BUREAU OF RECLAMATION

Hyrum Spillway Replacement
Draft Environmental Assessment

Cache County, Utah

PRO-EA-22-005
Interior Region 7 – Upper Colorado Basin
Provo Area Office
Provo, Utah

U.S. Department of the Interior March 2023

Mission Statements

Department of the Interior
The Department of the Interior conserves and manages the Nation's natural resources and cultural heritage for the benefit and enjoyment of the American people, provides scientific and other information about natural resources and natural hazards to address societal challenges and create opportunities for the American people, and honors the Nation's trust responsibilities or special commitments to American Indians, Alaska Natives, and affiliated island communities to help them prosper.

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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.

Hyrum Spillway Replacement Draft Environmental Assessment

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U.S. Department of the Interior March 2023

The U.S. Bureau of Reclamation (Reclamation) prepared an Environmental Assessment (EA) for the Hyrum Dam Spillway Replacement Project, and a Finding of No Significant Impact (FONSI) was signed in August 2016. During field explorations for the final design of the preferred alternative, it was discovered that further information on slope stability and alluvial foundation in the stilling basin was required. Based on these investigations and reviews, the following changes were made to the design which warrants further review of the new Proposed Action and modification of the original EA.

- The spillway crest structure was moved downstream beyond the erosion limit of the reservoir (angle of repose is approximately 30 degrees). This change resulted from the Consultant Review Board (CRB) review.
- Plastic concrete foundation treatment was designed in place of the deep soil mixing to reduce the potential for differential settlement along the spillway. This change resulted from the additional data collected during the field exploration.
- The spillway alignment was rotated slightly to minimize excavation and backfill.
- Excavation slopes were updated from 2:1 throughout to 3:1 at the crest structure and 2:1 benched every 20 vertical feet (ft).
- Seismic design was updated per risk informed design. Instead of simply designing the spillway for the 10,000-year earthquake event in Corrective Action Study (CAS), the design team designed the spillway to be fully operational after the 2,000-year earthquake event (this included modern safety factors and material strength reduction factors) and able to hold water after the 50,000-year seismic event (this was accomplished by stripping the design of factors discussed above and group risk analyses).
- Dewatering design was changed to be completed by the Technical Service Center (TSC) rather than contract design.

For further information, contact:

Brittany White
Fish and Wildlife Biologist
Provo Area Office
Phone: (801) 379-1052
Email: blwhite@usbr.gov

Erik Kemp
Fish and Wildlife Biologist
Provo Area Office
Phone: (801) 379-1116
Email: ekemp@usbr.gov

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1 Introduction

1.1 Background

The South Cache Water Users Association (Association) was notified by the Bureau of Reclamation (Reclamation), after completing a Comprehensive Facility Review (CFR) in 2003, that there was a need to pursue risk reduction actions related to the Safety of Dams (SOD) at Hyrum Reservoir. The results of the Hydrologic Risk Analysis indicated the need to pursue remedial actions to reduce risk of dam failure associated with overtopping of the dam, spillway and/or stilling basin walls; erosion of the spillway foundation; and hydraulic jacking of the spillway chute.

Hyrum Reservoir is located in Cache County, Utah. Operation and maintenance of the Hyrum Project are the responsibility of the Association. It was built to provide a reliable water supply to that area in Cache County. An overview map showing Hyrum Reservoir, the dam, and the current spillway alignment is shown in Figure 1.

The purpose of the Project is to minimize risk of dam failure by constructing a new spillway. Repairs or new construction would occur on a combination of Fee Title Land owned by Reclamation, and private land purchased by Reclamation, or private land on which Reclamation would acquire a temporary easement. The reservoir and dam are operated by the Association.

Figure 1 Hyrum Reservoir, the dam, and current spillway location

Hyrum Dam and Reservoir are the water storage features of the Hyrum Project, and are located on the Little Bear River, approximately nine miles southwest of Logan, Utah. The dam was constructed in 1935, and it provides storage for irrigation and municipal use. The reservoir has a total capacity of approximately 18,221 acre-feet (AF) at the top of the active conservation pool, elevation 4,672.5 feet (ft).

Hyrum Dam is a modified homogeneous earthfill embankment with a maximum structural height of 116 ft. The majority of the dam is composed of a "core" zone of mixed clay, silt, sand, and gravel that extends up to the crest elevation 4,680 ft.

The existing spillway is located approximately 900 ft to the right of the right abutment of the dam, near the left end of the dike. The structure consists of a concrete inlet transition, a gate structure with three 16-ft-wide by12-ft-high radial gates to control flow at a crest elevation 4,660.00 ft, a 16-ft-wide concrete chute with wall side slopes of 1:1, followed by a concrete stilling basin and a rubble concrete paved and riprap lined outlet channel. The spillway has a capacity of 6,000 ft^3/s at reservoir water surface (RWS) elevation 4,672.5 ft. The spillway is founded on highly erosive foundation material.

The original spillway chute was constructed with lightly reinforced concrete. The single layer of reinforcement is not continuous across construction joints and there are no water stops at the joints. The underdrain system consists of bell and spigot clay tile pipe placed in an excavated trench below the invert slab. The trench was backfilled with gravel with no filter material placed between the gravel and the fine-grained foundation material. The underdrains are continuous from the spillway

crest structure, upstream from the gates to the top of the steep chute above the stilling basin. The outfall from these drains daylights at the top of the chute steep section.

In the fall of 1990, a Rehabilitation and Betterment Program was started to repair cracks and joints in the spillway chute and other concrete as needed. The radial gates, hoists, and the electrical control system for the gates were also refurbished. The R&B program was completed in December 1995. Then in July through October 2004, emergency modifications were performed to repair the lower portion of the spillway chute. These modifications consisted of saw-cutting and removing a portion of the spillway chute floor, drilling and anchoring the remaining existing chute walls, filling and compacting voids beneath the chute floor while installing cutoff walls, filters, gravel and pipe underdrains, and replacing the cut concrete walls and chute floor. These emergency modifications reduced the risk of failure of the spillway for a short time, but they were not considered adequate for reduction of long-term risks.

Since 2004, the following five studies were performed to assess long and short-term risk and potential ways to mitigate it:

1. 2009 Corrective Action Study (CAS)
2. 2010 Comprehensive Facility Review (CFR)
3. 2012 Hydrologic Hazard for CAS
4. 2013 Baseline Risk Analysis
5. 2022 Hyrum Feasibility Study Summary (Feasibility Study)

Each of these efforts looked at the current condition of the spillway (and often other portions of the project including the dam) and assessed the potential short- and long-term risks associated with repairing the existing spillway, constructing a new spillway, or making no change to the current spillway. In order to minimize the risk of dam or spillway failure and thereby the risk of loss of human life, we describe within this environmental assessment, the potential effects of replacing or taking no action on the current spillway.

Reclamation has prepared this environmental assessment (EA) to comply with procedural requirements of the National Environmental Policy Act of 1969 (NEPA) and regulations outlined by the Council on Environmental Quality and the Department of Interior. This EA analyzes the potential impacts of the Proposed Action in comparison with the No Action Alternative. Under the No Action Alternative, the existing spillway would remain unchanged. As required by the NEPA implementing regulations, if significant impacts to the human environment are identified, an Environmental Impact Statement will be prepared. If no significant impacts are identified, Reclamation will issue a Finding of No Significant Impact (FONSI).

1.2 Purpose and Need for the Proposed Action

The purpose of the Project is to minimize the risk of dam and spillway failure.

1.2.1 Need to Reduce the Risk of Potential Failure Modes

Three failure modes were analyzed in the Corrective Action Alternatives (CAA) Report, based on the current condition of the spillway. These include the following: static failure modes, seismic

failure modes, and hydrologic failure modes. After thoroughly assessing each failure mode and calculating an annual failure probability (AFP) for each risk, a total baseline risk was calculated. The total baseline AFP for Hyrum Dam is 4.4E-03, which exceeds guidelines and therefore provides a sound justification and rationale to pursue action to reduce risk.

