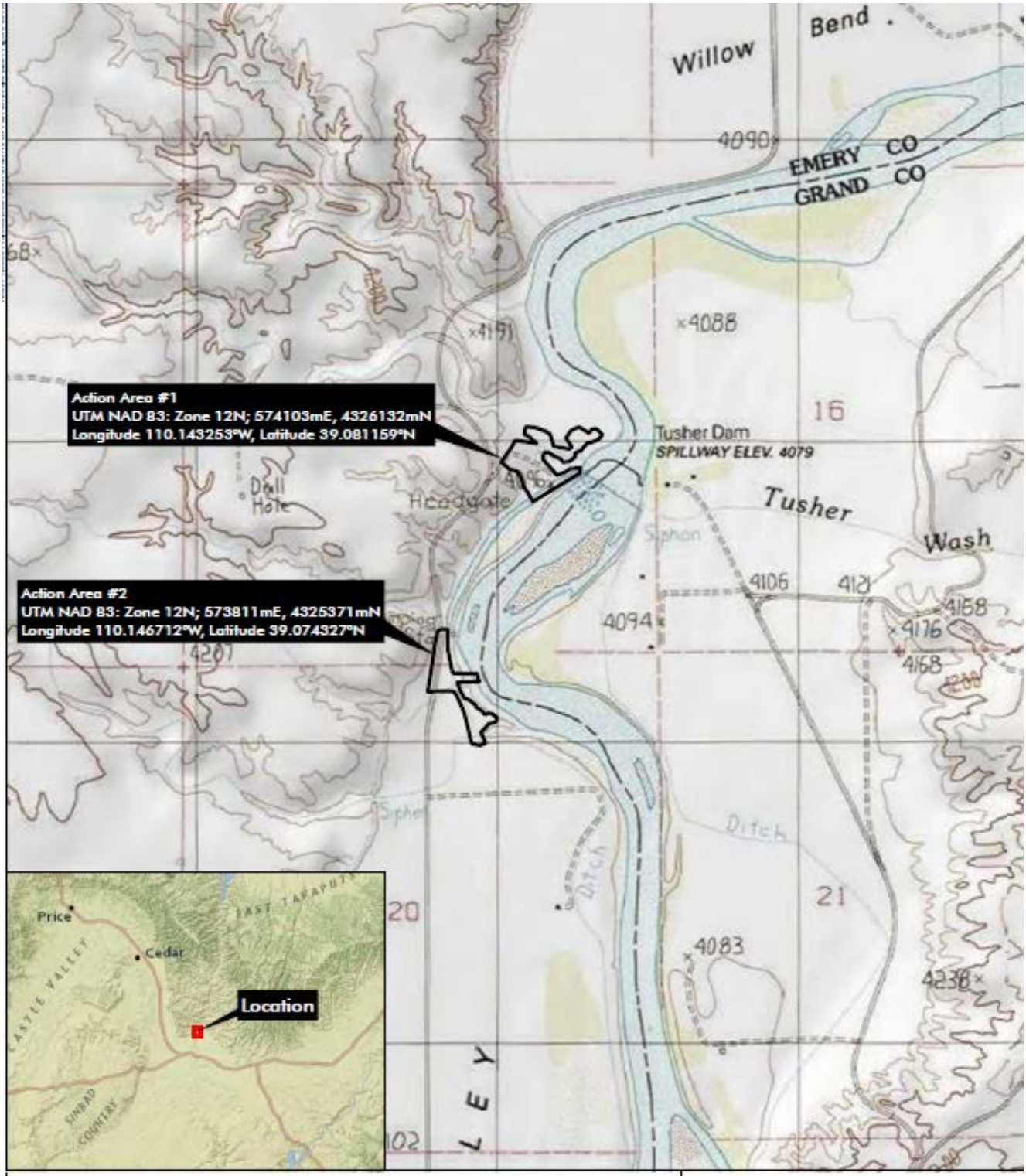
U.S. Geological Survey (USGS). 2017. National Water Information System: Web Interface. Station USGS 09315000 Green River at Green River, UT. Last Accessed, April 21, 2017.

United States U.S. Department of Agriculture Natural Resource Conservation Service (NRCS). 2007. Rapid Watershed Assessment HUC #14060008-Lower Green River, March 1, 2007. 22 pp. Available at: https://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS.

U.S. Department of Agriculture Natural Resource Conservation Service (NRCS). 2014. Green River Diversion Rehabilitation Final EIS. Available at: https://www.nrcs.usda.gov/wps/portal/nrcs/detail/ut/programs/planning/ewpp/?cid=nrcs141p2_034037. June, 2014.

Western Regional Climate Center (WRCC),). 2005. Data for Green River, UT. Accessed at http://www.wrcc.dri.edu/cgi-bin/cliMAIN.pl?utgree. Last accessed: April 21, 2017.

Woodling, J. 1985. Colorado's Little Fish, A Guide to the Minnows and Other Lesser-Known Fishes in the State of Colorado. Colorado Division of Wildlife, Denver, Colo



Green River Canal Fish Barrier Project

Sections 17 and 20, T20S, R16E; Salt Lake Meridian

USGS Blue Castle Butte, UT Quadrangle

Emery County, Utah

0 750 1,500 Feet

1 inch=1,500 feet

N

Figure 1
Vicinity Map

Prepared for: Bureau of Reclamation
File: 6824 Figure 1.mxd (GS)
April 21, 2017

ERO Resources Corp.

Green River Canal Fish Barrier Project

Action Area
Disturbed Upland
Fringe Wetland
Riparian Woodland
Upland Shrubland

Image Source: Google Earth©, July 2015

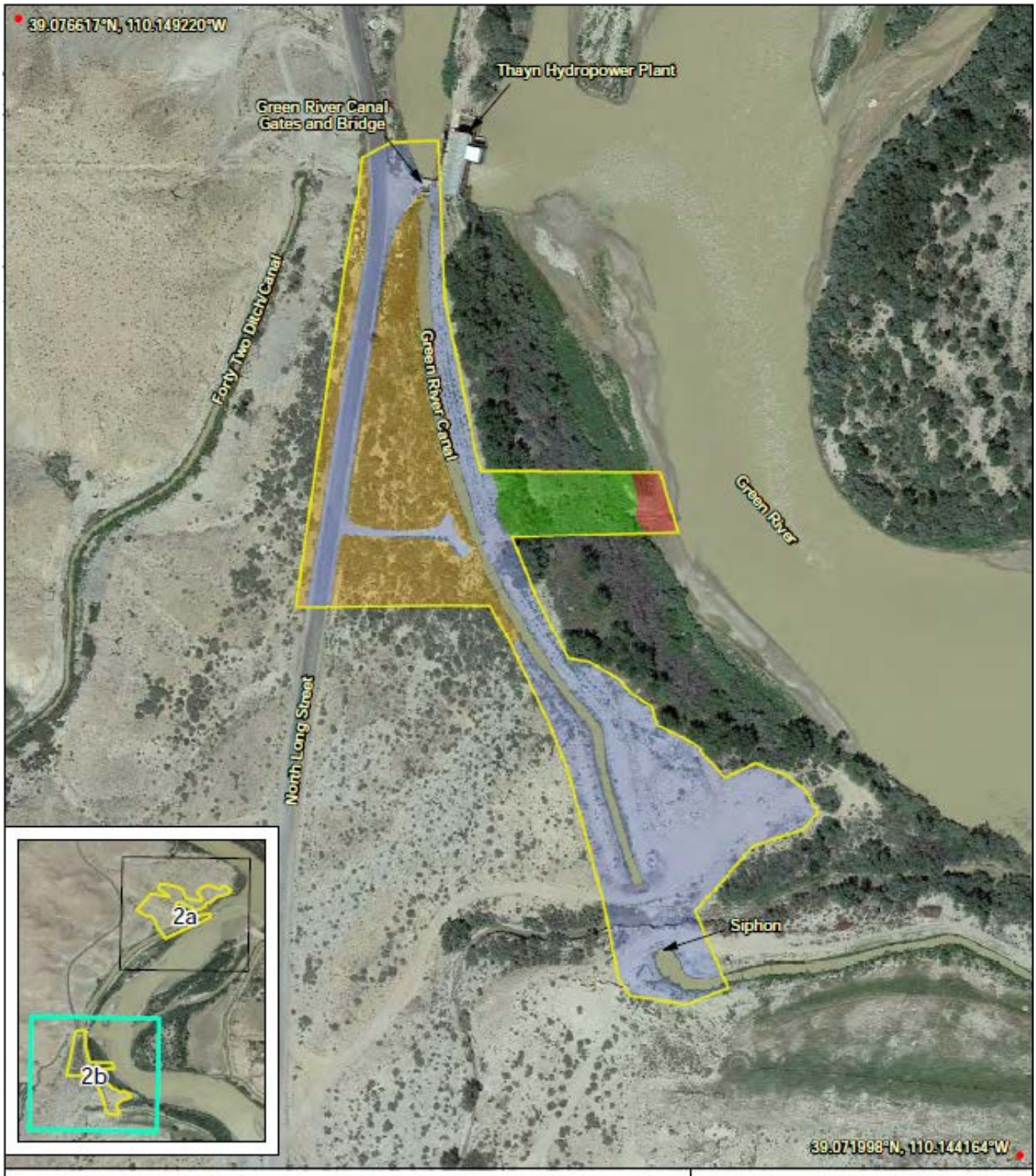
0 100 200 Feet
1 inch=200 feet

N

Figure 2a
Action Area #1
Existing Conditions

Prepared for: Bureau of Reclamation
File: 6824 Figures 2a & 2b.mxd (GS)
May 8, 2017

ERO
ERO Resources Corp.



Green River Canal Fish Barrier Project

Action Area
Disturbed Upland
Fringe Wetland
Riparian Woodland
Upland Shrubland

Image Source: Google Earth©, July 2015

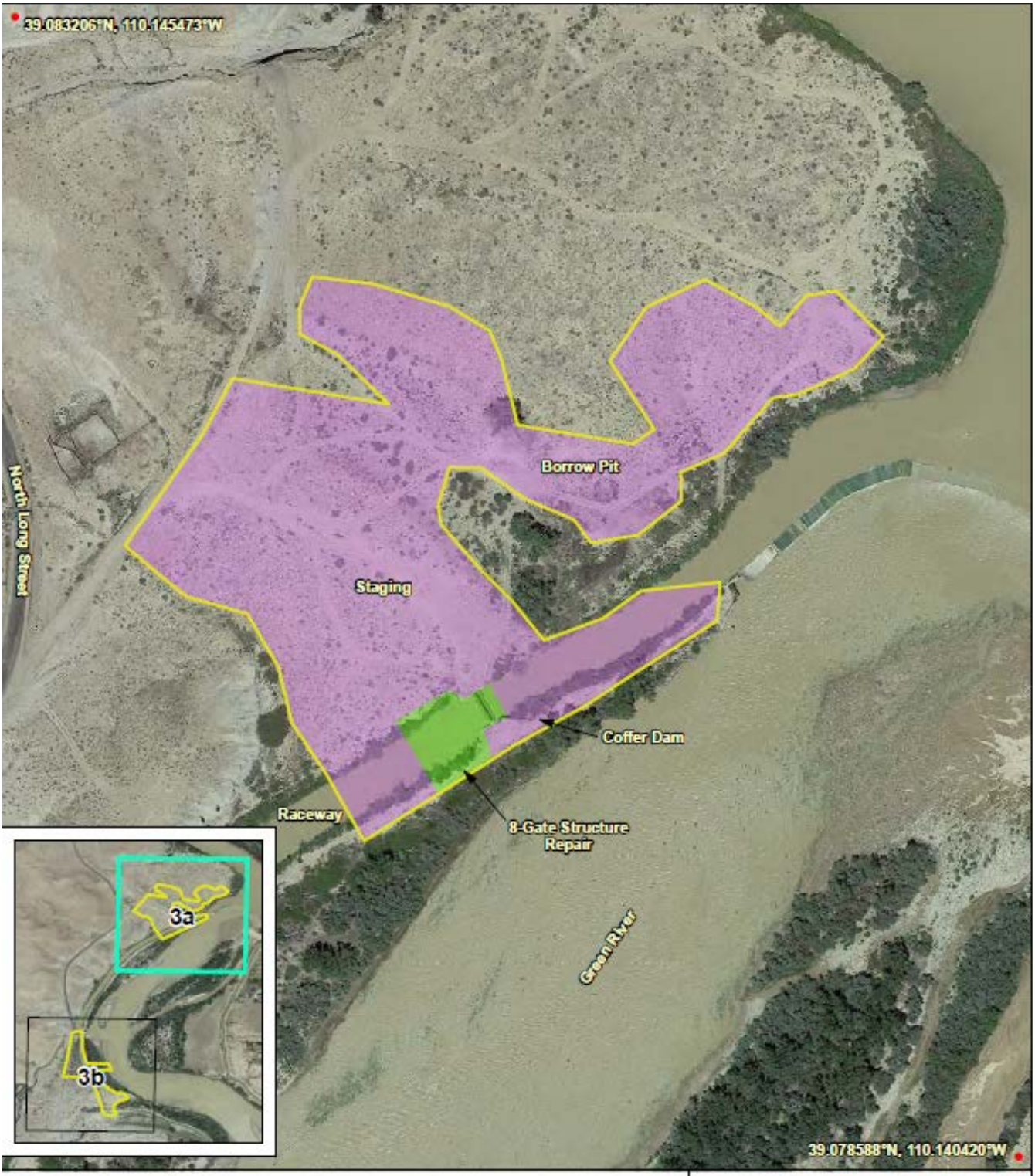
0 100 200 Feet
1 inch=200 feet

N

Figure 2b
Action Area #2
Existing Conditions

Prepared for: Bureau of Reclamation
File: 6824 Figures 2a & 2b.mxd (GS)
May 8, 2017

ERO
ERO Resources Corp.