1.2.2 Increase Public Safety and Reduce the Risk of Loss of Human Life

In 2012, a Population at Risk (PAR) estimate was made based on the 2010 census block residential population and 2011 aerial imagery. The total 2012 PAR used for this baseline risk analysis is 296, compared to 310 in 2003, and 362 in 2010. The Risk Estimating Team (RET) felt that the current PAR was accurately estimated based on the most up-to-date census and imagery, and therefore, appropriate for use in this risk analysis for both static and seismic potential failure modes. Based on these risks, there is a need to reduce the PAR and increase overall public safety.

1.2.3 Reduce Maintenance and Associated Costs

There is also a need to reduce the amount of annual maintenance of the spillway and the associated costs. It would minimize unneeded work and reset the life expectancy of the project.

1.3 Federal Decision

The Federal Action being considered is whether or not Reclamation should authorize the Association to either replace or do nothing to the existing spillway at Hyrum Reservoir.

1.4 Relevant Regulations, Permits and Authorizations

Implementation of the Proposed Action may require a number of authorizations or permits from state and federal agencies. Reclamation is the lead federal agency for this EA. This EA is prepared in compliance with all applicable federal statutes, regulations, and Executive Orders (EO).

1.4.1 National Environmental Policy Act (NEPA) of 1969, as amended (42 U.S.C. 4321 et seq.)

- Procedures for Implementing NEPA (33CFR 230; ER 200-2-2)
- Regulations for Implementing the Procedural Provisions of NEPA (40 CFR 1500 et seq. and 43 CFR 46 et seq.)

1.4.2 Endangered Species Act of 1973, as amended (16 U.S.C. 1531 et seq,) and related Statutes and Orders

- Fish and Wildlife Coordination Act of 1958, as amended (16 U.S.C. 661 et seq.)
- Secretarial Order 3206, American Indian Tribal Rights, Federal-Tribal Trust responsibilities, and the Endangered Species Act

1.4.3 National Historic Preservation Act of 1966, as amended (16 U.S.C. 470 et seq.) and related Statutes, Regulations and Orders

- American Indian Religious Freedom Act of 1978 (42 U.S.C. 1996)
- Archaeological Resources Protection Act of 1979 (16 U.S.C. 470)
- Native American Graves Protection and Repatriation Act of 1990 (25 U.S.C. 3001 et seq.)
- Protection and Enhancement of the Cultural Environment (EO 11593)

1.4.4 Clean Water Act (CWA) of 1972, as amended (33 U.S.C. 1251 et seq.) and related Orders

- Protection of Wetlands (EO 11990)

1.4.5 Other Statutes, Regulations and Orders

- Clean Air Act of 1972, as amended (42 U.S.C. 7401 et seq.)
- Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, 1994
- Floodplain Management (EO 11988)
- Wild and Scenic Rivers, 1968 (Public Law 90-542; 16 U.S.C 1271 et seq.)

Potential authorizations or permits may include those listed in Table 1-1 and others not listed.

Table 1-1 Potential authorizations or permits required

Agency/Department	Purpose
Utah Division of Water Quality	Utah Pollution Discharge Elimination System (UPDES) Permit, for dewatering the stilling basin.
Utah Division of Water Quality	Storm Water Discharge Permit under Section 402 of the Clean Water Act (CWA), if water is to be discharged as a point source into a natural stream or creek.
State of Utah Department of Natural Resources, Division of Water Rights (DWR)	Stream Alteration Permit under Section 404 of the CWA and Utah statutory criteria of stream alteration described in the Utah Code. This would apply for impacts to Little Bear River or other natural streams or creeks during Project construction.
Utah State Historic Preservation Office (SHPO)	Consultation pursuant to Section 106 of the National Historic Preservation Act (NHPA), 16 USC 470.

United States Fish and Wildlife Service (USFWS)	Consultation pursuant to Section 7 of the Endangered Species Act. (ESA)
United States Army Corps of Engineers (USACE)	A USACE Permit, in compliance with Section 404 of the CWA, may be required if waters of the United States are proposed to be filled or dredged as part of the Project.
Bureau of Reclamation	A supplemental Operation and Maintenance (O&M) Agreement will be necessary in order for permission to be granted for the Association to modify Federal facilities.

2 Alternatives

2.1 Introduction

This chapter describes the features of the No Action and Proposed Action Alternatives and includes a brief description of alternatives considered but eliminated from consideration and those considered through the feasibility study. It presents the alternatives in comparative form.

2.2 Alternatives Considered but Eliminated from Consideration

Other alternatives were evaluated early in the process but were eliminated because they required shutting down the existing spillway, required excessive excavation and disposal, increased risk of dam failure, or overcomplicated the designs to get the desired outcome.

2.3 No Action

The No Action Alternative implies no modifications to the existing spillway and no change in operations of the facility. While this is the least cost alternative, it does not address any of the risks associated with the potential spillway failure modes leading to dam failure and/or uncontrolled release of the reservoir. As verified in the re-estimation of the baseline risk undertaken during the 2020 Risk Analysis, these risks are above Reclamation guidelines.

This alternative is determined to not be feasible for the following reasons:

- Estimated at risks are above Reclamation's Guidelines for increasing justification for reducing risk. Alternative does nothing to reduce the risks associated with potential failure of the spillway leading to dam failure and release of the reservoir.

2.4 Proposed Action (Preferred Alternative)

The Proposed Action is the preferred alternative. Since the No Action Alternative presents potential spillway failure that would lead to dam failure and/or uncontrolled release of the reservoir, the Proposed Action is the preferred alternative moving forward.

The Proposed Action is an updated spillway modification and incorporates these nine components:

1) Crest structure design to reduce the risk of a seismic failure;
2) Chute design to eliminate the potential for spillway failure;
3) Spillway floor slab drain system design to catch seepage;
4) Perimeter walls drainage system to utilize limited space and keep the perimeter drain system separate from the chute drain system;
5) Stilling basin drainage system designed to alleviate uplift pressure under the stilling basin;
6) Stilling basin design to contain hydraulic flows up to 11,500 ft^3/s and to dissipate energy prior to the flow channel exiting into the existing downstream channel;
7) Downstream channel design to contain at least the discharge associated with the normal RWS elevation (~6,000 ft^3/s);
8) Foundation design to provide a stiffer foundation to reduce the risk of potential settlement; and
9) Siphon crossing design to allow existing conveyances to convey water below the spillway.

The following is a description of the alternative that was designed to feasibility level after all alternatives were evaluated. Figure 2 shows construction and project disturbance limits.