Green River Canal Fish Barrier Project

Permanent Construction Impact

Temporary Construction Impact

Action Area

Image Source: Google Earth©, July 2015

0 100 200 Feet

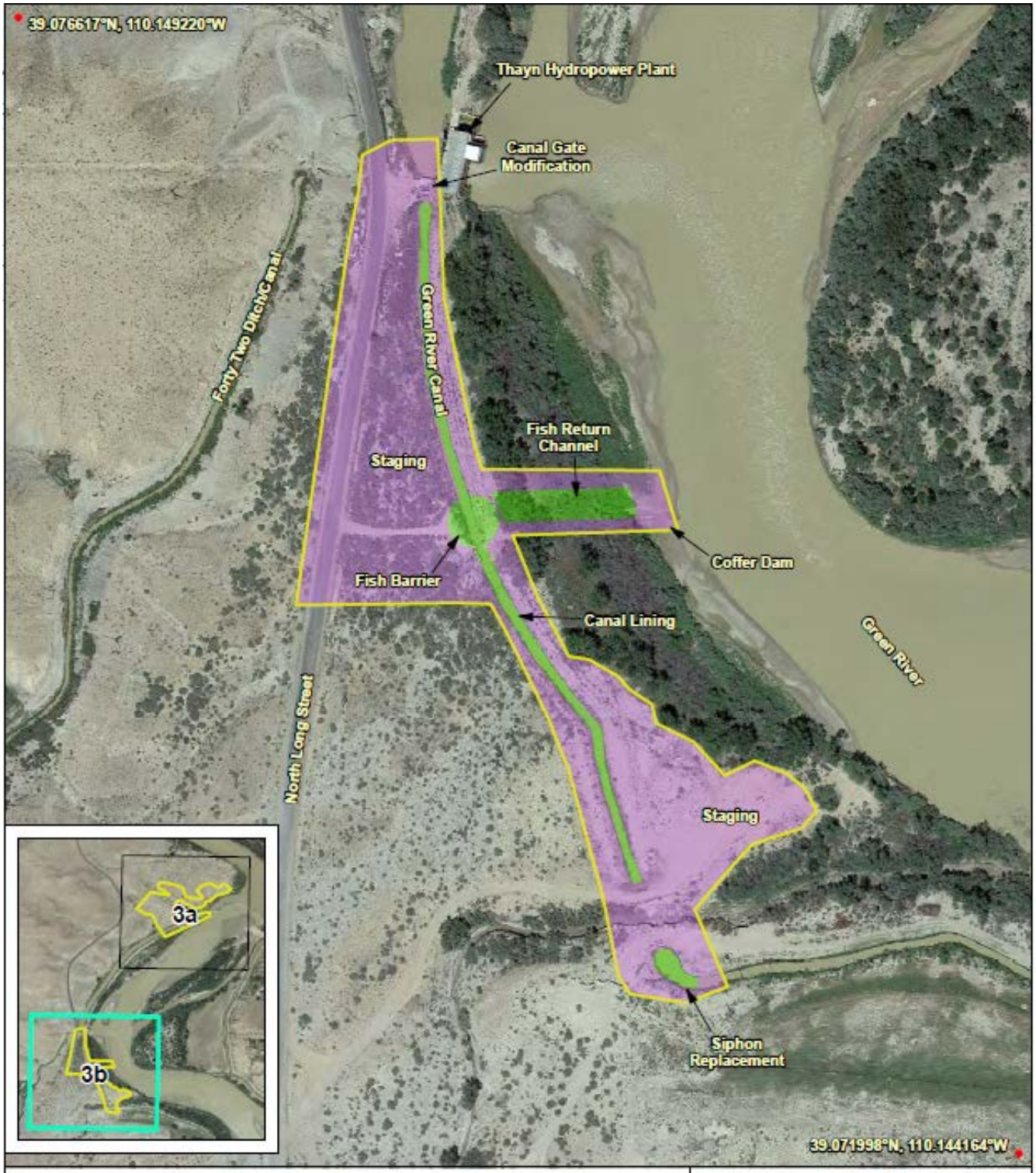
1 inch=200 feet

N

Figure 3a
Action Area #1
Proposed Impacts

Prepared for: Bureau of Reclamation
File: 6824 Figures 3a & 3b.mxd (GS)
May 8, 2017

ERO
ERO Resources Corp.



Green River Canal Fish Barrier Project

Permanent Construction Impact

Temporary Construction Impact

Action Area

Image Source: Google Earth©, July 2015

0 100 200 Feet

1 inch=200 feet

N

Figure 3b
Action Area #2
Proposed Impacts

Prepared for: Bureau of Reclamation
File: 6824 Figures 3a & 3b.mxd (GS)
May 8, 2017

ERO Resources Corp.

Green River Canal Fish Barrier Project

Action Area

Image Source: USDA FSA, August 2016

0 3,500 7,000 Feet

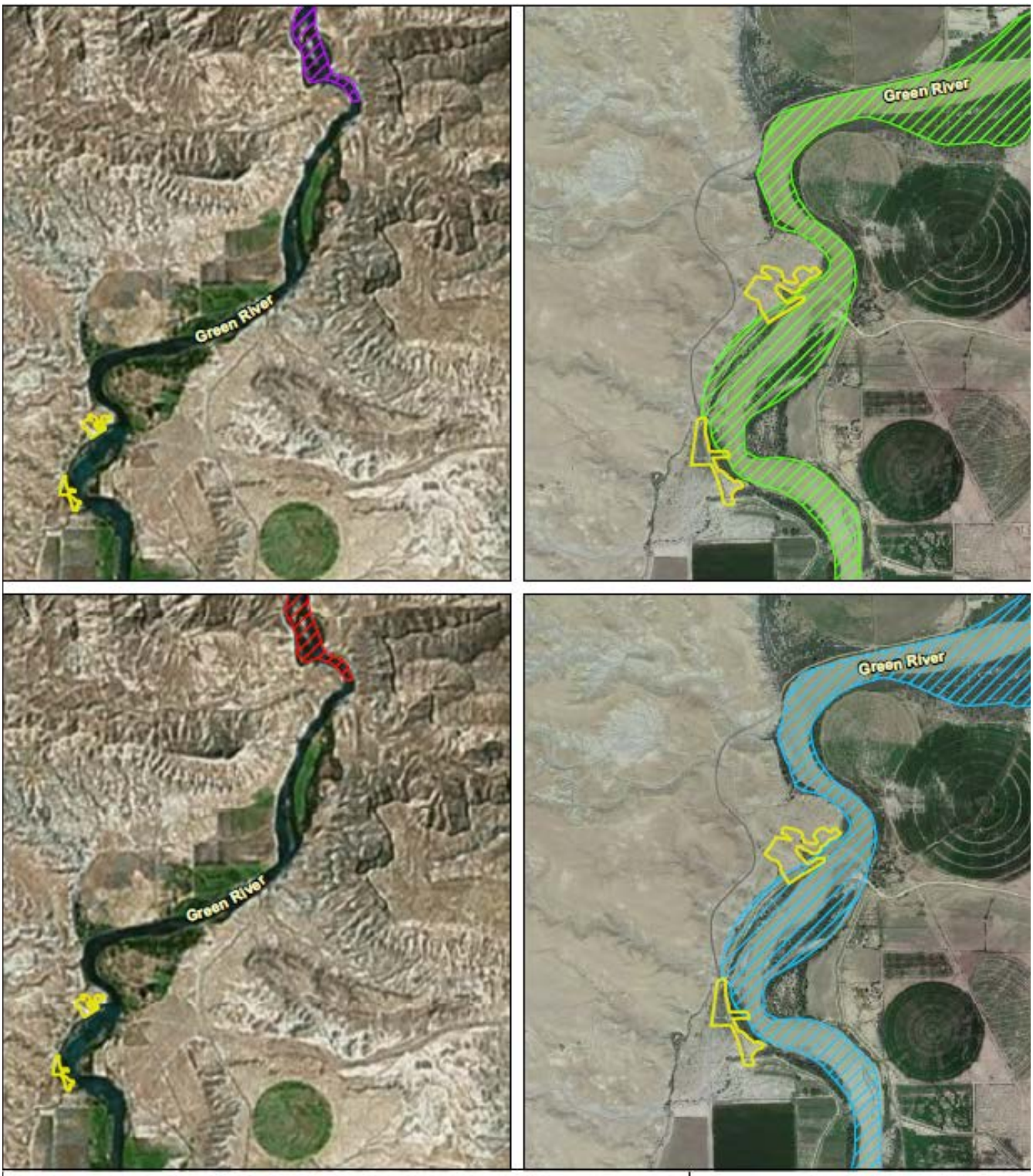
1 inch=7,000 feet

N

Figure 4
Aerial Image of Landscape Surrounding Project Area

Prepared for: Bureau of Reclamation
File: 6824 Figure 4.mxd (GS)
May 8, 2017

ERO Resources Corp.



Green River Canal Fish Barrier Project

Action Area
Bonytail Chub
Colorado Pikeminnow
Humpback Chub
Razorback Sucker

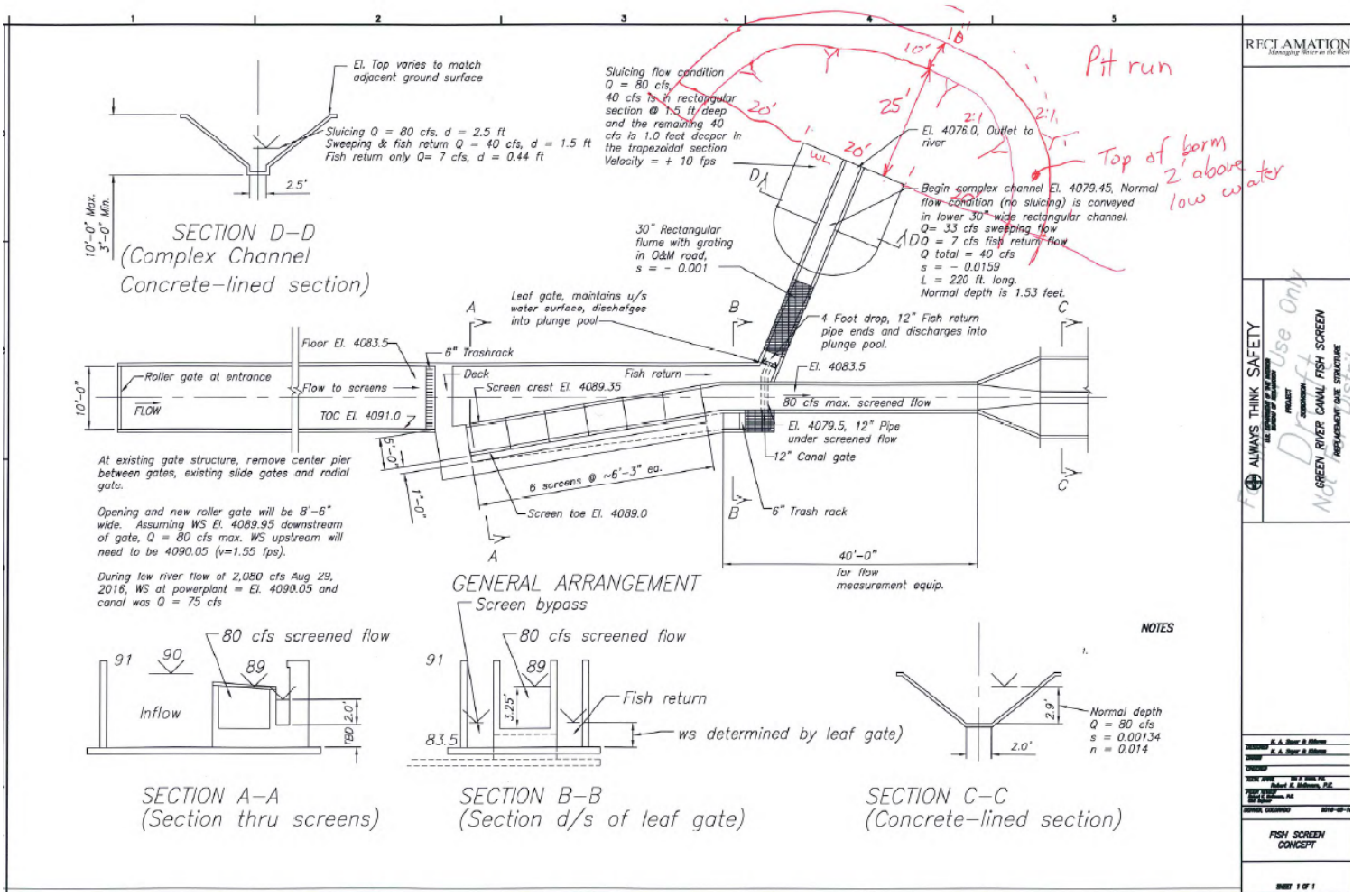
Image Source: USDA FSA, August 2016; Google Earth©, July 2015

N

Figure 5
Endangered Colorado River Fish
Designated Critical Habitat

Prepared for: Bureau of Reclamation
File: 6824 Figure 5.mxd (GS)
May 9, 2017

ERO
ERO Resources Corp.


El. Top varies to match adjacent ground surface
Sluicing Q = 80 cfs, d = 2.5 ft
Sweeping & fish return Q = 40 cfs, d = 1.5 ft
Fish return only Q= 7 cfs, d = 0.44 ft
2.5'
10'-0" Max.
3'-0" Min.
SECTION D–D
(Complex Channel
Concrete–lined section)
Sluicing flow condition
Q = 80 cfs,
40 cfs is in rectangular section @ 1.5 ft deep and the remaining 40 cfs is 1.0 feet deeper in the trapezoidal section
Velocity = + 10 fps
El. 4076.0, Outlet to river
Begin complex channel El. 4079.45, Normal flow condition (no sluicing) is conveyed in lower 30" wide rectangular channel.
Q= 33 cfs sweeping flow
Q = 7 cfs fish return flow
Q total = 40 cfs
s = – 0.0159
L = 220 ft. long.
Normal depth is 1.53 feet.
30" Rectangular flume with grating in O&M road,
s = – 0.001
Leaf gate, maintains u/s water surface, discharges into plunge pool
4 Foot drop, 12" Fish return pipe ends and discharges into plunge pool.
Floor El. 4083.5
6" Trashrack
Deck
Screen crest El. 4089.35
Fish return
El. 4083.5
Roller gate at entrance
Flow to screens
FLOW
TOC El. 4091.0
10'-0"
80 cfs max. screened flow
El. 4079.5, 12" Pipe under screened flow
12" Canal gate
6 screens @ ~6'-3" ea.
Screen toe El. 4089.0
6" Trash rack
40'-0"
for flow measurement equip.
At existing gate structure, remove center pier between gates, existing slide gates and radial gate.
Opening and new roller gate will be 8'–6" wide. Assuming WS El. 4089.95 downstream of gate, Q = 80 cfs max. WS upstream will need to be 4090.05 (v=1.55 fps).
During low river flow of 2,080 cfs Aug 29, 2016, WS at powerplant = El. 4090.05 and canal was Q = 75 cfs
GENERAL ARRANGEMENT
Screen bypass
80 cfs screened flow
91
90
89
Inflow
TOP 2.0'
SECTION A–A
(Section thru screens)
80 cfs screened flow
91
89
7.25'
Fish return
83.5
ws determined by leaf gate)
SECTION B–B
(Section d/s of leaf gate)
NOTES
2.9'
2.0'
Normal depth
Q = 80 cfs
s = 0.00134
n = 0.014
SECTION C–C
(Concrete–lined section)
Pit run
Top of berm 2' above low water
RECLAMATION
ALWAYS THINK SAFETY
GREEN RIVER CANAL FISH SCREEN
REPLACEMENT GATE STRUCTURE
FISH SCREEN CONCEPT

BIOLOGICAL ASSESSMENT PHOTO LOG
Green River Canal Fish Barrier Project (ERO Project 6824)
March, 2017

Photo 1. View north from Thayn hydropower plant, northeast of Action Area #2

Photo 2. View southeast of sporadic fringe wetlands along the banks of the Green River canal, near the area where the fish barrier and passageway will be installed

Photo 3. View northeast showing Thayn hydropower plant

Photo 4. Thayn hydropower plant located at the end of the power canal, view north (north of Action Area #2)

Photo 5. View southeast of Green River canal south of Thayn hydropower plant, looking towards center of Action Area #2

Photo 6. View southeast showing 8-gate structure to be replaced (southcentral of Action Area #1)

BIOLOGICAL ASSESSMENT PHOTO LOG
Green River Canal Fish Barrier Project (ERO Project 6824)
March, 2017

Photo 7. View south of inverted siphon outlet that will be replaced as part of the proposed project

Photo 8. View (east) of riparian woodland between the canal and river

United States Department of the Interior

FISH AND WILDLIFE SERVICE

IN REPLY REFER TO
FWS/R6
ES/UT
06E23000-
2017- F-0357

Utah Field Office
2369 West Orton Circle, Suite 50
West Valley City, Utah 84119

OCT 13 2017

Memorandum

To: Area Manager, Western Colorado Area Office, U.S. Bureau of Reclamation, 445 West Gunnison Avenue, Suite 221, Grand Junction, Colorado, 81501

From: Utah Field Supervisor, Ecological Services, U.S. Fish and Wildlife Service, West Valley City, Utah

Subject: Biological Opinion for Green River Canal Fish Barrier Project

In accordance with section 7 of the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 et seq.) (Act) and the Interagency Cooperation Regulations (50 CFR 402), this transmits our biological opinion (BO) for effects to the bonytail (*Gila elegans*), Colorado pikeminnow (*Ptychocheilus lucius*), humpback chub (*Gila cypha*), and razorback sucker (*Xyrauchen texanus*), (collectively referred to hereafter as Colorado River fishes) and designated critical habitat for these four fish species associated with construction, operation, and maintenance of a proposed fish screen and barrier, fish return channel, and facility improvements to the Green River Canal (Project). We received your request for formal consultation on June 19, 2017.