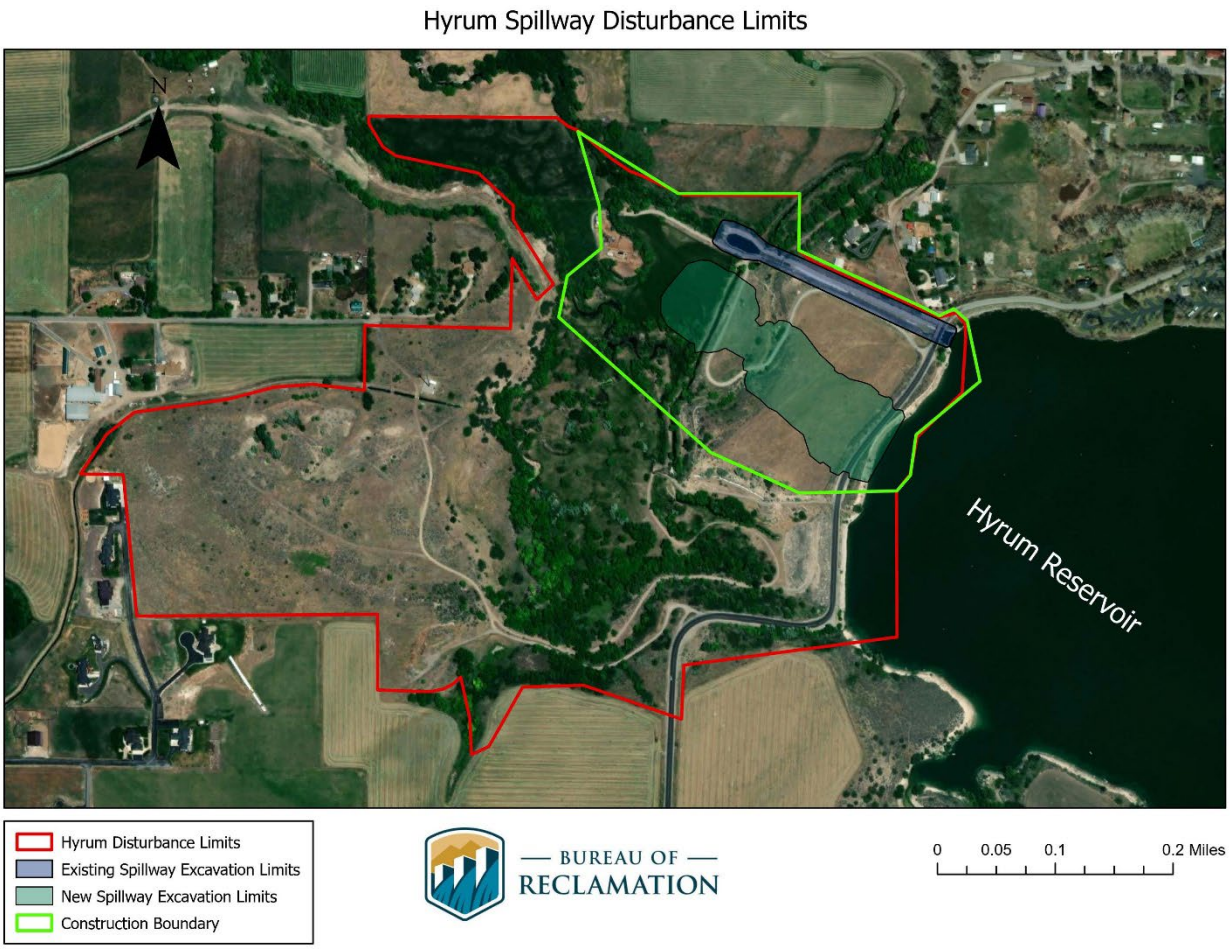

Figure 2 Hyrum Spillway Disturbance Limits

2.4.1 Crest Structure Design

The new spillway crest structure was designed to reduce the risk of a seismic failure of crest structure walls and seismic failure of crest structure piers. The design was evaluated at every panel throughout the entire spillway to ensure acceptable risk reduction of the spillway crest walls and piers. All panels were designed to be able to support spillway operation after a 2,000-year seismic event, which included strength reduction factors and all applicable load factors for adequate design. The crest structure was designed to further retain water after a 50,000-year seismic event, but not required to be in operation; for that reason, the 50,000-year earthquake event did not include strength reduction or load factors.

The existing spillway capacity and reservoir operation combine to make for overtopping of the dam highly unlikely. Spillway design alternative 1 maintains active conservation storage at RWS elevation 4672.5. Three, 15- by 12.5-ft gates were designed with a discharge capacity of approximately 11,500 ft3/s at RWS elevation 4679.0. The spillway crest is ogee-shaped with a crest elevation of 4660.0. Although each gate is a foot narrower than the existing spillway, the ogee crest increases the spillway efficiency thus requiring smaller gates to maintain the same discharge capacity.

The crest structure design includes a new, pre-cast bridge to handle traffic on the county road. This bridge is slightly wider than the existing bridge with two 12-ft-wide lanes. A separate hoist deck bridge will be located slightly downstream of the vehicular bridge. The hoist deck design is a pre-cast concrete and includes a pre-engineered metal shed.

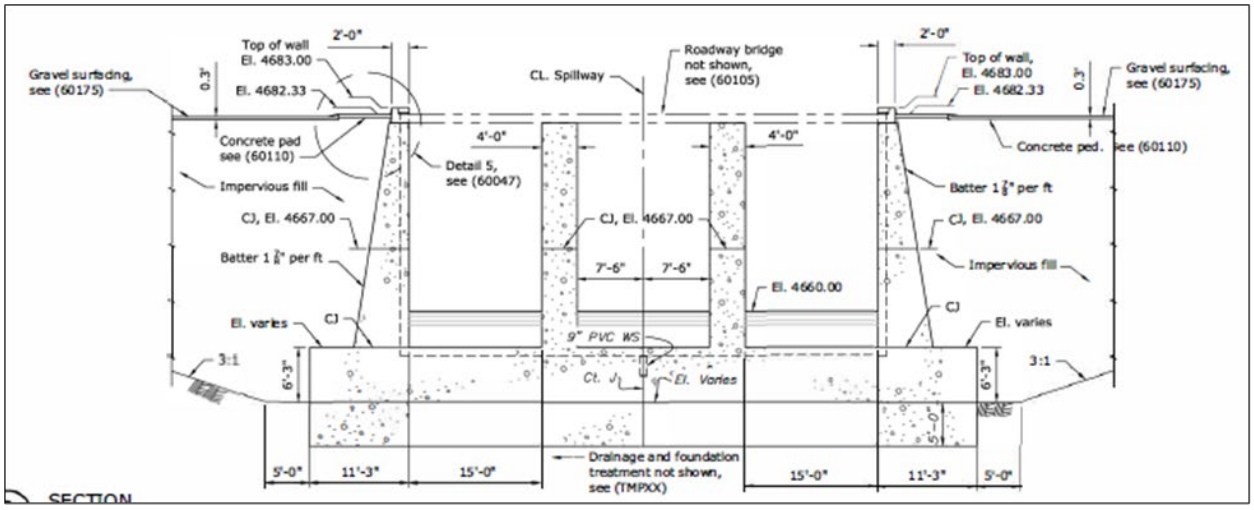

Figure 3 Crest Structure Section View at Ogee Crest

2.4.2 Chute Design

The spillway chute was designed to eliminate the potential for hydraulic jacking of the spillway, structural collapse of the spillway floor, and overtopping of the spillway chute walls. This includes waterstops to prevent water from leaking through the joints; continuous reinforcement and cutoffs throughout the chute slabs to reduce differential settlement; and efficient drain system to reduce uplift pressures should water get below the slabs.

Downstream of the crest structure, the spillway transitions from a 53-foot-wide chute to a 40-foot-wide chute between station 3+73 and 4+63. This gradual transition minimizes wave action and ensures smooth flow. The chute remains 40-ft-wide until station 9+04 where it transitions to 70 ft at station 11+25.

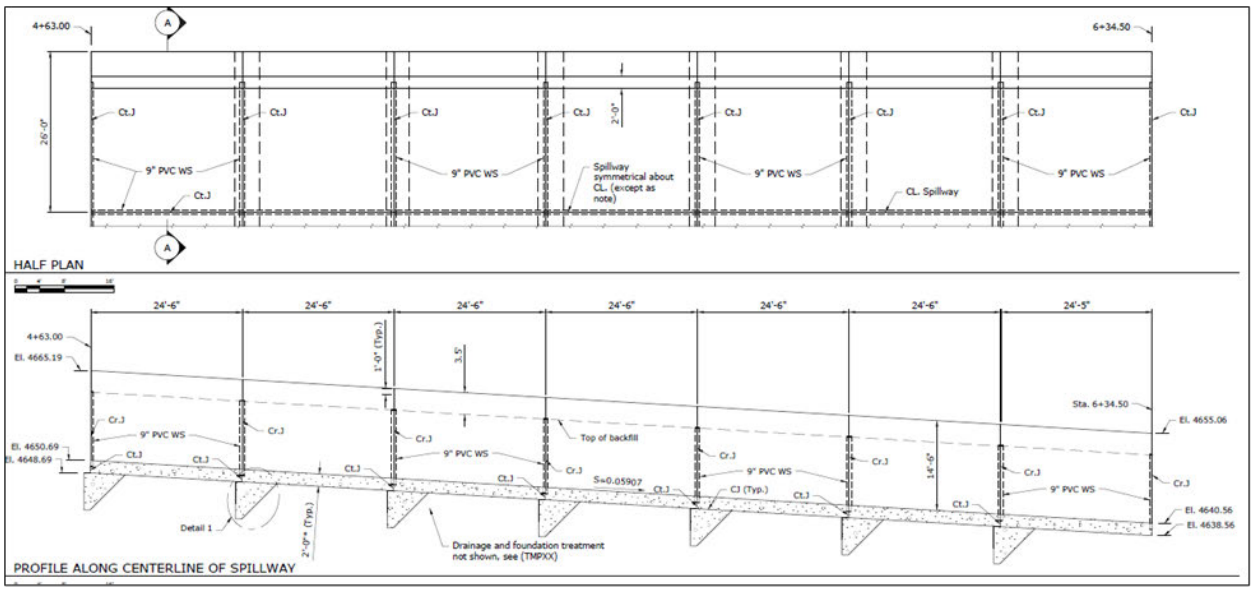

Figure 4 Upper chute Concrete Plan and Profile

2.4.3 Spillway Floor Slab Drain System Design

The drainage system begins just downstream of the ogee crest at approximately station 3+50. This drainage system continues down the full length of the spillway in two parts This includes 10-inch diameter perforated High Density Polyethylene (HDPE) pipes running parallel and transverse below the spillway. The pipes are surrounded by a 1-foot-thick layer of gravel with a 1-foot-thick layer of sand surrounding the gravel as well as in between the pipes and gravel. The chute drainage system consists of two different layouts. The first layout has two parts, one drainage system is placed on top of the Rammed Aggregate Piers (RAPs), upstream of station 6+83.50 and the other is placed on natural ground, downstream of station 6+83.50. The second drain system begin below the spillway eyebrow drains (for layout one) and then discharges out the chute blocks in the stilling basin.

The drainage system layout upstream of 6+83.50 includes a sand layer placed above the RAPs consisting of an approximately 3.5-foot-thick filter encasing drainpipes surrounded by 1-foot of gravel. The drainage material of the upstream system above the RAPs serves as a load transfer platform as well as a filter drain. This design is sufficient to distribute stresses between the RAPs and the spillway slab. The cutoff walls below the sand filter provide a seepage barrier. Given there is no sand layer (load transfer platform) below the 6-foot-thick reinforced triangular concrete cutoff walls, additional reinforcement was added.

The drainage system layout downstream of 6+83.50 each pipe (both longitudinally and transverse) trenched and surrounded by one ft of gravel with a 1-ft layer of sand just below. An 18-inch layer of sand will be placed below the rest of the chute slab where the pipes are not located. These pipes discharge out of two eyebrow drains just downstream of the vertical transition in the spillway floor.

The lower spillway chute drains begin below the upstream spillway eyebrow drains and discharge out the chute blocks in the stilling basin. These drains are submerged with water below the tailwater within the basin. However, these drains are designed to reduce the uplift pressure under the spillway

in the event of a sudden lowering of the water inside the stilling basin due to a sweepout or unwatering for maintenance. Each pipe is trenched and surrounded by one foot of gravel and a surrounding 1-ft layer of sand. An 18-inch layer of sand will be placed below the rest of the chute slab where the pipes are not located.

Both spillway chute slab drain systems include pipes that run under the joints of the spillway parallel to the spillway chute connected by transverse, 10-inch perforated pipes that run just upstream of the cutoffs below the spillway joints. The transverse pipes connect to the parallel pipes throughout the chute drain system; one in the center of the spillway to catch and seepage from operation of the spillway, and one on each end just below the spillway slab to catch any other seepage that may develop. These parallel pipes are connected by transverse pipes directly upstream of the cutoffs.

2.4.4 Perimeter Walls Drainage system

The perimeter drains consist of 8-inch HDPE perforated drains placed behind the walls about 1 foot above the top of the spillway floor slab. The pipes begin just downstream of the crest structure, run parallel behind the spillway walls and discharge into the riprapped basin outside of the stilling basin walls through a weir. The pipes are surrounded on each side by a 10-inch layer of gravel between the pipe and concrete wall, and a 1-ft layer of gravel on the outside of the pipe. A 1-ft surrounding layer of sand filter encases the gravel. Typically, the pipes are surrounded by a 1-ft layer of gravel, but due to the limited space above the heel of the spillway floor (due to cost saving reduction work) and the intention to keep the perimeter drain system separate from the chute drain system, the pipes are placed 10 inches from the concrete wall.

2.4.5 Stilling Basin Drainage System

The drains under the stilling basin will be submerged with water when the stilling basin is full of water but are designed to alleviate the uplift pressure under the stilling basin in the event of a sudden emptying of the basin either due to either sweepout or expedited dewatering for maintenance. The 10-inch perforated drains are placed near or below all joints in the spillway slab and along the perimeter of the stilling basin. Each pipe is trenched and surrounded by 1 ft of gravel with a 1-ft later of sand below the rest of the stilling basin slab.

2.4.6 Stilling Basin Design

The stilling basin was designed to contain the hydraulic jump for flows up to 11,500 ft3/s (100,000-year flood event), thus causing the potential for stilling basin failure due to sweepout or backwards erosion of the stilling basin to be determined to be highly unlikely.

The stilling basin begins at station 11+25 at invert elevation 4552.5 ft and ends at station 12+37.5. The Type II stilling basin length is designed to fully contain they hydraulic jump for flows up to 11,500 ft3/s plus the required freeboard. The stilling basin is also designed with chute blocks upstream and a dentated sill downstream to dissipate as much energy as possible prior to the flow channel exiting into the existing downstream channel.