This biological opinion is based on information provided in the June 2017 Final Biological Assessment (BA), analysis provided by the Upper Colorado River Recovery Program, project descriptions received by our office, personal communications between our offices, project engineers, and other sources of information.

You determined that the Project may affect but is not likely to adversely affect the southwestern willow flycatcher (*Empidonax traillii extimus*) or the Western yellow-billed cuckoo (*Coccyzus americus*). We concur with your determination because the habitat for these species in the action area is migratory in nature and all proposed ground-disturbing activities will conducted outside of the breeding and nesting season for both species.

CONSULTATION HISTORY

In 2010 and 2011, flows in the Green River caused severe damage to the Green River diversion structure, compromising its structural integrity. In response, the Natural Resource Conservation Service (NRCS) granted financial and technical assistance to the project sponsor, Utah Department of Agriculture and Food, through the Emergency Watershed Protection program, to

repair damage that occurred. The Green River Diversion Rehabilitation project consisted of replacing the diversion and ancillary components in place. Project sponsors incorporated various upgrades to meet current engineering standards, and Federal, State, and local permitting regulations. We received the Green River Diversion Rehabilitation project BA on June 16, 2014, and issued a Final BO on March 16, 2015. As part of the Terms and Conditions of the Green River Diversion Rehabilitation project BO, we required that the Upper Colorado River Recovery Program (Recovery Program) fund and construct a project that reduces entrainment into the Green River Canal and investigate the effectiveness of the solution (U.S. Fish and Wildlife Service (USFWS) 2015). To meet this requirement, the U.S. Bureau of Reclamation (Reclamation) planned and designed this Green River Canal Fish Barrier project (Project).

The following bullets summarize significant steps in the consultation process:

- Reclamation staff and consultants met with us on March 30, 2017, to review the action areas and proposed project activities.
- Consultants, on behalf of Reclamation, corresponded with us via email on April 6, 2017, regarding preliminary effects determinations for federally listed threatened, endangered, and candidate species, and proposed and designated critical habitat occurring in the Project area.
- On May 2, 2017, we confirmed the preliminary effects determinations provided by Reclamation via e-mail.
- Reclamation submitted a draft BA to us for review on May 15, 2017 and we provided comments on June 2, 2017.
- Reclamation addressed our comments and submitted a final BA to us on June 19, 2017.

BIOLOGICAL OPINION

1 DESCRIPTION OF THE PROPOSED ACTION

1.1 ACTION AREA

The action area is defined to mean "all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action." The action area for this Project is the Green River Canal and Green River 100-year floodplain starting from the upstream end of the canal downstream approximately 0.6 miles to the canal siphon This includes areas directly affected by Project actions (Figures 1 and 2) as well as indirect effects from sedimentation associated with project construction.

Figure 1. Project Area 1

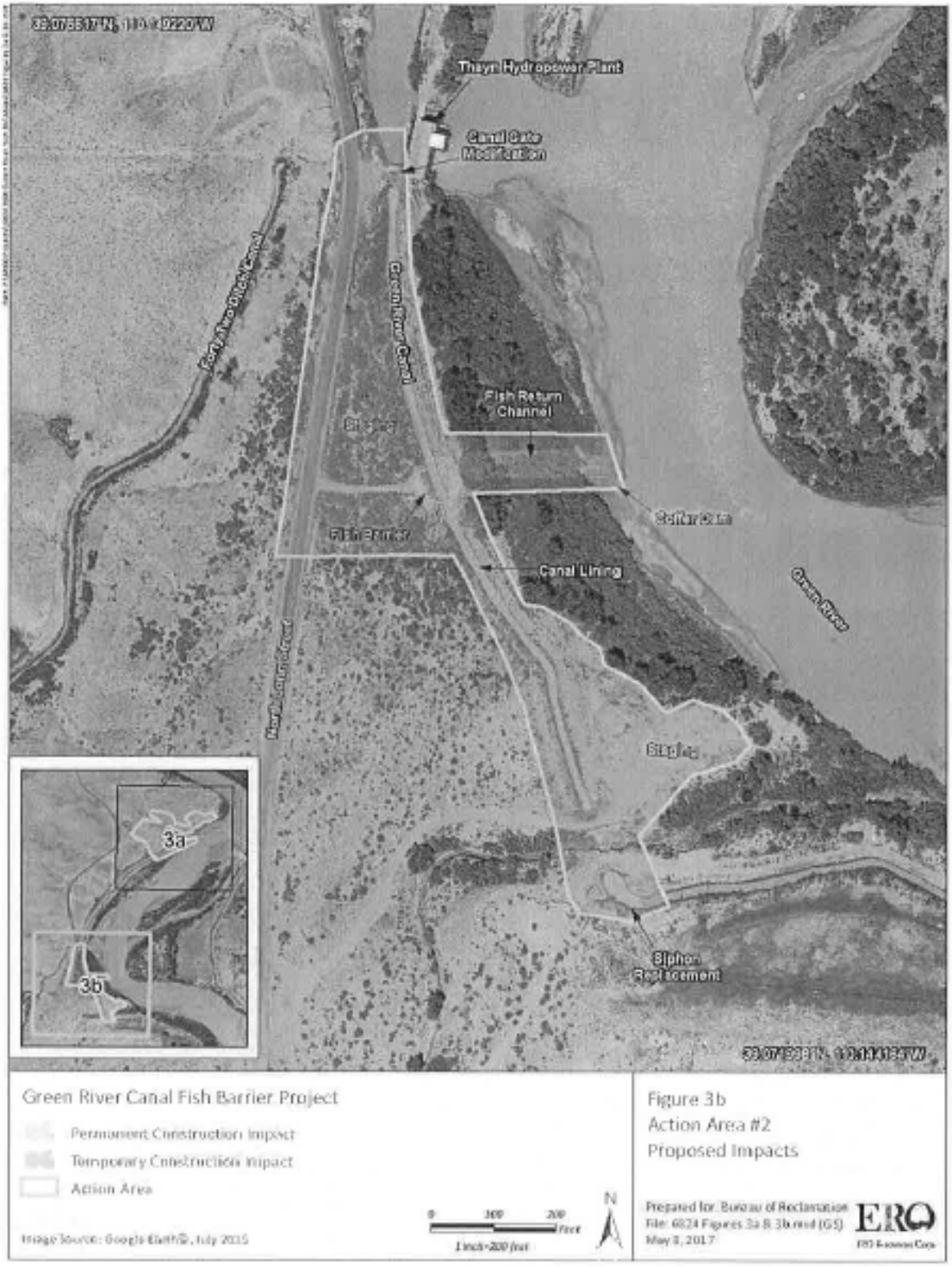


Figure 2. Project Area 2

1.2 PROPOSED ACTION

Reclamation, as a partner in the Recovery Program, is designing and funding the installation, operation, and maintenance of a fish barrier and ancillary facilities in the Green River Canal to address entrainment of federally listed fishes in the canal. The Project is part of the habitat restoration element of the Recovery Program.

The proposed action include the following activities:

- modifications to the Green River Canal gates;
- installation of the fish barrier and return channel;
- construction of a temporary cofferdam above the 8-gate structure and in the Green River at the fish return channel outlet;
- installing riprap upstream and downstream of the return channel outlet, canal lining in the Green River Canal;
- repair and modification of the 8-gate structure;
- installation of fish detection antennas (placed upstream of the fish barrier, downstream of the barrier, and in the fish return channel); and
- siphon replacement.

The proposed action also includes activities associated with the ongoing operation and maintenance of Recovery Program-related facilities, including the canal fish barrier and associated structures plus fish screens and passages located on the east side of the Green River Diversion Dam.

The construction footprints of the Project include permanent and temporary direct impacts to upland, riparian, riverbank, and riverbed habitat. Permanent disturbances include alteration of the riverbed and riverbank in designated critical habitat for listed fish species. Reclamation or their contractors will revegetate all temporary disturbance areas such as staging and access areas. Construction activities within the riparian corridor may disturb suitable habitat for fish species through equipment travel and operation and may create turbid water that may travel downstream potentially affecting fish species. Additional information on the proposed action and applicant-committed conservation measures are described in the Project BA (Reclamation 2017).

2 STATUS OF THE SPECIES

The purpose of this section is to summarize the best available information regarding the current range wide status of the listed fish species. Additional information regarding listed species may be obtained from the sources of information cited for these species.

All four Colorado River fishes are endemic to the Colorado River basin. The Colorado pikeminnow is the largest cyprinid fish (minnow family) native to North America and evolved as the main predator of fish in the Colorado River basin (USFWS 2002a). The razorback sucker is the largest native sucker in the western United States and the species feeds primarily on algae, aquatic insects, and other available aquatic macroinvertebrates using their ventral mouths and fleshy lips (Sigler and Sigler 1996; USFWS 2002b). The humpback chub is a medium-sized freshwater fish of the minnow family with a pronounced hump behind its head. Humpback chub

are mainly found in canyon reaches of rivers in the Colorado River basin and the species feeds on aquatic and terrestrial insects (USFWS 2002c). The bonytail is the rarest native fish in the Colorado River basin. Little is known about the specific food and habitat of the bonytail because the species was extirpated from most of its historic range prior to extensive fishery surveys, but it is considered adapted to mainstem rivers, residing in pools and eddies, while eating terrestrial and aquatic insects (USWFS 2002d). Additional information on the status of the four Colorado River fishes are described in the Project BA (Reclamation 2017).

3 ENVIRONMENTAL BASELINE

Our evaluation of the environmental baseline is based on the best available information. Regulations implementing the Act (50 CFR 402.02) define the environmental baseline as follows:

- the past and present impacts of all Federal, state, or private actions and other human activities in the action area;
- the anticipated impacts of all proposed state or Federal projects in the action area that have already undergone formal or early section 7 consultation; and
- the impact of state or private actions that are contemporaneous with the consultation process.

3.1 STATUS OF SPECIES WITHIN THE ACTION AREA

The Project occurs on the mainstem Green River near Green River, Utah. For all four endangered fish species, the Project occurs within the Upper Colorado River Basin Recovery Unit. Within this Recovery Unit, specific recovery criteria are established for the Green River sub-basin for all four species, including population demographics. Self-sustaining and stable populations of these species in the Green River sub basin are required for species recovery (USFWS 2002a, 2002b, 2002c, 2002d). The entire length of the Green River and its 100-year floodplain are designated as critical habitat for at least one of the species between the Yampa River confluence and the Colorado River confluence (Federal Register: 59 FR 13374). The Project is located within critical habitat for the Colorado pikeminnow and razorback sucker, and between Desolation Canyon (directly upstream) and Cataract Canyon (directly downstream), both of which are designated critical habitat for the all four species.

Currently, the Project action area includes:

- a wild, robust population of the Colorado pikeminnow;
- one of two primary Colorado pikeminnow nursery habitats;
- known, active migratory routes for spawning Colorado pikeminnow and razorback sucker;
- habitat immediately downstream of the Desolation Canyon humpback chub population center; and
- known occupied habitat for Colorado pikeminnow, razorback sucker, humpback chub, and bonytail.

The largest, most productive and most robust population of Colorado pikeminnow in the upper Colorado River basin occurs in the mainstem Green River (combining the lower Green River, Desolation and Gray Canyon, and middle Green River populations). Higher abundance of Colorado pikeminnow juveniles and recruits in the 2006 to 2008 sampling period is attributed to a relatively strong year class of age-0 Colorado pikeminnow produced in the lower Green River in 2000 (Bestgen et al. 2010). Length frequency histograms, especially in the Desolation-Gray Canyon and lower Green River reaches, indicate that abundance of Colorado pikeminnow recruits was much higher in the period from 2006 to 2008, than from 2000 to 2003 (Bestgen et al. 2010).

The importance of the lower Green River Colorado pikeminnow population is evidenced by increased abundance of adult Colorado pikeminnow in the White River and middle Green River through 2008. This phenomenon is almost certainly from the result of upstream movement (high transition rates) of large numbers of juvenile and recruit-sized Colorado pikeminnow that originated in downstream reaches of the Green River in 2006 and 2007 (Bestgen et al. 2010). Because important nursery areas occur downstream of the project and juveniles transition to habitats above the diversion, upstream migration over the diversion is important.

Colorado pikeminnow spawn in two principal sites: Gray Canyon in the lower Green River and the lower Yampa River (USFWS 2002a). Known spawning sites for razorback sucker are located in the lower Yampa River and in the Green River near Escalante Ranch, but other, less-used sites are probable, such as Desolation Canyon (USFWS 2002d). Both of these species are migratory spawners whose young emerge as larval fish from spawning locations and drift downstream. Because pikeminnow and razorback sucker spawning locations occur upstream of the Project and known populations occur downstream of the Project, adults and larval fish must pass the Project during reproductive cycles.

Although humpback chub are primarily resident fish, some movement between populations is expected. The Project is downstream of the Desolation Canyon humpback chub population and upstream of the Cataract Canyon humpback chub population. Therefore, any fish that move between these populations must pass the Project. In fact, several humpback chub were recently found via antenna in the Green River Canal, indicating that individuals use the Project area for movement.

To augment natural populations, the Recovery Program produces genetically diverse fish in hatcheries and stocks them in the river system. The stocking program is guided by an integrated stocking plan and utilizes at least seven fish hatcheries for propagation. In most years, the Recovery Program was successful at meeting stocking goals. In addition, the Recovery Program is working on research projects that elucidate ways to improve the survivorship of stocked fish. Razorback sucker and bonytail are stocked into the Green River, both upstream and downstream of the Project. In fact, one major stocking location is Green River State Park, immediately downstream of the Project.

Project construction, operation, and maintenance are expected to affect the wild and stocked populations directly and indirectly, depending upon the population being discussed. While this Project will not directly affect tributary populations of Colorado River fishes, it will beneficially impact individual fish movement to and from spawning locations, and emigration and

immigration between populations. Therefore, populations not in the immediate upstream or downstream area of influence of the Project will be impacted and are considered in this BO. In addition, the use of water from the Green River affects the habitat quantity and quality both upstream and downstream of the Project location, for many miles.

The Recovery Program has been investigating entrainment risk within the Green River Canal since 2013. Entrainment data is collected by dual-antenna Passive Induced Array (PIA) installed in the canal just downstream of the water flume and downstream of the siphon. The PIA can detect fish equipped with a PIT tag. The placement of multiple antennas increases the likelihood of detecting PIT tagged individuals. A preliminary analysis report by researchers with the Recovery Program indicates all four Colorado River fishes have been detected in the Green River Canal (Speas et. al. 2017). The total number of PIT tagged endangered fish detected in the canal since 2013 is summarized in Table 1.

Table 1. Total Number of Individual PIT Tagged Fish Recorded in the Green River Canal (Speas et. al. 2017).

Common Name	Scientific Name	Total Number of Individual Fish (2013-2016)
Bonytail	*Gila elegans*	116
Colorado pikeminnow	*Ptychocheilus lucius*	149
Humpback chub	*Gila cypha*	5
Razorback sucker	*Xyrauchen texanus*	1,103

Analysis of the detection data shows that a substantial number of endangered fish become entrained in the Green River Canal, but that entrainment mortality is not certain in these situations. Once entrained fish reach the end of the raceway, they have three routes for continued movement: (1) continue down the Green River Canal through the headgate; (2) return to the Green River through the Thayn Hydropower turbines; or (3) swim back upstream via the raceway and return to the river. Larval fish are likely swept passively through either Thayn Hydropower facilities or the canal. We investigated and determined that adults and juveniles are likely excluded from the possibility of using the second route because the trash racks on the Thayn Hydropower facilities are too narrow for entrainment and that hydropower operations do not generally harm larval fishes, because they are too small to be affected by the turbines USFWS 2015).