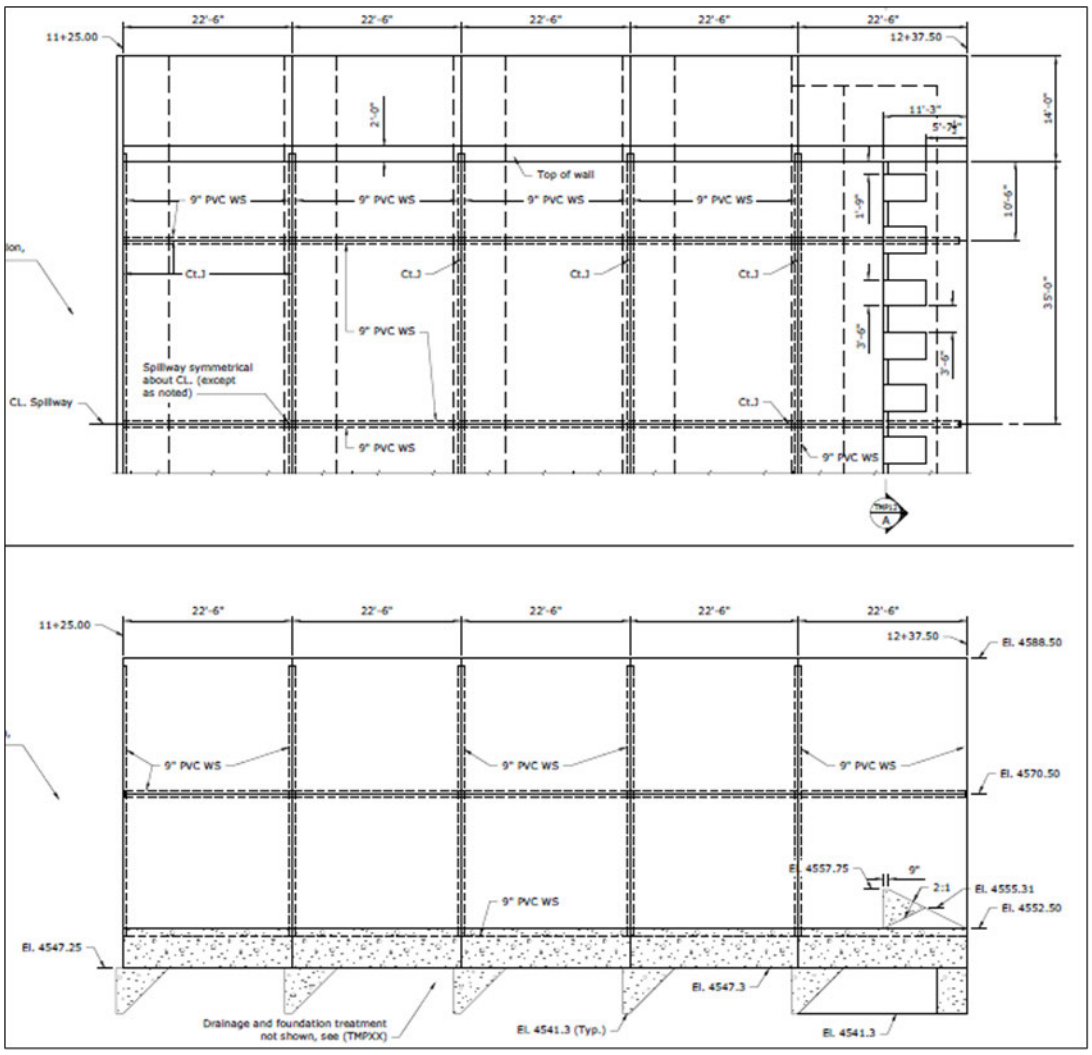

Figure 5 Stilling basin concrete drawings. Note that upstream chute blocks are upstream of station 11+25.00

2.4.7 Downstream Channel Design

The channel downstream of the stilling basin consists of a riprap lined trapezoidal channel that is approximately 437 ft long starting at station 12+93. This channel is currently not designed to contain the maximum flows exiting the spillway due to area constraints and the Little Bear capacity is much smaller than 11,500 ft3/s. Therefore, the channel will be designed to contain at least the discharge associated with the normal RWS elevation (~6,000 ft3/s). Further design refinements including riprap size will be included in final design.

2.4.8 Foundation Design

Feasibility designs for the spillway foundation consist of a RAP ground improvement program, described in TM-86-68313-10. Rammed Aggregate Piers are installed by either pre-drilling an 18-to-36-inch diameter hole or advancing a hollow mandrel with sacrificial end plate to the termination

depth. Crushed stone is then compacted in lifts from the base of the hole to the surface with a beveled tamper or the mandrel to create overlapping bulbs of compacted gravel, shown in Figure 6. The compaction creates stiff piers and densifies granular soil surrounding the pier. The bulb expansion also creates high lateral stresses in the soil in between piers. Piers are for the Hyrum Spillway range in spacing from 5 to 10 ft center-to-center in a triangular pattern at depths of up to 30 feet. RAP's will terminate in the dense gravels underlaying Provo clay. RAP spacings are dependent on the bearing pressure of the spillway and thickness of the Provo Clay. Closer spacings provide a stiffer foundation where the bearing pressures and clay thickness is greater to reduce the potential settlement with more lightly loaded spillway panels over thinner clay deposits.

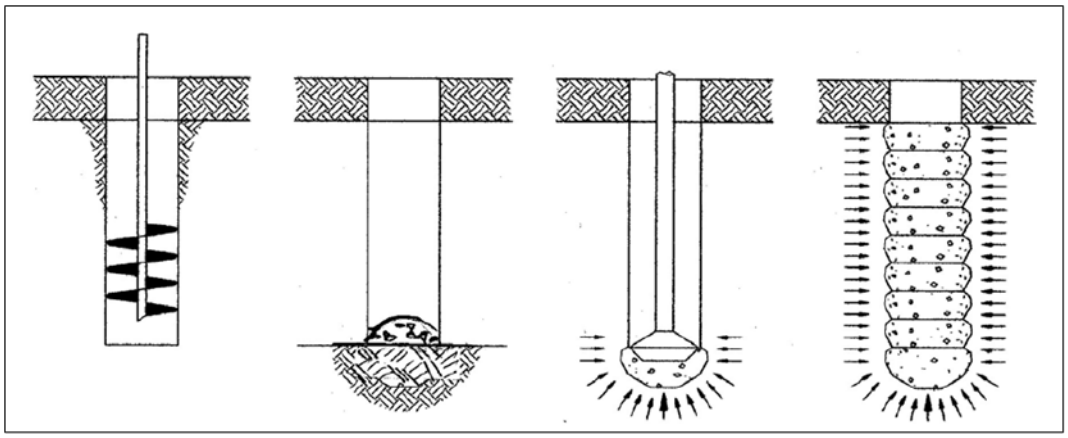

Figure 6 Typical drilled RAP installation

2.4.9 Siphon Crossing Designs

Two existing water conveyances cross the proposed spillway alignment. Water deliveries must be made during each irrigation season. For these spillway crossings, inverted siphons will convey water below the spillway.

2.4.10 East Field Canal

The inverted siphon for the East Field Canal spillway crossing was sized based on the hydraulic properties of the canal and the canal bank elevations upstream of the inlet. The capacity of the inverted siphon and configuration of the inlet transition structure assures a minimum freeboard of 2.6 ft is met for the design flow rate. Downstream of the inverted siphon, an interim canal alignment will be constructed to direct flows to the existing Wellsville Eastfield canal siphon underneath the existing spillway. Once the existing spillway is removed, the final canal alignment will transition to the existing canal at a centerline radius of 500 ft, in accordance with allowable curvature requirements for unlined canals of this capacity.

2.4.11 Hyrum Feeder Ditch

The design of the inverted siphon assumes a non-pressurized ditch capacity of 12 ft3/s. The inverted siphon was sized to assure that the installation will not limit the overall capacity of the Hyrum Feeder Ditch. Specifically, sizing was such that the losses in the new inverted siphon do not

exceed the friction losses in the length of existing PVC pipe to be replaced by more than 1-foot. Manhole structures were utilized at the inlet and outlet of the inverted siphon to provide necessary inlet submergence to prevent blowback, to allow for any venting of air carried by flows upstream of the inverted siphon, and for any air purging downstream of the inverted siphon.

3 Affected Environment and Environmental Consequences

This chapter describes the environment that could be affected by the Proposed Action, including those resources that were considered but eliminated from detailed study. For those resources that were analyzed in detail, the present condition or characteristics of each resource are discussed first, followed by a discussion of the predicted impacts caused by the No Action and the Proposed Action.

3.1 Resources Considered but Eliminated from Detailed Analysis

The following resources were considered but eliminated from further analysis because they did not occur in the Project area or because their effect is so minor (negligible) that it was discounted. Table 3-1 provides the resources and rationale for considering but eliminating from detailed analysis.

Table 3-1 Resources Considered but Eliminated from Detailed Analysis

Resource	Rationale for Considering but Eliminating from Detailed Analysis
Wilderness, and Wild and Scenic Rivers	There are no designated wilderness areas or Wild and Scenic Rivers within the Project area; therefore, there would be no impact to these resources from the Proposed Action.
Floodplains and Flood Control	The creation of Hyrum Reservoir is a flood control measure taken to protect people and property below the reservoir. No changes to the capacity of the dam or minimum flows would occur. In addition, there would be a negligible impact to the floodplains below the dam and spillway.
Visual	The Project would have negligible impacts to visual aesthetics because temporary impacts would be localized and not incompatible with the current aesthetics in the area, with no discernable long-term effects.
Water Quality and Water Rights	There is no anticipated change to water quality as a result of the No Action or Proposed Action.
Environmental Justice	The Proposed Action would have no significant impacts on Environmental Justice.

3.2 Public Health, Safety, Air Quality, and Noise

Public Health and Safety

One of the purposes of this project is to reduce the risk of the loss of human life due to dam failure. The current dilapidated conditions of the spillway are well documented and those conditions will not improve over time. In 2012, a new sunny day population at risk (PAR) estimate was made based on the 2010 census block residential population and 2011 aerial imagery. The total 2012 PAR used for this baseline risk analysis is 296, compared to 310 in 2003, and 362 in 2010. The Risk Estimating Team felt that the current PAR was accurately estimated based on the most up-to-date census and imagery, and therefore, appropriate for use in this risk analysis for both static and seismic potential failure modes. Based on these risks, there is a need to reduce the PAR and increase overall public safety.

Air Quality

Measurements of air quality for the project area or even Hyrum city itself are not available. However, measurements are collected daily in Logan. Table 2 shows the 3-year annual average values for the air quality metrics measured in Logan, Utah.

Table 3-2 Three-year average annual air quality metrics in Logan, Utah 2012-2014

	Ozone	NO2	PM 2.5	PM 10
3-yr average value	0.65	12.54	9.23	20.0
Rating	Moderate	No Rating	Good	No rating

Generally, air quality is good during the spring, summer, fall, and early winter seasons and decreases dramatically during the winter in times of inversion and high pressure. This is generally due to increased amounts of Particulate Matter (PM 2.5).

Noise

Noise in and around the Project area mainly includes roadway traffic, farming equipment in nearby agricultural fields, recreational watercraft on the reservoir, and recreators utilizing day use and campground facilities.

3.2.1 No Action

Taking no corrective action to repair or replace the current spillway would increase the risk of loss of public health and safety. Over time, conditions would continue to degrade, and the risk of dam failure would increase. Under the No Action Alternative, public health and safety would be at risk. In addition, properties, possessions, and domestic livestock below the spillway and dam would also be at a higher risk of damage or loss.

Under the No Action Alternative, there would be no change to air quality or noise as current conditions would remain the same.

3.2.2 Proposed Action

The direct impacts to human health and safety from repairing the existing spillway include a reduction of risk of loss of human life, property, and possessions to a level below Reclamation standard. In other words, this would be a beneficial effect of repairing and replacing the spillway.

The direct impacts to air quality and noise from repairing the existing spillway include increased air and noise pollution during construction. It would take approximately three years to construct the Proposed Alternative. This would likely contribute to the overall air pollution in the valley by increasing particulate matter, despite this increase the overall effects would be minor.

3.3 Waters of the U.S.

Waters of the U.S. (WOTUS) provide important and beneficial environmental functions. Wetlands and surface waters aid the environment by protecting and improving water quality, providing fish and wildlife habitat, and storing floodwaters. Through section 404 of the Clean Water Act of 1972, as amended, the U.S. Army Corps of Engineers (USACE) is the permitting authority for the discharge of dredged or fill material into all Waters of the U.S.

According to the National Wetlands Inventory (NWI), Hyrum Reservoir is classified as a lacustrine system and is considered a WOTUS as defined in 40 CFR 230.3.

3.3.1 No Action

Under the No Action Alternative, the Project would not be built, and therefore there would be no negative effect on wetlands or other WOTUS. However, if the spillway failed, Waters of the U.S. would be negatively impacted.

3.3.2 Proposed Action

Construction of the Proposed Action would include the discharge of fill material into wetlands and would require a Section 404 permit from the USACE. Reclamation completed a wetland delineation in the project area in accordance with USACE 1987 Wetland Delineation Manual (USACE 1987) and the Regional Supplement: Arid West Region Version 2.0 (USACE 2008). Wetlands are designated in pink in Figure 7. Avoidance, minimization, and mitigation measures would be applied to the Proposed Action as necessary; therefore, the Proposed Action would not cause a significant impact to WOTUS.

Figure 7 Wetlands in Proposed Action area

3.4 Transportation and Roads

The paved road that runs along the top of the dam and perpendicular to the spillway is 300 South, in Hyrum, Utah. This road is maintained, throughout the year, by Cache County. The number of vehicles that traverse the road daily, seasonally, or annually is currently unknown. However, it is used to access homes and farms south and southwest of the reservoir, as well as point access to the reservoir itself. It is also used as a route to access Highway 89 at the southern end of the valley. Overall, the traffic in the area is very light.

Additionally, there is a gravel road that is gated and starts south of the current location of the apron/gates of the existing spillway. It largely parallels the existing spillway before winding down off the slope and back around to the edge of the stilling basin (See figure 2). It provides access to leased farmland below the dam and spillway.

3.4.1 No Action
Under the No Action Alternative, there would be no change to roads or transportation as current conditions would remain the same.

3.4.2 Proposed Action
Under the Proposed Action Alternative, impacts include closing down 300 South during the demolition and reconstruction phases, temporary increases in traffic of workers, concrete trucks and heavy equipment use in the area, and overall disruption of use for those who use the road frequently. These impacts would be temporary and minimal and standard industry practices such as traffic control and coordination with local emergency responders would be implemented.

3.5 Soils and Farmlands

Prime and unique farmlands are identified by the location and extent of the soils that are best suited to food, feed, fiber, forage, and oilseed crops. The southern end of the Cache valley is composed largely of loamy textured soils. These soils provide the basis for the large proportion of prime farmland found therein, if it is irrigated. Most of the remaining land is farmland of statewide importance.

In order to determine the number of acres of prime farmland that could be affected on the Hyrum project, a disturbance limits polygon was drawn in the Natural Resources Conservation Service's (NRCS) Web Soil Survey Application, (http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx) around the construction boundary of the project. Within the project disturbance limits, 6.3 acres were considered prime farmland if irrigated. The majority of the remaining acreage was considered farmland of statewide or local importance.

There is ongoing erosion occurring with the reservoir basin between the current spillway and the right abutment of the dam. It is a result of many years of wave action along the shore. It is currently affecting the road over the spillway and dam. Jersey barriers have been moved back to ensure the safety of approaching vehicles. This road is considered a Reclamation road and can be closed at the discretion of the Bureau.

3.5.1 No Action
Under the No Action Alternative, there would be no effect to prime farmlands or farmlands of statewide importance. All conditions would remain the same.

Those conditions include the disturbance and present location of the spillway and stilling basin. Also, there is an existing canal, road, and steep slope that could not be farmed. Although there would be no change to the current condition, the disturbance of this area has already occurred.

3.5.2 Proposed Action
Under the Proposed Action Alternative, there would be approximately 6.1 acres of disturbance of mapped prime farmland. However, as described above, it would not change it from the current state. The chute and stilling basin would be constructed in the existing location and the canal, road, and steep slope would remain the same.

There may be some moving of earth in areas already disturbed, but they would be restored to their current condition. There would be almost no difference in the effects to prime farmland and soils under this alternative as compared to the No Action Alternative. Minor effects may occur if the reservoir basin continues to erode.

3.6 Socioeconomics

In 2020, Hyrum City's population was 9,362 people, showing a 18.3 percent increase from the 2010 Census. Hyrum and its surrounding areas are included in the Logan Metropolitan Statistical Area, which comprises over 150,000 people. The median annual income per household in Hyrum was $73,971.

3.6.1 No Action

Under the No Action Alternative, there would not be any changes to the local economy.

3.6.2 Proposed Action

The Proposed Action would require significant amounts of man-power and materials during construction. This would inject money into the local economy as some of this would be sourced from local entities.

3.7 Recreation

Yearly visitation at Hyrum Reservoir during fiscal year 2022 was 127,955 persons (Reclamation Use Data Reports). Monthly data generated by Utah State Parks suggests June to be the busiest month.

The four primary reasons guests visit Hyrum Reservoir are, in order of visitor preference: l) boating, 2) day-use areas, 3) camping, and 4) fishing (Reclamation Use Data Reports). The predominant visitor origination comes from the local areas of Cache valley with some use coming from the Wasatch front.

There are no special recreational uses in the primary jurisdiction zone. In order to be able to operate and protect these facilities, Reclamation and the South Cache Water Users control this area by restricting public uses for security reasons. All public use in the primary jurisdiction zone is prohibited.

3.7.1 No Action

Under the No Action Alternative, there would be no effect on recreation at Hyrum Reservoir.

3.7.2 Proposed Action

The reservoir will continue to impound water for the duration of construction. Additionally, construction within the reservoir will occur during the low water season and a cofferdam should be constructed when the water surface elevation is near the low point for the year. Road closures during construction may cause impacts to recreators, though these impacts would be temporary and minimal. Therefore, the Proposed Action Alternative would have minimal impacts to recreation at Hyrum Reservoir and State Park.