The detection data analysis shows a number of fish are able to escape. However, if fish pass through the siphon, permanent entrainment is much more likely. It is important to note that PIT tagged fish represent a relatively small percentage of the population and the PIA do not detect PIT tagged fish at a 100 percent accuracy rate. Entrainment in canals is likely greater when a larger percentage of the river is being diverted and fish are more likely to become entrained when swimming downstream rather than up due to the orientation of the raceway entry. Thus, it can reasonably be expected that the entrainment of fish in the canal is higher (if not significantly higher) than the representative numbers presented in the Speas et al. (2017) Recovery Program report.

3.2 STATUS OF CRITICAL HABITAT IN THE ACTION AREA

The action areas include critical habitat units identified as essential for the species' recovery (USFWS 2002a, 2002b, 2002c, 2002d). This section of the Green River and the Green River Canal is within designated critical habitat for the Colorado pikeminnow and razorback sucker. Bonytail and humpback chub are also known to occur in the action area; however, the closest critical habitat for each of these species is approximately 3.25 miles upstream of the Project.

The Service has identified water, physical habitat, and the biological environment as the physical or biological features of critical habitat for listed Colorado River fish species (59 FR 13374-13400). Water includes a quantity of water of sufficient quality delivered to a specific location in accordance with a hydrologic regime required for the particular life stage for each species. The physical habitat includes areas of the Colorado River system that are inhabited or potentially habitable for use in spawning and feeding, as a nursery, or serve as corridors between these areas. In addition, oxbows, backwaters, and other areas in the 100-year floodplain, when inundated, provide access to spawning, nursery, feeding, and rearing habitats. Food supply, predation, and competition are important elements of the biological environment (59 FR 13374-13400).

The physical or biological features for critical habitat are present within the action area. All four federally listed species evolved in desert river hydrology, relying on high spring flows and stable base flows for habitat conditions essential to their survival. In addition to main channel migration corridors, Colorado pikeminnow, bonytail, and razorback sucker rely on floodplain and backwater habitats for various stages of their life history. High spring flows also act as spawning queues (USFWS 2002a, 2002b, 2002d). In contrast, humpback chub rely more on canyon-bound reaches with swift currents and white water (USFWS 2002c).

3.2.1 Physical or biological feature – water

Past projects have resulted in depletions and changes in flows that have affected the endangered Colorado River fishes. These native fishes are adversely affected by depletions to water flow at sensitive life-stages (Muth et al. 2000). Depletions may reduce high spring flows, resulting in changes to food supply and productivity. Reductions in water flows can reduce spawning habitat availability and adversely affect backwater habitats, resulting in lower habitat quality. Water depletions may also contribute to flow changes that favor nonnative fish species. We have identified competition with nonnative fish species as a factor in the decline of the endangered Colorado River fishes and nonnative fishes are known occupy the same backwaters that are very important for young Colorado pikeminnow and razorback sucker (Recovery Program 2014).

3.2.2 Physical or biological feature – physical habitat

As previously discussed, the completion of Flaming Gorge Dam created a fish passage barrier. Native Colorado pikeminnow, razorback sucker, humpback chub, and bonytail can no longer migrate into Wyoming from the lower Green River. Fish barriers isolate populations, decreasing the ability of individuals to interact, and hinder the transfer of genetic material. Recently, the Green River Diversion acted as a fish barrier because recent large-scale flooding has blocked the

historic portion of the diversion that was passable by fish. In the 2015-2016 rebuild of the diversion, upstream and downstream fish passage structures were incorporated into the design. Analysis of preliminary PIT antenna data shows all four species of Colorado River fishes use the fish passage structures (Speas et al. 2017).

The quantity and timing of flows influence how the channel and various habitats are formed and maintained. Channel narrowing is a problem because as the channel width decreases, water velocity increases, and the amount of low velocity habitats, important to the early life stages of the fish, decreases. Habitat below Flaming Gorge Dam has historically been shaped by an artificial flow regime, which decreased low flow habitats, disrupted vegetative communities, and altered channel morphology (Muth et al. 2000). However, recent operation changes have made this flow regime better match natural conditions. These changes affect temperature, channel morphology, and habitat conditions.

3.2.3 Physical or biological feature – biological environment

The biological environment is impaired by the presence of non-native fishes common in the Green River. Non-native fishes occupy the same backwaters that are very important for young Colorado pikeminnow and razorback sucker. Specifically, largemouth and smallmouth bass, walleye, northern pike, and channel catfish (*Ictalurus punctatus*) are present in this system and predate upon juvenile native fish. Programs are ongoing to remove bass, walleye, and northern pike from this system. Other non-natives found in the Green River include centrarchids and non-native cyprinids. Reduction in flows contributes to further habitat alterations that support nonnative fish species, such as increased temperatures, reduced habitat availability, and reduced turbidity (Recovery Program 2014).

4 EFFECTS OF THE PROPOSED ACTION

4.1 DIRECT AND INDIRECT EFFECTS

4.1.1 Construction

The Project directly affects Colorado River fishes of all age classes in the Project area during all phases of construction activities. One of the first actions that impact Colorado River fishes and their critical habitat is isolation of in-stream construction areas from the river. The Project will isolate 3.5 acres of the wetted channel for the Green River canal from just above the 8-gate structure downstream to the siphon. Below the siphon, we assume no Colorado River fish can escape the canal and those fish are already impacted by of canal operations. This assumption is supported by the Upper Colorado River Program's study of entrainment in the Green River canal (Speas et al. 2017). Analysis of PIT tag detection data for Colorado River fish show that only 2.7 percent of detected fishes at the siphon antenna were later detected outside of the canal, whereas 86 percent of fish detected above the siphon were subsequently detected elsewhere in the upper Colorado River basin.

Prior to instream construction activities, Reclamation will have approved biologists conduct a fish clearance from the areas that will be isolated (Reclamation 2017). The canal company will turn off water to the canal and Reclamation will install cofferdams at the upstream and

downstream end of the Project to preclude fish from reentering the area. Reclamation will then coordinate with approved biologists to salvage any remaining Colorado River fishes or other native fishes from isolated areas.

However, the possibility that a fish may be injured or killed by heavy equipment or during fish salvage efforts cannot be ruled out. Fish injury or mortality may occur if individual fish are struck by equipment or debris during the placement of cofferdams. During the dewatering process, it is possible that some fish will be injured or stranded in remaining pools of water within the canal.

Placement of cofferdams also indirectly affects Colorado River fishes and critical habitat by temporarily increasing sediment in the river. Increased sedimentation would occur during placement and removal of the cofferdams. Natural river cobble materials used in cofferdam construction have a variety of material sizes, ranging from large-diameter rock and cobble to gravel, sand, and silt material. During placement and removal of the material, silt and sand are mobilized in the water column and remain suspended for some period, depending on the amount of fine material present and the river flow during cofferdam construction. We expect sediment mobilization to stabilize after a few hours to a few days, again depending on the amount of sediment in the fill material and the flow in the river. We expect the impact of sediment to Colorado River fishes and their critical habitat to be minor and temporary.

Contaminant releases during Project construction could also adversely affect Colorado River fishes by displacing fish from preferred habitats into less desirable or already occupied areas. An accidental rupture of any of the construction equipment fuel tanks used on site could cause a small release of petroleum products into the river. Contaminants released into the floodplain or main channel would result in habitat degradation and could result in take of individual fish, including impacts to populations downstream of the release site. While applicant committed measures will reduce the chance for contaminant releases, accidental releases could still occur.

We predict that acute and chronic effects of refined petroleum spills or other toxicants from the Project are low. While an accidental spill of product into the waterway could cause the loss of individual fish depending on the stream flow volumes and spill size, best management practices would reduce the likelihood of any petroleum products to reach the waterway. This is because no large quantities of petroleum products would be located at the construction site, and proper procedures would be in place to prevent and respond to any spills (Reclamation 2017). Spills of other construction materials (e.g., concrete, sand) are also possible although we predict the risks of these spills are low. If construction introduced these materials into the river while Colorado River fishes are present, the species response would be proportionate to the amount and toxicity of the released materials. Because activities will be carried out while Colorado River fishes are isolated from the area, the anticipated risks to the species would be minimal.

Indirect effects from instream Project construction may also cause a loss or reduction to aquatic invertebrates, a primary food source for several species of Colorado River fishes. Heavy equipment likely will crush and kill aquatic invertebrates within the stream substrate. However, the area affected by the disturbance is small relative to the upstream river, which provides a continual source of aquatic invertebrates to repopulate the project area after construction. We do not expect alterations in the substrate and its embeddedness to result in mortality to aquatic

invertebrates, but it may have minor impacts by altering habitat suitability downstream of the action area. We expect habitat characteristics for aquatic invertebrates to re-establish over the long-term once construction activities are completed.

Reclamation will not conduct any in-channel work from mid-March through September. A majority of the construction is anticipated from October through mid-March during low-flow periods and outside the spawning season (late spring and early summer); therefore, eggs are unlikely to be affected by construction. High flows that trigger spawning normally occur between May and July.

Completing construction outside of the sensitive spawning and larval stage time frames minimizes impacts to spawning fish, and avoids impacts to larval endangered fishes in the project vicinity. Reclamation proposes to limit final work activities to personnel with hand tools and use of vehicles within staging areas or along routes through summer 2018. Revegetation activities in temporary disturbance areas are proposed for fall 2018.

Permanent disturbances include alteration of the canal and riverbed in designated critical habitat for listed fish species. The proposed permanent impacts associated with construction activities on endangered Colorado River fish habitat in the action areas are approximately 1.02 acres, and are associated with reshaping and lining the canal, adding riprap in specific locations, installing the fish barrier and return channel and replacing the siphon (Figures 1 and 2). The remaining 0.79 acres are temporary impacts associated with installing the cofferdams, conducting canal gate modifications, construction access, and operation and maintenance activities. In addition, we expect applicant committed conservation measures, best management practices, and compliance with Section 401 and 404 permit terms and conditions will reduce potential adverse impacts and minimize the temporary impacts from the Project to Colorado River fishes and their critical habitat during construction.

4.1.2 Project Operation and Maintenance Activities

Similar to potential direct and indirect effects during construction, operation and maintenance aspects of the Project directly and indirectly affect adult and juvenile Colorado pikeminnow, razorback sucker, bonytail, and humpback chub, and larval razorback sucker and Colorado pikeminnow. Humpback chub larvae do not drift more than a few miles from the canyon reaches where larval emergence occurs and we have not documented bonytail larvae near the Project area in the Green River.

In the long-term, we expect operation of the Green River fish barrier to be beneficial to endangered Colorado River fishes by reducing entrainment into the Green River Canal. Currently, most fish entrained into the canal below the siphon have no means to escape and are presumed to be killed in canal facilities or adjacent agricultural fields.

The fish barrier is designed to return adult and sub-adult fish back to the Green River. However, eggs, larval, juvenile, and adult fish may still become entrained in the canal downstream of the fish barrier resulting in mortality by stranding or desiccation. There is also potential for larval, juvenile, and adult fish to become injured by the fish barrier or debris or stranded in the fish return resulting in injury or death. Reclamation designed the fish barrier to meet velocity

requirements to minimize the potential for take of Colorado River fishes; however, we anticipate some take may occur. Based on assessments of similar barriers, we expect the barrier to be at least 90 percent effective in reducing entrainment of juvenile and adult fishes into the canal (Reclamation 2006)

Ongoing maintenance activities (sediment and debris removal and mechanical, structural, or electrical maintenance) and facility operations activities may result in adverse effects to the endangered Colorado River fishes in the action areas. Compared to current operations of the Green River canal, ongoing future work associated with the facilities will result in lower levels of harm and harassment to the endangered Colorado River fish. Maintenance activities will be conducted periodically, and associated effects will be of short duration and include a reduction of flows and temporary displacement of fish.

Reclamation anticipates that the canal company will conduct frequent (about six times per year) maintenance activities to keep the facilities stable and in good condition, which would reduce the magnitude and number of repairs over time. We expect a reduction in repair activities in the canal to provide a long-term benefit to endangered Colorado River fish. The proposed action result in minimal disturbance to these species compared to past and current conditions associated with fish entrapment within the Green River Canal. In addition, conservation measures minimize the potential take of individuals from the Project. Another beneficial effect from the Project includes more stable facilities and stable canal banks, which reduce erosion and turbidity in the waterway.

While there are some adverse effects from Project construction, operation, and maintenance, we expect the Project will provide a long-term benefit by reducing entrainment of Colorado River fishes from the Green River Canal. By reducing entrainment in the canal, the Project will reduce mortality from fish ending up in canal facilities or agricultural fields.

4.1.3 Effects to Designated Critical Habitat

The action areas contain all of the physical or biological features of critical habitat listed above (section 2.2). Effects to designated critical habitat physical or biological features are the same as described in the paragraphs above. The project will directly and permanently impact about 1.02 acres and temporarily impact about 0.79 acres of the 21.25 acres of critical habitat in the action area, which are 4.8 percent and 3.7 percent of available critical habitat in the action area, respectively.

5 CUMULATIVE EFFECTS

We consider cumulative effects to include the effects of future state, tribal, local, or private actions that are reasonably certain to occur in the action area in this biological opinion. We do not consider future Federal actions that are unrelated to the proposed action in this section because they require separate consultation pursuant to section 7 of the Act.

Declines in the abundance or range of Colorado River fish species are attributed to various human activities on Federal, state, and private lands, such as the following:

- human population expansion and associated infrastructure development;
- construction and operation of dams along major waterways;
- water retention, diversion, or dewatering of springs, wetlands, or streams;
- recreation, including off-road vehicle activity;
- expansion of agricultural or grazing activities, including alteration or clearing of native habitats for domestic animals or crops; and
- introductions of non-native plant, wildlife, or fish or other aquatic species, which can alter native habitats, out-compete, or prey upon native species.

Many of these activities are expected to continue on state and private lands within the range of the various federally protected wildlife, fish, and plant species, and could contribute to cumulative effects to the species within the action area of the proposed action. Species with small population sizes, endemic locations, or slow reproductive rates, or species that primarily occur on non-federal lands where landholders may not participate in recovery efforts, would generally be highly susceptible to cumulative effects.

Reasonably foreseeable future activities that may affect river-related resources in the area include oil and gas exploration and development, fire management, irrigation, recreational activities, and activities associated with the Upper Colorado River Endangered Fish Recovery Program. Implementation of these projects affects the environment including but not limited to water quality, water rights, socioeconomic, and wildlife resources.

Cumulative effects to these species would include the following types of impacts:

- changes in land use patterns that would further fragment, modify, or destroy potential spawning sites or designated critical habitat;
- shoreline recreational activities and encroachment of human development that would remove upland or riparian and wetland vegetation and potentially degrade water quality;
- competition with, and predation by, exotic fish species introduced by anglers or other sources; and
- additional water depletions reducing habitat quality and quantity.

6 CONCLUSION

After reviewing the current status of endangered Colorado River fishes, the environmental baseline for the action area, the effects of the proposed action, and the cumulative effects, it is our biological opinion that the Project is not likely to jeopardize the continued existence of endangered Colorado River fishes, and the Project is not likely to result in destruction or adverse modification of designated critical habitat. We have reached this conclusion based on the following reasons:

1. The Project will benefit Colorado River fishes by reducing mortality from stranding or desiccation in the Green River Canal and adjacent fields compared to existing conditions.
2. The fish barrier and ancillary facility improvements are identified as a key component to recovery of Colorado River fishes by reducing entrainment of fishes from the Green River Canal and other similar water development facilities.
3. Reclamation and the canal company has committed to conservation measures and best management practices, including fish salvage and appropriate construction timing, to reduce impacts to Colorado River fishes during Project construction, operation, and maintenance.
4. Replacement, repair, and hardening of canal facilities will reduce maintenance activities in the canal, thereby reducing effects to Colorado River fishes. Effects associated with maintenance activities will be of short duration and include a reduction of flows and temporary displacement of fish.
5. Reclamation has committed to restoring the 0.79 acres of designated critical habitat temporarily impacted by Project construction.
6. All permanent losses of designated critical habitat are minor when considering the entirety of the species' designated critical habitat in the action area and are being mitigated through the applicants' commitment to operating, monitoring, and maintaining the fish barrier and screen.

7 INCIDENTAL TAKE STATEMENT

Section 9 of the Act and Federal regulation pursuant to section 4(d) of the Act prohibit the take of endangered and threatened species, respectively, without a special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. We define harm to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavioral patterns including breeding, feeding, or sheltering. We define harass as intentional or negligent act or omission that creates the likelihood of injury to listed wildlife by annoying it to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to breeding, feeding or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered to be prohibited taking under the Act provided that such taking is in compliance with the terms and conditions of this incidental take statement.

Amount or Extent of Take Anticipated

We anticipate the Project will result in take of endangered Colorado River fishes from construction, operation, and maintenance for the fish barrier and ancillary facilities. As previously discussed, we anticipate take from construction is largely from isolation of in-stream construction areas from the river using cofferdams. Construction activities, most likely the installation of cofferdams above the 8-gate structure and the fish return channel, have the ability to injure or kill fish as the structures are constructed in the canal. However, fish translocation efforts and construction BMPs will minimize these impacts. In the last year, the highest number of fish found within the canal using PIT detections was 231 Colorado River fishes. Thus, we assume 231 Colorado River fishes are the highest number of fish that could become isolated from construction activities. Based on research by Utah Division of Wildlife Resource biologists on fish translocation efficiency (Wagner and Fridell 2006), we expect translocations of Colorado River fishes by qualified biologists to be 80 percent efficient. Therefore, we anticipate take of 47 Colorado River fishes from construction activities.

For operation and maintenance of the barrier and ancillary facilities, we anticipate take to occur largely from entrainment of Colorado River fishes into the Green River canal. For reconstruction of the Green River Diversion (USFWS 2015), our BO previously anticipated the Green River canal would cause take in the form of mortality for approximately 1,500 juvenile and adult Colorado River fishes annually. In addition, the BO also anticipated take of 2 percent and 3 percent of larval razorback sucker and Colorado pikeminnow, respectively, from canal operations (based on the amount of flow diverted from the river by the Green River canal).

As discussed above, we expect the fish barrier and screens to be 90 percent effective in reducing take of juvenile and adult Colorado River fishes at the Green River canal. Therefore, we anticipate take of 150 juvenile and adult Colorado River fishes from the Project, largely by mortality from entrainment into the canal and eventually into adjacent fields or injury caused by fish sliding down the fish screen.

The Green River canal operates during periods when larval razorback suckers and Colorado pikeminnow are drifting down the Green River and we expect the barrier and screen to reduce take of larval suckers and pikeminnow compared to existing conditions where all larval fishes entrained into the Green River canal are killed. A study by Colorado State University and Reclamation's Water Resources Laboratory (Bestgen et al. 2004) evaluated screen effectiveness on larval fishes, using fathead minnow larvae of various sizes as a surrogate for larval Colorado River fishes. Of note, the study found screens were highly effective (greater than 80 percent) in reducing entrainment and mortality as long as the mesh size of the screen were smaller than the head width of larval fishes. If the larval head width and the mesh size were the same, larval survival decreased to 50 percent.

The mesh size of the screens at the barrier are 3/32 of an inch or approximately 2.25 millimeters. This mesh size is approximately the same size as the head width of larval razorback suckers and Colorado pikeminnow as they are drifting downstream. Because the mesh size and larval head width are the same, we expect the fish barrier and screen to be 50 percent effective in reducing take of larval suckers and pikeminnow in the Green River canal. Therefore, we anticipate take of 1 percent of larval razorback suckers and 1.5 percent of larval Colorado pikeminnow from

Project operation and maintenance. It is important to note that we expect the Project to reduce take of Colorado River fishes compared to existing conditions at the canal.

In summary, we anticipate Project construction to take up to 47 Colorado River fishes during the one-year construction period. For project operations and maintenance, we anticipate annual take of up to 150 juvenile and adult Colorado River fishes, 1 percent of larval razorback suckers, and 1.5 percent of larval Colorado pikeminnow from mortality associated with entrainment and injury from fish screens.

Effect of Take

In this BO, we determined that this level of anticipated take is not likely to result in jeopardy to Colorado River fishes or adverse modification of their critical habitat. The following reasonable and prudent measures are designed to ensure that if the Project results in take, methods exist to minimize take to the amount anticipated in this BO.

Reasonable and Prudent Measures

Reclamation and Applicant have committed to conservation measures described in Reclamation's biological assessment (Reclamation 2017). In addition to those measures, we believe the following reasonable and prudent measures are necessary and appropriate to minimize the impacts of incidental take of Colorado pikeminnow, humpback chub, bonytail, and razorback sucker.

1. The Green River Canal Company and local water users must implement proper operation and maintenance of all components of the fish barrier, including the weir walls, screens, and fish return channel.

Terms and Conditions

In order to be exempt from the prohibitions of section 9 of the Act, Reclamation and the Applicant must comply with the following terms and conditions, which implement the reasonable and prudent measures described above and outline required reporting and monitoring requirements. These terms and conditions are non-discretionary.

The implementing regulations for incidental take require Federal agencies to report the progress of the action and its impact on the species (50 CFR 402.14(i)). To meet this mandate, Reclamation will monitor and report the progress of their actions as follows:

1. Upon completion of the diversion, Reclamation and the Applicant will submit a final project report to us that describes the project implementation, completion of conservation commitments, and effectiveness of the fish barrier. A description of any interaction with endangered species, such as during fish salvage, should be included in the report.

2. As part of the anticipated take, Reclamation will conduct annual monitoring of Colorado River fish entrainment into the Green River canal below the fish barrier for at least five years after Project implementation to determine whether Project actions exceed the estimated take in this BO. Reclamation shall work with the Recovery Program to submit

an annual report detailing estimated annual entrainment of Colorado River fishes in the canal prior to the following years monitoring efforts. If monitoring estimates of annual take exceed the anticipated take identified in this BO, Reclamation will re-initiate consultation with our office to determine if additional design features or operating measures are necessary to reduce take from entrainment.

Reporting Requirements

If any Colorado River fishes are injured or killed during construction activities, immediate notification must be made to our Utah Field Office at (801) 975-3330. Pertinent information including the date, time, and location shall be recorded and provided to us.

Re-initiation Notice – Closing Statement

This concludes formal consultation on the proposed Green River Canal Fish Barrier project. As provided in 50 CFR Sec. 402.16, reinitiation of formal consultation is required for projects where discretionary Federal agency involvement or control over the action has been retained (or is authorized by law) and under the following conditions:

1. The amount or extent of take specified in the Incidental Take Statement for this opinion is exceeded.
2. New information reveals effects of the action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion.
3. The action is subsequently modified in a manner that causes an effect to listed species or critical habitat that was not considered in the biological opinion.
4. A new species is listed or critical habitat designated that may be affected by the action.

In instances where the amount or extent of incidental take is exceeded or if the terms and conditions of this biological opinion are not fully implemented, any operations causing such take must cease immediately pending re-initiation. To re-initiate section 7 consultation, Reclamation should immediately notify our office by phone or email if the anticipated incidental take is exceeded or if your agency needs to change the proposed action.

Thank you for your coordination in preparing the biological evaluation form and your interest in conserving threatened and endangered species. If you have any questions about this BO or impacts to Colorado River fishes, please contact George Weekley at (801) 975-3330 ext. 137.

Electronic cc:

Mr. Michael Pectol, U.S. Army Corps of Engineers, Bountiful, UT
Mr. Thomas Chart, Upper Colorado River Recovery Program, Denver, CO

8 REFERENCES

59 FR 13374-13400. Endangered and Threatened Wildlife and Plants; Determination of Critical Habitat for the Colorado River Endangered Fishes: Razorback Sucker, Colorado Squawfish, Humpback Chub, and Bonytail Chub. Federal Register, Vol. 59, No. 54, pages 13374 – 13400. March 21, 1994.

Badame, P. 2012. Population estimates for humpback chub (Gila cypha) in Desolation and Gray Canyons, Green River, Utah 2006-2007. Final Report of Utah Division of Wildlife Resources to Upper Colorado River Endangered Fish Recovery Program, Denver, Colorado.

Badame, P. 2011. Humpback chub population estimates for Desolation/Gray Canyons, Green River Utah. Annual Report Project 129 of the Upper Colorado River Endangered Fish Recovery Program, Denver, Colorado.

Badame, P. 2008. Population Estimates for Humpback Chub (Gila cypha) In Cataract Canyon, Colorado River, Utah, 2003–2005. Upper Colorado River Endangered Fish Recovery Program Project #22L. 24 pages.

Bestgen, K.R., J.A. Hawkins, G.C. White, C.D. Walford, P. Badame & L. Monroe. 2010. Population Status of Colorado pikeminnow in the Green River Basin, Utah and Colorado, 2006-2008. Colorado River Recovery Implementation Program Project Number 128. 112 pages.

Bestgen, K.R., J.M. Bundy, K.A. Zelasko & T.L. Wahl. 2004. Effectiveness of High-Velocity Inclined Profile-Bar Fish Screens Measured by Exclusion and Survival of Early Life Stages of Fathead Minnow. North American Journal of Fisheries Management, 24:4, 1228-1239

Muth, R.T., L.W. Crist, K.E. LaGory, J.W. Hayse, K.R. Bestgen, T.P. Ryan, J.K. Lyons & R.A. Valdez. 2000. Flow and Temperature Recommendations for Endangered Fishes in the Green River Downstream of Flaming Gorge Dam. Upper Colorado River Endangered Fish Recovery Program, Project FG-53.

Sigler, W.F. & J.W. Sigler. 1996. Fishes of Utah: A Natural History. Salt Lake City, Utah: University of Utah Press.

Speas, D., K. McAbee, D. Speas, J. Stahli, P. McKinnon, & T. Jones. 2017. Preliminary Results of Entrainment in the Green River Canal, 2013-2016. Annual Report Project C-28a of the Upper Colorado River Endangered Fish Recovery Program, Lakewood, Colorado.

U.S. Bureau of Reclamation (Reclamation). 2017. Green River Canal Fish Barrier Project Biological Assessment. Grand Junction, CO. 45 pages.

U.S. Bureau of Reclamation (Reclamation). 2016. Technical Service Center, Hydraulic Investigations and Laboratory Services Group. Hydraulic Laboratory Technical Memorandum PAP-1157: Laboratory Tests of a Corrugated Water Screen for Screening Fish from Irrigation Water Diversions. Denver, Colorado. December 2016.

U.S. Bureau of Reclamation (Reclamation). 2006. Fish Protection at Water Diversions; A Guide for Planning and Designing Fish Exclusion Facilities. Water Resources Technical Publication. Denver, Colorado. April 2006.

U.S. Fish and Wildlife Service (USFWS). 2002a. Colorado pikeminnow (Ptychocheilus lucius) Recovery Goals: amendment and supplement to the Colorado Squawfish Recovery Plan. Denver, Colorado: US Fish and Wildlife Service, Mountain-Prairie Region. 111 pages.

U.S. Fish and Wildlife Service (USFWS). 2002b. Razorback Sucker (Xyrauchen texanus) Recovery Goals: amendment and supplement to the Razorback Sucker Recovery Plan. Denver, Colorado: US Fish and Wildlife Service, Mountain-Prairie Region. 113 pages.

U.S. Fish and Wildlife Service (USFWS). 2002c. Humpback chub (Gila cypha) Recovery Goals: amendment and supplement to the Humpback Chub Recovery Plan. Denver, Colorado: US Fish and Wildlife Service, Mountain-Prairie Region. 107 pages.

U.S. Fish and Wildlife Service (USFWS). 2002d. Bonytail (Gila elegans) Recovery Goals: amendment and supplement to the Bonytail Chub Recovery Plan. Denver, Colorado: US Fish and Wildlife Service, Mountain-Prairie Region. 97 pages.

U.S. Fish and Wildlife Service (USFWS). 2015. Biological Opinion for the Green River Diversion Rehabilitation Project, Grand & Emery Counties, Utah. 72 pages.

Upper Colorado River Endangered Fish Recovery Program. 2014. Upper Colorado River Basin Nonnative and Invasive Aquatic Species Prevention and Control Strategy. Denver, CO. 160 pages.

Wagner, J., and R.A. Fridell. 2006. NRCS Emergency Watershed Protection project summary from December 2005 through June 2006. Field report on activities conducted under USDA Contract 53-8D43-6-01. Utah Division of Wildlife Resources Field Report. 11 pp.

United States Department of the Interior

BUREAU OF LAND MANAGEMENT
Green River District
Price Field Office
125 South 600 West
Price, UT 84501
http://www.blm.gov/utah

2018 MAR 21 PM 1:00

IN REPLY REFER TO:
UTU-93043
2800 (UTG020)

MAR 19 2018

CERTIFIED MAIL-RETURN RECEIPT REQUESTED
7016 2710 0000 2318 7331

Alan Schroeder, Natural Resource Specialist
Western Colorado Area Office, Bureau of Reclamation
445 West Gunnison Ave., Suite 221
Grand Junction, CO 81501-5711

DECISION
:
:
Right-of-Way Grant UTU-93043

Enclosed is a copy of right-of-way grant (serial number UTU-93043) which has been approved by the Bureau of Land Management and issued under authority of Title V of the Federal Land Policy and Management Act of October 21, 1976, as amended through September 1999, (90 Stat. 2776; 43 U.S.C. 1761). The issuance of this right-of-way grant constitutes a final decision by the Bureau of Land Management in this matter.

This decision may be appealed to the Interior Board of Land Appeals, Office of the Secretary, in accordance with the regulations contained in 43 CFR, Part 4, and the enclosed Form 1842-1. If an appeal is taken, your notice of appeal must be filed in this office (at the above address) within 30 days from receipt of this decision. The appellant has the burden of showing that the decision appealed from is in error.

If you wish to file a petition pursuant to regulation 43 CFR 4.21 (58 FR 4939, January 19, 1993) or 43 CFR 2801.10 for a stay of the effectiveness of this decision during the time that your appeal is being reviewed by the Board, the petition for a stay must accompany your notice of appeal. A petition for a stay is required to show sufficient justification based on the standards listed below. Copies of the notice of appeal and petition for a stay must also be submitted to each party named in this decision and to the Interior Board of Land Appeals and to the appropriate Office of the Solicitor (see 43 CFR 4.413) at the same time the original documents

are filed with this office. If you request a stay, you have the burden of proof to demonstrate that a stay should be granted.

Standards for Obtaining a Stay

Except as otherwise provided by law or other pertinent regulation, a petition for a stay of a decision pending appeal shall show sufficient justification based on the following standards:

(1) The relative harm to the parties if the stay is granted or denied;

(2) The likelihood of the appellant's success on the merits;

(3) The likelihood of immediate and irreparable harm if the stay is not granted; and

(4) Whether the public interest favors granting the stay.

Please note that under the regulations in 43 CFR Group 2800, this decision is effective even if an appeal is filed. If you have any questions, please contact Connie Leschin, Realty Specialist, at the above address, by e-mail cleschin@blm.gov, or by phone (435) 636-3610.

Sincerely,

Don Stephens

Don Stephens
Assistant Field Manager

Enclosure:
Right-of-Way Grants UTU-93043

FORM 2800-14
(August 1985)

Issuing Office
Price Field Office

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
RIGHT-OF-WAY GRANT

SERIAL NUMBER UTU-93043

---

1. A right-of-way is hereby granted pursuant to Title V of the Federal Land Policy and Management Act of October 21, 1976 (90 Stat. 2776; 43 U.S.C. 1761).