3.8 Visual Resources

Hyrum State Park is in the northeastern part of Utah. It lies at 4,700 ft and consists of 265 acres surrounding a 450-acre reservoir. The park is used for fishing, boating, camping, picnicking, hiking, waterskiing, and swimming. Hyrum State Park's facilities are located at the northern shore of the reservoir, and include 31 RV campsites, restrooms, showers, a ranger station, boat ramp, dock, and trailheads.

The dam creating Hyrum Reservoir was completed in April 1935, by the United States Bureau of Reclamation. Prior to that, local settlers had dug a 9-mile canal from the Little Bear River to the town of Hyrum to irrigate their crops. The current visual setting of the construction site is urban/rural with sagebrush roadsides and grassy meadow.

3.8.1 No Action

The No Action Alternative would have no effect on visual resources.

3.8.2 Proposed Action

The Proposed Action would require some vegetation removal on the downstream side of the dam but would be reseeded after construction. Visual impacts would be limited to the viewshed at the construction site and would be short-term and minimal.

3.9 Water Resources and Hydrology

Hyrum Dam and Reservoir are the water storage features of the Hyrum Project, located on the Little Bear River, approximately 9 miles southwest of Logan, Utah. The dam was constructed in 1935 and provides storage for irrigation use. Hyrum Dam controls a drainage area of approximately 212 miles.

The average annual unregulated runoff volume (1981 to 2010) from the drainage basin is approximately 77,000 AF, with 47,000 AF (61 percent) occurring during the spring runoff period of April 1 to July 31. Year to year observed inflow into Hyrum Reservoir is extremely variable. For the time period WY 1981 to WY 2014, the minimum April to July volume was 12 KAF (WY 2003) compared with a maximum of 106 KAF (WY 2011). The median April to July volume during this time period was 50 KAF in WY 1996.

Stream flows in the Little Bear River are monitored approximately 2 miles upstream of Hyrum Reservoir by U.S. Geological Survey (USGS) gage 10105900, Little Bear River at Paradise, UT. Daily discharge data for this site is available from October 1, 1992 to present. As shown in Figure 4, mean daily observed flows typically begin to increase in early March and peak in late April to early May. After May, river flows rapidly decline down to base flows by early July. Outside of this runoff period, base flows are typically below 50 cubic ft per second (cfs). For the period of WY 1993 to WY 2014, the median peak daily streamflow observed at this gage is 561 cfs. The maximum peak streamflow of 4800 cfs occurred in 2005 and the minimum of 173 cfs occurred in 2000.

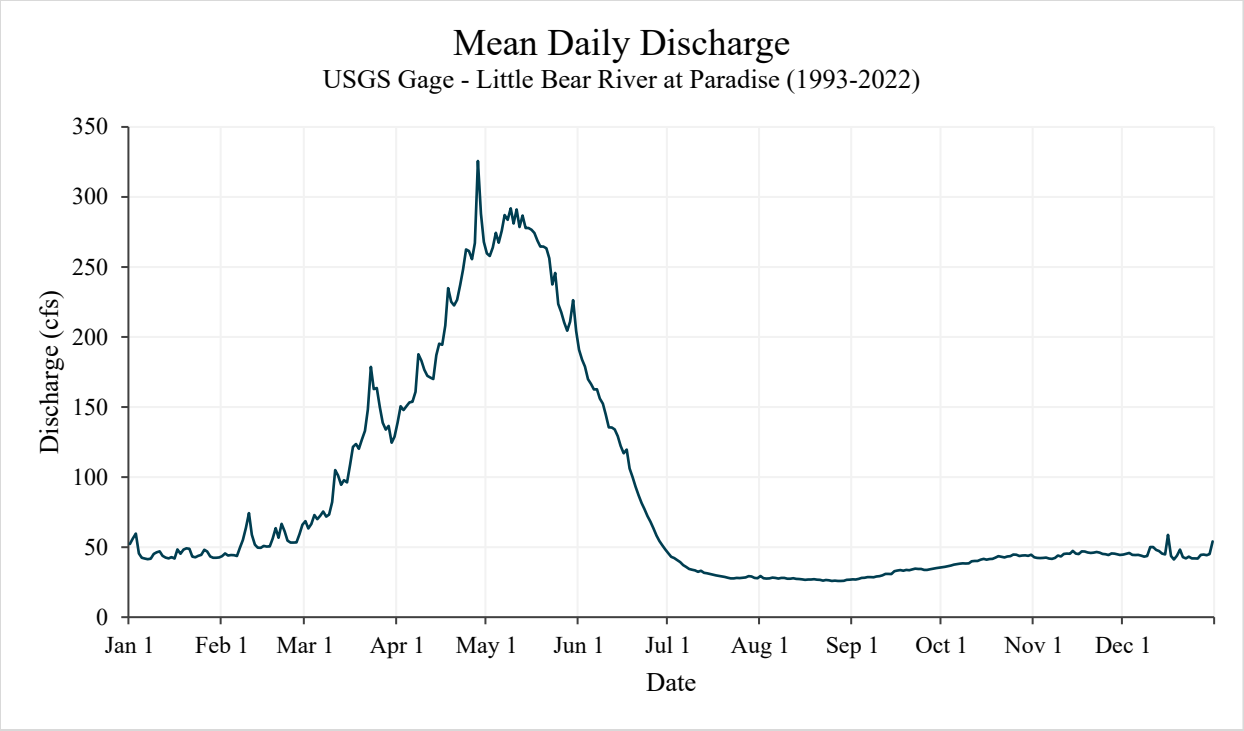

Figure 8 Mean daily discharges at the Little Bear River at Paradise from 1993 to 2022

3.9.1 No Action

Initially, under the No Action Alternative, there would be no impact on water resources and hydrology. However, not taking action to mitigate the risks at the facility could eventually lead to disrupted or restricted operations, or in a worst case scenario dam failure. In either case, water resources for the area would be significantly impacted.

3.9.1.1 Proposed Action

Long term, the Proposed Action would help to mitigate the current risks at Hyrum Dam and Spillway, likely resulting in a safer facility and ensuring future water supplies.

3.10 Operations

The total capacity of Hyrum Reservoir is 17,746 AF. This capacity represents the total storage volume between the streambed at the dam axis (elevation 4,602 ft) and the top of the spillway gates (elevation 4,672.5 ft). To maintain an operating head through the outlet works (sill elevation 4,629.6 ft), the water surface of the reservoir must be maintained above elevation 4,633.5 ft, leaving an active capacity of 13,881 AF. The inactive pool is 853 AF and the dead storage is 3,012 AF.

At elevation 4,672.5 ft, the spillway is designed to discharge 6,000 cfs. At elevation 4,666 ft, the outlet works will discharge 300 cfs. The combined total of these discharges were provided to protect

the structure against the inflow design flood. Studies have shown those capacities to be too small for flood protection. There are no minimum releases set forth for fish and wildlife purposes. Discharge capacity of the bypass pipe is approximately 80 cfs (CAAS Report 2016).

Water for the irrigation system is diverted from the outlet works of the dam. Four canals – the Hyrum Feeder Canal, the Wellsville-Mendon Canal, the Wellsville Canal, and the East Field Canal – divert from this point. The Hyrum Feeder Canal extends north for about one mile and discharges into a lateral of the Hyrum Irrigation Company. The 14-mile Wellsville-Mendon Canal crosses the river valley in an inverted siphon and delivers water to lands on the west side of the valley. The 5.4-mile Wellsville Canal receives water from a pumping plant, and supplies lands on the west side of the valley, which lie about 70 ft above those watered by the Wellsville-Mendon Canal. Water is made available to lands upstream of the reservoir by exchange.