2. Nature of Interest:

   a. By this instrument, the holder:

   US Bureau of Reclamation
   Western Colorado Area Office
   445 W Gunnison Ave., Ste 221
   Grand Junction, CO 81501

   receives a right to operate, maintain, and terminate an existing staging area and borrow site within portions of the public lands described as follows:

   Salt Lake Meridian, Utah
   T. 20 S., R. 16 E.,
   Sec. 17, Lot 3.

   b. The right-of-way or permit area granted herein contains 4 acres, more or less.

   c. This instrument shall expire on December 31, 2022, unless, prior thereto, it is relinquished, abandoned, terminated, or modified pursuant to the terms and conditions of this instrument or of any applicable Federal law or regulation.

   d. This instrument may be renewed. If renewed, the right-of-way or permit shall be subject to the regulations existing at the time of renewal and any other terms and conditions that the Field Manager or other authorized officer deems necessary to protect the public interest.

   e. Notwithstanding the expiration of this instrument or any renewal thereof, early relinquishment, abandonment, or termination, the provisions of this instrument, to the extent applicable, shall continue in effect and shall be binding on the holder, its successors, or assigns, until they have fully satisfied the obligations and/or liabilities accruing herein before or on account of the expiration, or prior termination, of the grant.

3. Rental:

   In accordance with 43 CFR 2806.14 (b) it has been determined that the holder of this right-of-way grant, US Bureau of Reclamation, is exempt from rental fees.

Terms and Conditions:

4. Standard

   a. This grant or permit is issued subject to the holder's compliance with all applicable regulations contained in Title 43 Code of Federal Regulations part 2800.

   b. Each grant issued for a term of 10 years or more shall, at a minimum, be reviewed by the authorized officer at the end of the 10th year and at regular intervals thereafter not to exceed 10 years. Provided, however, that a right-of-way or permit granted herein may be reviewed at any time deemed necessary by the authorized officer.

   c. The stipulations, plans, maps, or designs set forth in Exhibits A (Plan of Development) and B (Map), attached hereto, are incorporated into and made a part of this grant instrument as fully and effectively as if they were set forth herein in their entirety.

   d. The holder shall contact the authorized officer at least 48 hours prior to the anticipated start of construction and/or any surface disturbing activities. The holder shall not initiate any construction or other surface disturbing activities on the right-of-way without the prior written authorization of the authorized officer. Any notice to proceed shall authorize construction or use as therein expressly stated and only for the particular location or use therein described. The authorized officer may require and schedule a preconstruction conference with the holder prior to the holder's commencing construction and/or surface disturbing activities on the right-of-way. The holder and/or his representative shall attend this conference. The holder's contractor, or agents involved with construction and/or any surface disturbing activities associated with the right-of-way, shall also attend this conference to review the stipulations of the grant including the plan of development.

   e. In the event that the public land underlying the right-of-way (ROW) encompassed in this grant, or a portion thereof, is conveyed out of Federal ownership and administration of the ROW or the land underlying the ROW is not being reserved to the United States in the patent/deed and/or the ROW is not within a ROW corridor being reserved to the United States in the patent/deed, the United States waives any right it has to administer the right-of-way, or portion thereof, within the conveyed land under Federal laws, statutes, and regulations, including the regulations at 43 CFR Part [2800][2880], including any rights to have the holder apply to BLM for amendments, modifications, or assignments and for BLM to approve or recognize such amendments, modifications, or assignments. At the time of conveyance, the patentee/grantee, and their successors and assigns, shall succeed to the interests of the United States in all matters relating to the right-of-way, or portion thereof, within the conveyed land and shall be subject to applicable State and local government laws, statutes, and ordinances. After conveyance, any disputes concerning compliance with the use and the terms and conditions of the ROW shall be considered a civil matter between the patentee/grantee and the ROW Holder.

5. Applicable Laws

   a. The holder shall comply with all Federal, State, and local regulations whether or not specifically mentioned within this grant.

   b. BLM may suspend or terminate your grant if you do not comply with applicable laws and regulations or any terms, conditions, or stipulations of the grant (such as rent payments), or if you abandon the right-of-way. Your failure to use your right-of-way for its authorized purpose for any continuous 5-year period creates a presumption of abandonment.

   c. Use of pesticides shall comply with the applicable Federal and state laws. Pesticides shall be used only in accordance with their registered uses and within limitations imposed by the Secretary of the Interior. Prior to the use of pesticides, the holder shall obtain from the Field Manager or other authorized officer written approval of a plan showing the type and quantity of material to be used, pest(s) to be controlled, method of application, location of storage and disposal of containers, and any other information deemed necessary by the authorized officer. Emergency use of pesticides shall be approved in writing by the authorized officer prior to such use.

   d. The holder of this right-of-way grant or the holder's successor in interest shall comply with Title VI of the Civil Rights Act of 1964 (42 U.S.C. 2000d et seq.) and the regulations of the Secretary of the Interior issued pursuant thereto.

   e. The holder shall meet Federal, State, and local emission standards for air quality.

f. The holder shall comply with all applicable Federal laws and regulations existing or hereafter enacted or promulgated. In any event, the holder(s) shall comply with the Toxic Substances Control Act of 1976, as amended (15 U.S.C. 2601, et seq.) with regard to any toxic substances that are used, generated by or stored on the right-of-way or on facilities authorized under this right-of-way grant. (See 40 CFR, Part 702-799 and especially, provisions on polychlorinated biphenyls, 40 CFR 761.1-761.193.) Additionally, any release of toxic substances (leaks, spills, etc.) in excess of the reportable quantity established by 40 CFR, Part 117 shall be reported as required by the Comprehensive Environmental Response, Compensation and Liability Act of 1980, Section 102b. A copy of any report required or requested by any Federal agency or State government as a result of a reportable release or spill of any toxic substances shall be furnished to the authorized officer concurrent with the filing of the reports to the involved Federal agency or State government.

g. The holder shall comply with the construction practices and mitigating measures established by 33 CFR 323.4, which sets forth the parameters of the "nationwide permit" required by Section 404 of the Clean Water Act. If the proposed action exceeds the parameters of the nationwide permit, the holder shall obtain an individual permit from the appropriate office of the Army Corps of Engineers and provide the authorized officer with a copy of same. Failure to comply with this requirement shall be cause for suspension or termination of this right-of-way grant.

h. The holder agrees to indemnify the United States against any liability arising from the release of any hazardous substance or hazardous waste (as these terms are defined in the Comprehensive Environmental Response, Compensation and Liability Act of 1980, 42 U.S.C. 9601, et seq. or the Resource Conservation and Recovery Act of 1976, 42 U.S.C. 6901 et seq.) on the right-of-way (unless the release or threatened release is wholly unrelated to the right-of-way holder's activity on the right-of-way. This agreement applies without regard to whether a release is caused by the holder, its agent, or unrelated third parties.

i. The holder is prohibited from discharging oil or other pollutants into or upon the navigable waters of the United States, adjoining shorelines, or the waters of the contiguous zone in violation of Section 311 of the Clean Water Act as amended, 33 U.S.C. 1321, and the regulations issued there under, or applicable laws of the State and regulations issued there under. Holder shall give immediate notice of any such discharge to the authorized officer and such other Federal and State officials as are required by law to be given such notice.

6. Miscellaneous

a. The holder shall perform all operations in a good and workmanlike manner so as to ensure protection of the environment and the health and safety of the public. All design, material, and construction, operation, maintenance, and termination practices shall be in accordance with safe and proven engineering practices.

b. The holder shall designate a representative who shall have the authority to act upon and to implement instructions from the authorized officer. The holder's representative shall be available for communication with the authorized officer within a reasonable time when construction or other surface disturbing activities are underway.

c. The holder shall permit free and unrestricted public access to and upon the right-of-way for all lawful purposes except for those specific areas designated as restricted by the Field Manager or other authorized officer to protect the public, wildlife, livestock or facilities constructed within the right-of-way.

d. The holder shall inform the Field Manager at (435) 636-3600 within 48 hours of any reportable accidents on federal lands.

e. Any cultural and/or paleontological resource (historic or prehistoric site or object) discovered by the holder, or any person working on his behalf, on public or Federal land shall be immediately reported to the authorized officer. Holder shall suspend all operations in the immediate area of such discovery until written authorization to proceed is issued by the authorized officer. An evaluation of the discovery will be made by the authorized officer to determine appropriate actions to prevent the loss of significant cultural or scientific values. The holder will be responsible for the cost of evaluation and any decision as to proper mitigation measures will be made by the authorized officer after consulting with the holder.

f. The holder shall protect all survey monuments found within the right-of-way. Survey monuments include, but are not limited to, General Land Office and Bureau of Land Management Cadastral Survey Corners, reference corners, witness points, U.S. Coastal and Geodetic benchmarks and triangulation stations, military control monuments, and recognizable civil (both public and private) survey monuments. In the event of obliteration or disturbance of any of the above, the holder shall immediately report the incident, in writing, to the authorized officer and the respective installing authority if known. Where General Land Office or Bureau of Land Management right-of-way monuments or references are obliterated during operations, the holder

shall secure the services of a registered land surveyor or a Bureau cadastral surveyor to restore the disturbed monuments and references using surveying procedures found in the Manual of Surveying Instructions for the Survey of the Public Lands in the United States, latest edition. The holder shall record such survey in the appropriate county and send a copy to the authorized officer. If the Bureau cadastral surveyors or other Federal surveyors are used to restore the disturbed survey monument, the holder shall be responsible for the survey cost.

7. Construction / Maintenance

   a. The holder shall conduct all activities associated with the construction, operation, and termination of the right-of-way within the authorized limits of the right-of-way.

   b. Equipment and vehicles shall be inspected and cleaned for vegetation matter and seeds prior to entering BLM administered lands. Clothing and animals should also be inspected for vegetation matter and seeds. Vehicles and equipment should be power washed at a commercial facility or other applicable site where invasive species/noxious weeds seeds can be flushed through a waste treatment plant, where seeds will become inert.

   c. The holder shall construct, operate, and maintain the facilities, improvements, and structures within this right-of-way in strict conformity with the plan of development which was approved and made part of this grant. Any relocation, additional construction, or use that is not in accord with the approved plan of development, shall not be initiated without the prior written approval of the authorized officer. A copy of the complete right-of-way grant, including all stipulations and approved plan of development, shall be made available on the right-of-way area during construction, operation, and termination to the authorized officer. Noncompliance with the above will be grounds for an immediate temporary suspension of activities if it constitutes a threat to public health and safety or the environment.

   d. The map, site plan, building design, floor plan, tower design, and electrical drawings submitted with the original proposal shall be made a part of this right-of-way grant. All construction must conform to these drawings and maps.

   e. The holder shall provide for the safety of the public entering the right-of-way. This includes, but is not limited to barricades for open trenches, flagmen/women with communication systems for single-lane roads without intervisible turnouts, and attended gates for blasting operations.

   f. If any clearing is needed, the right-of-way will be brush-hogged to prevent unnecessary disturbance. Only those areas where safety, absolute need for construction or other regulations may warrant the use of topsoil removal by blading or scalping. This right-of-way clearing shall be limited to the limits of the right-of-way. Suitable topsoil material removed in conjunction with clearing and stripping shall be conserved in stockpiles within the right-of-way.

   g. Prior to fill construction, the existing surface shall be sloped to avoid sharp banks and allow equipment operations. No fills shall be made with frozen or water saturated soils. Construction equipment shall be routed evenly over the entire width of the fill to obtain a thorough compaction.

   h. Construction holes left open overnight shall be covered. Covers shall be secured in place and shall be strong enough to prevent livestock or wildlife from falling through and into a hole.

   i. Construction sites shall be maintained in a sanitary condition at all times; waste materials at those sites shall be disposed of promptly at an appropriate waste disposal site. "Waste" means all discarded matter including, but not limited to, human waste, trash, garbage, refuse, oil drums, petroleum products, ashes, and equipment.

   j. If during any phase of the construction, operation, or termination any oil or other pollutant should be discharged from containers or vehicles and impact Federal lands, the control and total removal, disposal, and cleanup of such oil or other pollutant, wherever found, shall be the responsibility of the holder, regardless of fault. Upon failure of holder to control, cleanup, or dispose of such discharge on or affecting Federal lands, or to repair all damages to Federal lands resulting therefrom, the authorized officer may take such measures as he deems necessary to control and cleanup the discharge and restore the area, including, where appropriate, the aquatic environment and fish and wildlife habitats, at the full expense of the holder. Such action by the authorized officer shall not relieve the holder of any liability or responsibility.

   k. Fences, gates, brace panels and any other impacted range improvements shall be reconstructed to appropriate Bureau standards and/or specifications as determined by the authorized officer.

   l. When construction activity in connection with the right-of-way breaks or destroys a natural barrier used for livestock control, the gap, thus opened, shall be fenced to prevent the drift of livestock. The subject natural

barrier shall be identified by the authcrized officer and fenced by the holder as per instruction of the authorized officer.

m. Construction-related traffic shall be restricted to routes approved by the authorized officer. New access roads or cross-country vehicle travel will not be permitted unless prior written approval is given by the authorized officer. Authorized roads used by the holder shall be rehabilitated or maintained when construction activities are complete as approved by the authorized officer.

n. Existing roads and trails on public lands that are blocked as the result of the construction project shall be rerouted or rebuilt as directed by the authorized officer.

o. No construction or routine maintenance activities shall be performed during periods when the soil is too wet to adequately support construction equipment. If such equipment creates ruts in excess of four inches deep, the soil shall be deemed too wet to adequately support construction equipment.

p. The holder shall construct waterbars on all disturbed areas as needed. Waterbars are to be constructed to: (1) simulate the imaginary contour lines of the slope (ideally with a grade of one or two percent); (2) drain away from the disturbed area; and (3) begin and end in vegetation or rock whenever possible.

q. The holder is responsible for consultation with the authorized officer and/or local authorities for acceptable weed control methods (within limits imposed in the grant stipulations). The holder shall be responsible for annual surveys, reporting the results of the surveys to the BLM, and weed control on disturbed areas within the limits of the right-of-way.

8. Reclamation / Rehabilitation / Termination

a. Ninety (90) days prior to termination of the right-of-way, the holder shall contact the authorized officer to arrange a pre-termination conference. This conference will be held to review the termination provisions of the grant.

b. Upon grant termination by the Field Manager or other authorized officer, all improvements shall be removed from the public lands within 90 days, or otherwise disposed of as provided in paragraph (4)(d) or as directed by the authorized officer.

IN WITNESS WHEREOF, The undersigned agrees to the terms and conditions of this right-of-way grant or permit.

(Signature of Holder)	(Signature of BLM Authorized Officer)
Area Manager	Assistant Field Manager, Price Field Office
(Title)	(Title)
3-8-18	3-19-18
(Date)	(Effective Date of Grant)

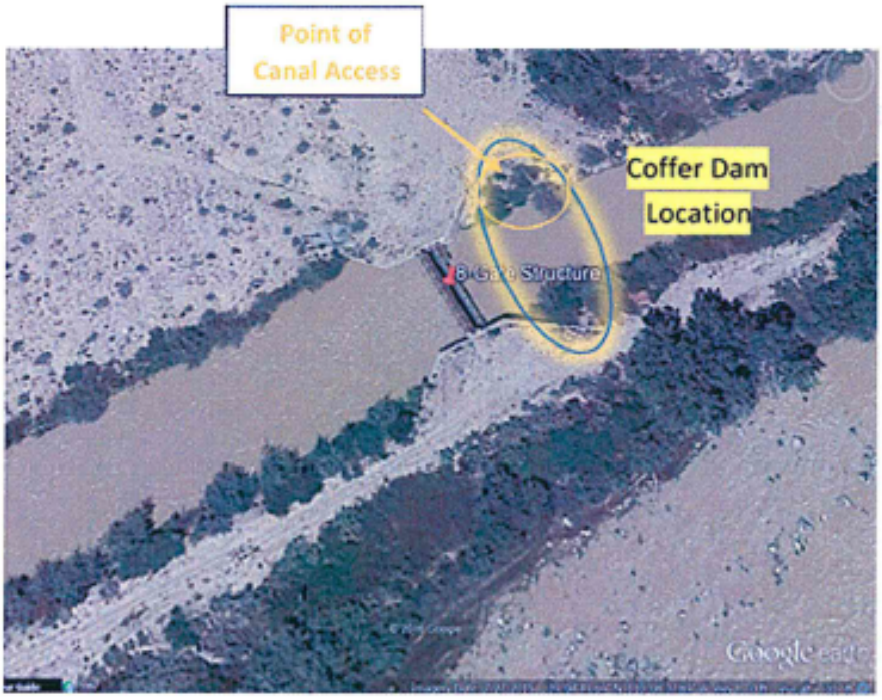
Plan of Development

EXHIBIT A

1. Project Description

The project includes the Green River Canal Company's rehabilitation of their 8-Gate Structure, shown in Figure 1. The replacement of this structure was included in the NRCS's Final Environmental Impact Statement for the Green River Dam Rehabilitation Project but the actual construction was not included in the construction contracts. While work is being performed on the 8-Gate Structure, the US Bureau of Reclamation will be constructing a fish barrier and return channel, canal lining and siphon crossing on private land within and adjacent to the Green River Canal and the Green River. Reclamation is preparing an Environmental Assessment for that action.

The 8-gate Structure and potential staging/borrow sites for the coffer dam are on Bureau of Land Management land. Green River Canal Company and Thayn Hydro (Lee Thayn) have an existing right-of way from BLM for the operation and maintenance of their canal including the 8-Gate Structure. However, that right-of-way does not include the staging/borrow site. The staging/borrow site location was included in the BLM right-of-way granted to the state of Utah as part of the dam rehabilitation project.



The 8-Gate Structure, located in the west raceway of the Green River Diversion Dam, would be modified. Brush and debris would be cleared immediately downstream of the structure on both sides of the canal. A temporary ramp would be constructed to create access from the raceway bank to the raceway bottom. Concrete would be used to reshape and repair the raceway prism.

A coffer dam would be constructed within the raceway immediately upstream of the 8-Gate Structure to facilitate construction. Fill material would be hauled from an existing borrow area on nearby BLM land. Material would gradually be added and compacted in the raceway until it spans across the entire width of the raceway. Any water which penetrates the cofferdam during construction would be pumped to the upstream side of the coffer dam. The cofferdam would also be utilized to transport equipment to the east side of the raceway. After construction, cofferdam material would be removed from the raceway and returned to the borrow pit, and the disturbed area would be graded to match existing contours and reseeded with a seed mix specified by BLM.

2. Purpose and Need for the Facility

The Green River Canal Company has a right-of-way for the operation and maintenance of their canal, including the 8-Gate Structure; however, there is a need to obtain additional right-of-way from the BLM for the Staging/Borrow area. Construction of the coffer dam may also be outside of the scope of the existing BLM right-of-way. The purpose of the coffer dam is to temporarily dry up the canal to facilitate replacement of the 8-Gate Structure

3. Estimated needs
   The volume of material from the borrow area to construct the coffer dam will be about 850 cubic yards.
4. The type of facility will be a temporary coffer dam.
5. The area requested is shown on the attached map and is includes about 4 acres outside of the existing Green River/Thayne right-of-way and about 0.25 acres within the existing right-of-way. Access to the site will be from established gravel roads.
6. The right-of-way requested in this plan of development would be temporary. The construction period would be between November 1 and March 30. Construction may begin in the fall of 2018, but funding availability may delay the construction start until the fall of 2019 or 2020.
7. Design Factors
   The volume of the coffer dam will be about 850 cubic yard. There will not be any excavation in the canal for the coffer dam. The material for the dam will be excavated from the borrow area. The top of the dam will be about 12 feet wide, the ends of the dam will follow the contour of the canal banks. The upstream and downstream side slopes will be approximately 2 horizontal to 1 vertical.

8. Additional Components of the Right-of-way
   - Sand/Gravel supplies
     a. Material in the identified borrow site are compatible and sufficient for project needs.

9. Government Agencies Involved
   - State of Utah
   - Emery County

10. Right-of-way location
    Section 17: Lot 3.
    T. 20 S.• R 16 E .• Salt Lake Meridian. Emery County, Utah
    The area requested contains approximately 4.25 acres, more or less, which includes approximately 0.25 acres within the Green River Canal/Thayne Hydro right-of-way.

11. Maps
    a. USGS Topographic maps
       - Blue Castle Butte USGS Topo map.

12. Anticipated conflicts with resources

The activities included in this project that are on land administered by the BLM were included in the Green River Diversion Rehabilitation project. The environmental compliance for that project included an Environmental Impact Statement which resulted in a Record of Decision. Consultation with the Fish and Wildlife Service was also completed, resulting in a Biological Opinion. The ROD and BO are attached for reference in this application.

Reclamation also completed a Biological Assessment and received a Biological Opinion for the

construction of the Fish Screen within the Green River Canal. A Cultural Resource assessment was also completed, and a Memorandum of Agreement was executed with the Utah State Historical Preservation Office. Reclamation's BA/BO and Cultural Resources clearance included the BLM property in this right-of-way permit application. The BA/BO and the MOA are also attached for reference purposes.

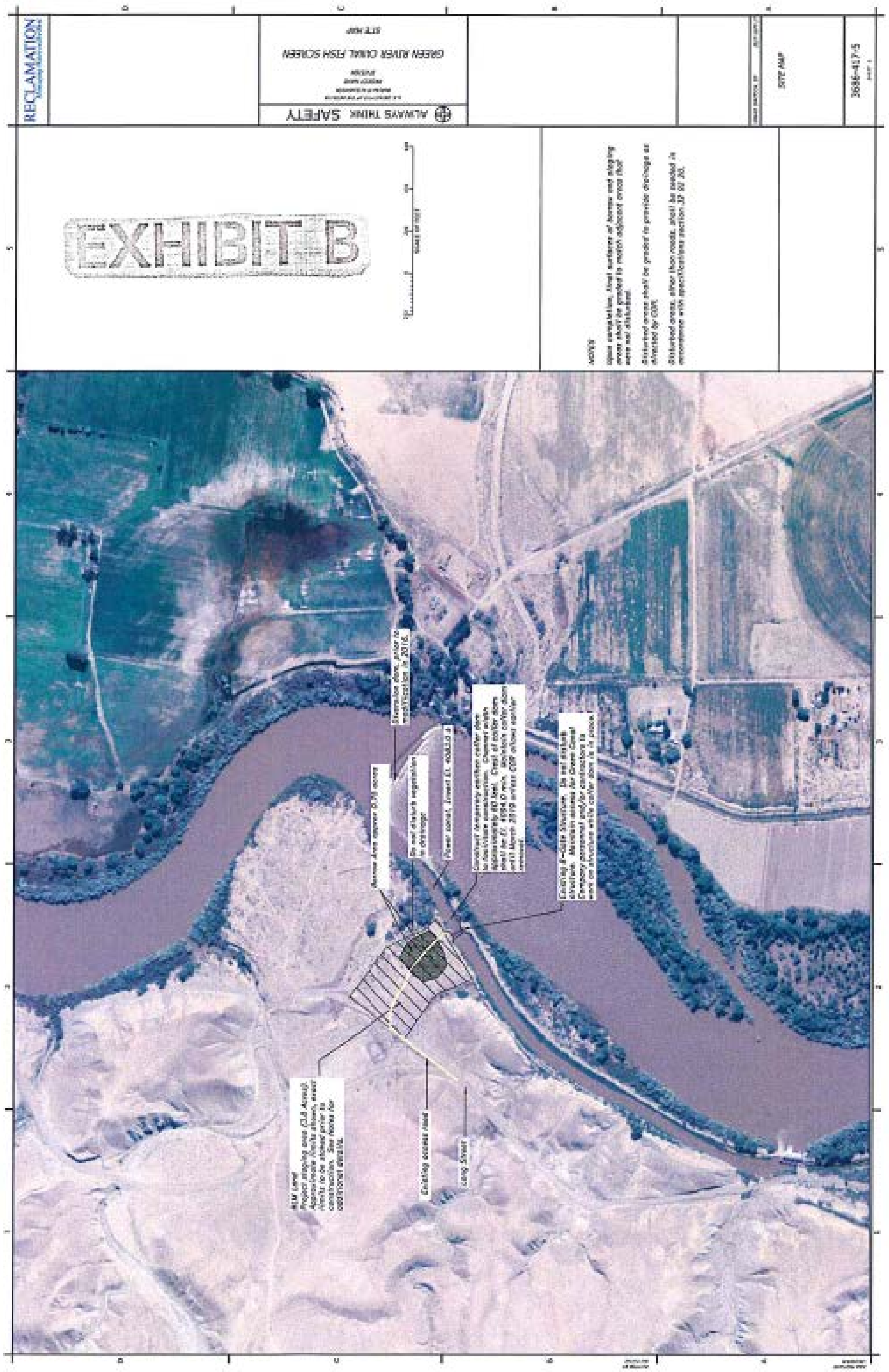
13. Construction of the Facility

- The gates in the 8-gate structure would be closed to stop any water flowing downstream in the canal. This will limit sediment travel during coffer dam construction. The coffer dam would be built by hauling borrow pit material to the canal bank and placing the material on the bank. The material would then be moved into the standing water with earth moving equipment. The material would slowly be advanced across the raceway until reaching the opposite raceway bank.

  After completion of rehabilitation work on the 8-Gate Structure, the gates will be closed. Again, this will prevent flowing water from transporting sediment during dam removal. The coffer dam will be removed using an excavator. The excavated material will be placed on the canal bank above the waterline. After the excess water has drained from the excavated material, the material would returned to the borrow site. Once the coffer dam, including accumulated sediment behind the dam, is completely removed and the material placed in the borrow pit, the disturbed area in the borrow pit would be re-graded to match existing contours. The disturbed area would then be reseeded with a seed mix approved by the BLM and/or the State of Utah.

14. Operation and Maintenance

- There will be no change in the access to the 8-Gate Structure after it has been rehabilitated. Access and operation and maintenance provisions of the existing right-of way will be adequate for those functions.


RECLAMATION
ALWAYS THINK SAFETY
GREEN RIVER CANAL FISH SCREEN
SITE MAP
EXHIBIT B
3686-417-5

MEMORANDUM OF AGREEMENT
AMONG
THE WESTERN COLORADO AREA OFFICE, BUREAU OF RECLAMATION,
THE U.S. ARMY CORPS OF ENGINEERS, SACRAMENTO DISTRICT,
AND THE UTAH STATE HISTORIC PRESERVATION OFFICER
REGARDING THE GREEN RIVER CANAL FISH BARRIER PROJECT,
UPPER COLORADO RIVER ENDANGERED FISH
RECOVERY IMPLEMENTATION PROGRAM,
EMERY COUNTY, UTAH

WHEREAS, the Bureau of Reclamation (Reclamation) plans to construct a fish barrier on the Green River Canal (Canal), replace the Canal's intake gates and one of the Canal's siphons, line approximately 1,000 feet of the Canal, and modify the 8-Gate structure located in the Tusher Diversion Dam west-raceway (Project); and

WHEREAS, Reclamation plans to use Federal funds to implement the Green River Canal Fish Barrier Project to minimize canal entrainment of adult and sub-adult Colorado pikeminnow and razorback sucker, thereby making the Project an undertaking subject to review under Section 106 of the National Historic Preservation Act (NHPA), 54 U.S.C. § 306108, and its implementing regulations, 36 CFR Part 800; and

WHEREAS, the U.S. Army Corps of Engineers, Sacramento District (USACE) proposes to issue a permit for the Project, pursuant to Section 404 of the Clean Water Act (33 U.S.C. § 1344) to Reclamation, for the Project and therefore has a federal action associated with the Project (USACE's undertaking); and

WHEREAS, the USACE has designated Reclamation as the lead federal agency for compliance with Section 106 of the NHPA for the Project, has participated in the development of this MOA, and has chosen to participate in the MOA as a Signatory; and

WHEREAS, Reclamation has defined the undertaking's area of potential effect (APE) as contained within 15 acres and includes the USACE's undertaking, as depicted in Attachment A of this MOA; and

WHEREAS, Reclamation, as lead federal agency has determined, in consultation with the Utah State Historic Preservation Officer (SHPO), that the Green River Canal (42EM4443) is eligible for listing on the National Register of Historic Places under Criterion A and that the Project will result in an adverse effect to historic properties; and

WHEREAS, Reclamation has consulted with the Southern Ute Indian Tribe, Ute Indian Tribe – Uintah and Ouray Reservation, and the Ute Mountain Ute Tribe on the proposed undertaking, and the tribes have chosen not to participate in the consultation; and

WHEREAS, Reclamation has consulted with the Emery County Commissioners and the City of Green River on the proposed undertaking, and they have chosen not to participate in the consultation as a concurring party; and

WHEREAS, in accordance with 36 CFR § 800.6(a)(1), Reclamation has notified the Advisory Council on Historic Preservation (ACHP) of its adverse effect determination providing the specified documentation, and the Council has chosen not to participate in the consultation pursuant to 36 CFR § 800.6(a)(1)(iii);

NOW, THEREFORE, pursuant to Section 106 of the NHPA, Reclamation, USACE, and the SHPO agree that the undertaking shall be implemented in accordance with the following stipulations in order to take into account the effect on historic properties.

STIPULATIONS

Reclamation shall ensure that the following measures are carried out:

I. MITIGATION

a. Prior to any modification of the Green River Canal, Reclamation will ensure that the segment of the property (5EM4443) shall be recorded in accordance with *The Secretary of the Interior's Standards and Guidelines for Architectural and Engineering Documentation guidance for Level I Documentation*, as published in the Federal Register on September 29, 1983 (Vol. 48, No. 190, pp. 44730-34). One feature of the property (siphon) will be documented as a part of the mitigation. The documentation will be of archival quality, and will include a detailed narrative history, mapping of the property and photographic documentation of the portions of the historic property to be included in the project. Photographs will be black and white archival quality (4" x 6") prints. Features will be plotted on the maps with GPS waypoints and will be extensively described and indexed in the report. Representative design drawings will not be necessary for this property, as it is not significant for its design characteristics.

Stipulation I.a must be satisfied prior to the start of construction and/or any earth disturbances within the APE.

b. Reclamation will submit a copy of the Level I Documentation to the SHPO within one (1) year of the execution of this MOA. The SHPO shall review and provide comments within thirty (30) calendar days of receipt. Once accepted by SHPO, SHPO shall receive a minimum of one archivally-stable copy of the final recordation for its files and provide documentation of acceptance. The activities prescribed by the stipulations of this MOA shall be carried out by or under the direct supervision of a person or persons meeting, at minimum, the Secretary of the Interior Profession Qualification Standards (48 FR 44738-39) (PQS) in the appropriate discipline. This does not preclude the use of properly supervised persons who do not meet the PQS.

II. DURATION

This MOA will be null and void if its terms are not carried out within one (1) year from the date of its execution. Prior to such time, Reclamation may consult with the SHPO to reconsider the terms of the agreement. Unless terminated pursuant to Stipulation VI, below, this MOA will be in effect through Reclamation's implementation of the stipulations of this MOA, and will terminate and have no further force or effect when

Reclamation, in consultation with the SHPO, determines that the terms of the MOA have been fulfilled in a satisfactory manner. Within 14 days of a determination that the terms of the MOA have been satisfactorily fulfilled, Reclamation will notify the SHPO and USACE of the termination of the MOA.

III. POST-REVIEW DISCOVERIES

If previously unidentified potential historic properties are discovered within the APE or unanticipated effects on historic properties found, Reclamation shall implement the discovery plan included as Attachment B of this MOA.

IV. DISPUTE RESOLUTION

Should the SHPO or USACE object at any time to any actions proposed or the manner in which the terms of this MOA are implemented, Reclamation shall consult with the SHPO and/or USACE to resolve the objection, as appropriate. If Reclamation determines that such objection cannot be resolved, Reclamation will:

a. Forward all documentation relevant to this dispute, including Reclamation's proposed resolution, to the ACHP. The ACHP shall provide Reclamation with its advice on the resolution of the objection within thirty (30) days of receiving adequate documentation. Prior to reaching a final decision on the dispute, Reclamation shall prepare a written response that takes into account any timely advice or comments regarding the dispute from the ACHP, USACE, and the SHPO, and provide them with a copy of this written response. Reclamation will then proceed according to its final decision.

b. If the ACHP does not provide its advice regarding the dispute within the thirty (30) day time period, Reclamation may make a final decision on the dispute and proceed accordingly. Prior to reaching such a final decision, Reclamation shall prepare a written response that takes into account any timely comments regarding the dispute from the SHPO and USACE, and provide them and the ACHP with a copy of such written response.

c. Reclamation's responsibility to carry out all other actions subject to the terms of this MOA that are not the subject of the dispute remain unchanged.

V. AMENDMENTS

This MOA may be amended when such an amendment is agreed to by all Signatories. The amendment will be effective on the date the amendment is fully executed. Reclamation will file a copy of the amendment to the MOA, signed by all of the Signatories, with the ACHP, pursuant to §800.6(c)(7).

VI. TERMINATION

If any Signatory to this MOA determines that its terms will not or cannot be carried out, that party shall immediately consult with the other Signatories to attempt to develop an amendment to this MOA per Stipulation V, above. If within thirty (30) days (or another

time period agreed to by all Signatories) an amendment cannot be reached, any Signatory may terminate the MOA upon written notification to the other Signatories.

Once the MOA is terminated, and prior to work continuing on the undertaking, Reclamation must either (a) execute an MOA pursuant to 36 CFR § 800.6 or (b) request, take into account, and respond to the comments of the ACHP under 36 CFR § 800.7. Reclamation shall notify the Signatories as to the course of action it will pursue.

EXECUTION of this MOA by Reclamation, USACE, and the SHPO, pursuant to 36 CFR § 800.6, including its transmittal by Reclamation to the ACHP in accordance with 36 CFR § 800.6 (b)(1)(iv), and subsequent implementation of its terms shall evidence that Reclamation has taken into account the effects of this undertaking on historic properties and afforded the ACHP an opportunity to comment.

SIGNATORIES:

Utah State Historic Preservation Officer

By:_____ Date: 8-30-17
Brad Westwood, SHPO

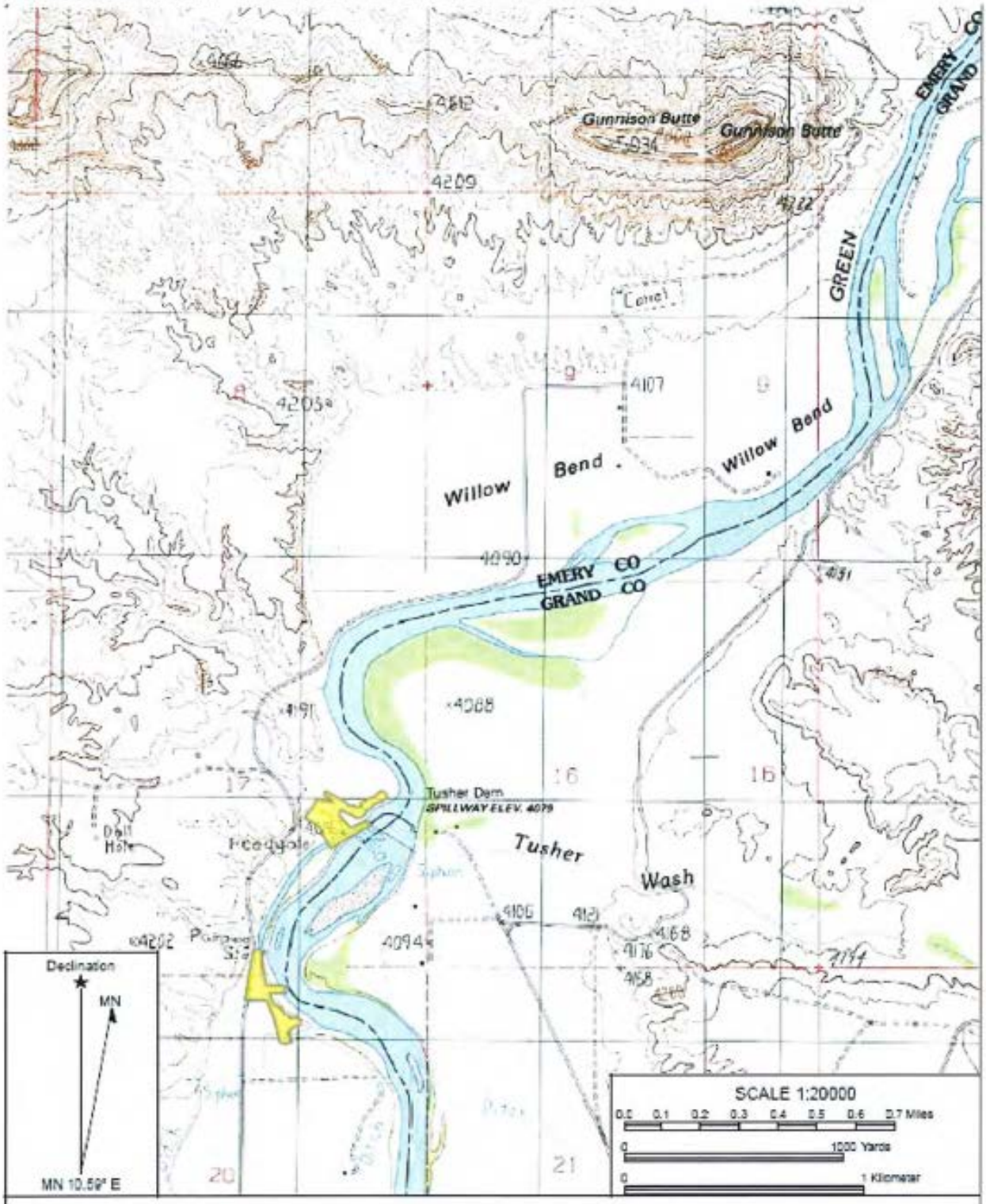
Bureau of Reclamation, Western Colorado Area Office

By:_____ Date: 8-28-17
Ed Warner, Area Manager

U.S. Army Corps of Engineers, Sacramento District:

By:_____ Date: 8/22/2017
Jason Gipson, Chief, Nevada-Utah Section

ATTACHMENT A – AREA OF POTENTIAL EFFECT



Name: BLUE CASTLE BUTTE
Date: 06/06/17

Location: Sec 016 T020S R016E UT Salt Lake
Caption: Yellow polygons depict the Green River Fish Barrier Project Area of Potential Effect

5

ATTACHMENT B – UNANTICIPATED DISCOVERY PLAN

PLAN AND PROCEDURES FOR THE UNANTICIPATED DISCOVERY OF CULTURAL RESOURCES

GREEN RIVER FISH BARRIER PROJECT
UPPER COLORADO RIVER ENDANGERED FISH
RECOVERY IMPLEMENTATION PROGRAM,
EMERY COUNTY, UTAH

1. INTRODUCTION

Reclamation plans to construct a fish barrier on the Green River Canal (Canal), replace the Canal's intake gates and one of the Canal's siphons, line approximately 1,000 feet of the Canal, and modify the 8-Gate structure located in the Tusher Diversion Dam west-raceway. The following Unanticipated Discovery Plan (UDP) outlines procedures to follow, in accordance with state and federal laws, if archaeological materials are discovered.

2. RECOGNIZING CULTURAL RESOURCES

A cultural resource discovery could be prehistoric or historic. Examples include, but are not limited to:

- An accumulation of shell, burned rocks, or other food related materials
- An area of charcoal or very dark stained soil with artifacts,
- Stone tools or waste flakes (i.e. an arrowhead, or stone chips),
- Clusters of tin cans or bottles, logging or agricultural equipment that appears to be older than 50 years,
- Buried railroad tracks, decking, or other industrial materials.

When in doubt, assume the material is a cultural resource.

3. ON-SITE RESPONSIBILITIES

STEP 1: STOP WORK. If any Reclamation employee, contractor or subcontractor believes that he or she has uncovered a cultural resource at any point in the project, all work within 50 feet of the discovery must stop. The discovery location should be secured at all times.

STEP 2: NOTIFY BUREAU OF RECLAMATION. Contact the Project Overseer at the Bureau of Reclamation:

Reclamation Project Overseer:
Jennifer Ward
970-248-0651
jward@usbr.gov

The Project Manager or the Reclamation Project Overseer will make all other calls and notifications.

If human remains are encountered, treat them with dignity and respect at all times. Cover the remains with a tarp or other materials (not soil or rocks) for temporary protection in place and to shield them from being photographed. Do not call 911 or speak with the media.

4. FURTHER CONTACTS AND CONSULTATION

A. Project Manager's Responsibilities:

- Protect Find: The Project Manager is responsible for taking appropriate steps to protect the discovery site. All work will stop in an area adequate to provide for the total security, protection, and integrity of the resource. Vehicles, equipment, and unauthorized personnel will not be permitted to traverse the discovery site. Work in the immediate area will not resume until treatment of the discovery has been completed following provisions for treating archaeological/cultural material as set forth in this document.
- Direct Construction Elsewhere On-site: The Project Manager may direct construction away from cultural resources to work in other areas prior to contacting the concerned parties.
- Contact CR Manager: If there is a CR Program Manager, and that person has not yet been contacted, the Project Manager will do so.
- Contact Project Overseer: If the Project Overseer at the Bureau of Reclamation has not yet been contacted, the Project Manager will do so.
- Identify Find: The Project Manager will ensure that a qualified professional archaeologist examines the find to determine if it is archaeological.
    - If it is determined not archaeological, work may proceed with no further delay.
    - If it is determined to be archaeological, the Project Manager will continue with notification.
    - If the find may be human remains or funerary objects, the Project Manager will ensure that a qualified physical anthropologist examines the find. If it is determined to be human remains, the procedure described in Section 5 will be followed.

B. Project Overseer's Responsibilities

- Notify SHPO: The Project Overseer will notify the Utah State Historic Preservation Office (SHPO).

Colorado State Historic Preservation Office:
Mr. Brad Westwood, State Historic
Preservation Officer
Utah Division of State History
300 S. Rio Grande Street (450 West)
Salt Lake City, UT 84101
(801)-367-6324

- Notify USACE: The Project Overseer will notify the U.S. Army Corps of Engineers, Sacramento District (USACE).

Nevada-Utah Section:
Mr. Mike Pectol, Project Manager
Bountiful Office
533 West 2600 South, Suite 150
Salt Lake City, UT 84010
(801) 295-8380 x15

C. Further Activities

- Archaeological discoveries will be documented as described in Section 6.
- Construction in the discovery area may resume as described in Section 7.

5. SPECIAL PROCEDURES FOR THE DISCOVERY OF HUMAN SKELETAL MATERIAL

Any human skeletal remains, regardless of antiquity or ethnic origin, will at all times be treated with dignity and respect.

In the event possible human skeletal remains are discovered, Reclamation will coordinate with the following contact:

Emery County Sheriff
(435) 564-3431

A. Further Activities:

When consultation and documentation activities are complete, construction in the discovery area may resume as described in Section 7.

6. DOCUMENTATION OF ARCHAEOLOGICAL MATERIALS

Archaeological deposits discovered during construction will be assumed eligible for inclusion in the National Register of Historic Places until a formal Determination of Eligibility is made.

The Project Manager will ensure the proper documentation and assessment of any discovered cultural resources in cooperation the SHPO, the USACE, affected tribes, and a contracted consultant (if any). All prehistoric and historic cultural material discovered during project construction will be recorded by a professional archaeologist in accordance with all state and federal laws.

7. PROCEEDING WITH CONSTRUCTION

Project construction outside the discovery location may continue while documentation and assessment of the cultural resources proceed. A professional archaeologist must determine the boundaries of the discovery location. In consultation with SHPO, USACE, and affected tribes, the Project Manager and Project Overseer will determine the appropriate level of documentation and treatment of the resource.

Construction may continue at the discovery location only after the process outlined in this plan is followed and the Bureau of Reclamation determines that compliance with state and federal laws is complete.

SOUTHERN UTE INDIAN TRIBE

Southern Ute Cultural & Preservation Department
P.O. Box 737, Mail Stop #73, Ignacio CO 81137
Phone: 970-563-0100 Fax: 970-563-1098

February 22, 2018

Lesley McWhirter
445 West Gunnison Ave., Suite 221
Grand Junction, CO 81501

Dear Ms. McWhirter,

I have reviewed your Consultation Request under section 106 of the National Historic Preservation Act regarding the Green River Canal Fish Screen Project project and offer the following response as indicated by the box that is checked.

- ☐ NO INTEREST: I have determined that there is not a likelihood of eligible properties of religious and cultural significant to the Southern Ute Indian Tribe.
- ☒ NO EFFECT: I have determined that there are no properties of religious and cultural significance to the Southern Ute Indian Tribe that are listed on the National Register within the area of potential effect or that the proposed project will have no effect on any such properties that may be present.
- ☐ NO ADVERSE EFFECT: I have identified properties of cultural and religious significance within the area of effect that I believe are eligible for listing in the National Register, for which there would be no adverse effect as a result of the proposed project.
- ☐ ADVERSE EFFECT: I have identified properties of cultural and religious significance within the area of potential effect (APE) that are eligible for listing in the National Register. I believe the proposed project would cause an adverse effect on these properties.
- ☐ REQUEST FOR ADDITIONAL INFORMATION: The Southern Ute Indian Tribe requests additional information on the planned site for its impact on properties of religious and cultural importance to the Tribe as follows:

Note:

Sincerely,

Ms. Cassandra Atencio
NAGPRA Coordinator
Southern Ute Cultural Department
Southern Ute Indian Tribe

State of Utah

GARY R. HERBERT
Governor

SPENCER J COX
Lieutenant Governor

Office of the Governor
PUBLIC LANDS POLICY COORDINATING OFFICE

KATHLEEN CLARKE
Director

February 23, 2018

Submitted via electronic mail: lmcwhirter@usbr.gov

Lesley McWhirter
Bureau of Reclamation
445 West Gunnison Avenue, Suite 221
Grand Junction, CO 81501

Subject: **Green River Canal Fish Screen Project**
RDCC Project Number 61786

Dear Ms. McWhirter:

The State of Utah supports the Green River Canal Fish Screen Project and appreciates the Bureau of Reclamation (USBR) for taking active measures to prevent or reduce the mortality of endangered fish in the Green River Canal by screening them out of the canal and returning them to the Green River. The following comments were prepared through collaboration with the Utah Division of Forestry, Fire & State Lands (FFSL) and this office.

The subject portion of the bed of the Green River is considered Sovereign Land of the State of Utah and is managed by FFSL. In addition to obtaining a stream alteration permit, this action will require prior authorization from FFSL.

We understand that contact has been made between FFSL and USBR, and FFSL has received USBR's application. Thank you for the opportunity to review and comment on the Draft Environmental Assessment. Please direct any written questions regarding this correspondence to the Public Lands Policy Coordinating Office at the address below, or call to discuss any questions or concerns.

Sincerely,

Kathleen Clarke
Director