The operations of Hyrum Reservoir vary from year to year and are dependent on a number of factors. In general, the reservoir is allowed to fill through the fall and winter until pool elevation reaches the spillway crest (4,660 ft; 12,316 AF). This is 12.5 ft below the top of the spillway gates (4,672.5 ft; 17,746 AF), and leaves 5,430 AF of space for flood control. Additional winter runoff is then discharged through the spillway via the center radial gate, which is opened sufficiently (two to three ft) to allow discharge of typical low winter inflows. During this period, reservoir levels are typically maintained at 4,661 to 4,662 ft, due to surcharge on the spillway, and gate adjustments are only made in the case of a flood event.

In early spring (usually March), the mountain snowpack and projected runoff volumes are reviewed, and based on the type of winter the area is having, a decision as to when the center radial gate will be closed is made. Based on an average snowpack, the center radial gate is closed around mid-March (later in higher snowpack years) to capture spring runoff and allow the reservoir to fill eight ft. The reservoir is allowed to fill freely to within a few feet (e.g. four ft) of the top of the spillway gates, though a lower elevation may be targeted during high snowpack years. The three spillway gates were not designed to support the flow of water over their tops. Once the targeted elevation is achieved, the center radial gate is opened and adjusted regularly in an effort to fill and achieve maximum reservoir storage (4672.5 ft) just prior to initial irrigation releases, without overtopping the gates. Observed reservoir elevation data for the period WY 2015 – WY 2023 is shown in Figure 8.

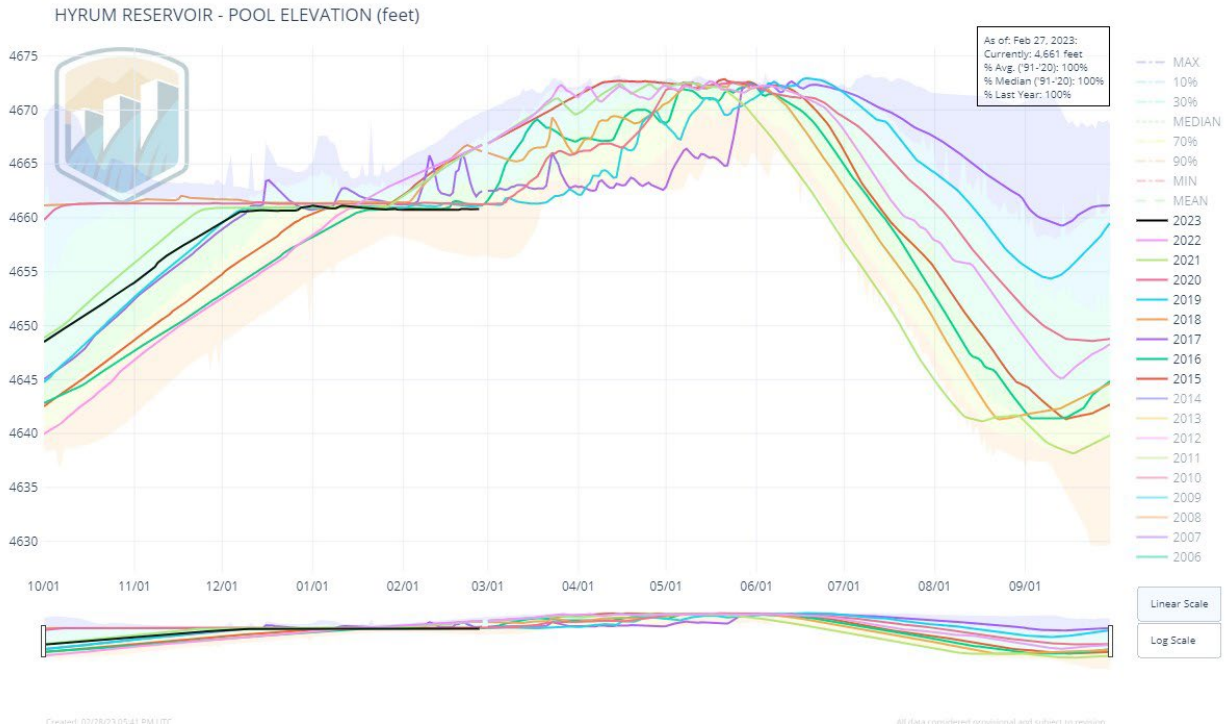

Figure 9 Pool elevation of Hyrum Reservoir throughout the calendar year

Recently, improvements to the 24-inch bypass pipe, including the installation of a 24-inch butterfly valve and flowmeter, have provided the capability to bypass winter time and early spring flows through the outlet works. Theoretically, this would eliminate the need to use the spillway to discharge these lower flows. Operational experience and data involving the use of the bypass for this purpose is limited to this point.

The timing and magnitude of Hyrum Reservoir storage targets vary from year to year. Factors that impact reservoir operations include the following:

- Observed snowpack within and adjacent to the Little Bear River Basin, with particular attention given to the Monte Cristo Snotel site (MCRU1).
- Anticipated timing of initial irrigation releases.
- Timing and magnitude of spill from Porcupine Reservoir located upstream.
- Current and forecasted streamflows and seasonal (April-July) runoff volumes in the Little Bear River (upstream) at Paradise, Utah (PRZU1).

A key operational goal for Hyrum Reservoir, is to ensure that maximum storage is achieved immediately prior to the start of the irrigation season. While the first day of irrigation releases typically occurs in mid-May, the date varies depending on several factors, including:

- Cache Valley weather and hydrologic conditions
- Soil moisture
- Snowmelt

- Temperature and precipitation
- The Association maintenance schedules for distribution canals
- Water rights timing

During spring runoff, Reclamation and the Association communicate regularly to ensure that Hyrum Reservoir is full in advance of irrigation releases. Hyrum Reservoir generally fills every year.

3.10.1 No Action

Initially, under the No Action Alternative, there would be no impact on operations. However, not taking action to mitigate the risks at the facility could eventually lead to disrupted or restricted operations or, in a worst case scenario, dam failure. In either case, water resources for the area would be significantly impacted.

3.10.2 Proposed Action

Construction of the Proposed Action is estimated to extend over the period of approximately three years. The reservoir will remain in use impounding water for the duration of construction. Water will be available for irrigation during the irrigation season each year between April 1st and September 30th. If the canals that supply irrigation water are out of commission due to construction, the contractor will be required to find and deliver water to the canals to continue irrigation operations. Following construction, there are no anticipated impacts to Hyrum Dam operations. Mitigating the current risks at the facility is expected to have a positive effect on long-term operations and reliability.

3.11 Vegetation

Vegetation within the uplands of the project area includes agricultural crops, bunch grasses, and thistles. Vegetation in the riparian zones of the river and irrigation canals consists of cottonwoods, willows, and rose. Soils have been substantially disturbed through historical agricultural use.

3.11.1 No Action

Under the No Action Alternative, no improvements or changes would be made to the spillway and there would be no impacts to vegetation.

3.11.2 Proposed Action

While construction would require grading and removal of some vegetation in the project area, all construction activities would occur in areas that have been previously disturbed by the development of existing facilities, farming practices, and roadways. Under the Proposed Action Alternative, areas impacted by vegetation removal that are outside of agricultural areas would be reseeded with native plant species.

3.12 Fish, Wildlife, and Migratory Birds

Fish
The fish species present in Hyrum Reservoir include fathead minnow (*Pimephales promelas*), redside shiner (*Richardsonius balteatus*), Utah sucker (*Catostomus ardens*), brown trout (*Salmo trutta*), rainbow trout (*Orncorhynchus mykiss*), splake (female *Salvenlinus namaycush* x male *Salvelinus fontinalis*), bluegill (*Lepomis macrochirus*), largemouth bass (*Micropterus salmoides*), and yellow perch (*Perca flavescens*). Vegetated shorelines are comprised of cottonwood (Populus spp.), willow (Salix spp.), and box elder (Acer negundo) that provide some cover to various life stages of fish during periods of higher water levels.

Wildlife
The most common terrestrial wildlife species in and around the study area include: deer mouse (*Peromyscus sp.*), yellow-bellied marmot (*Marmota flaviventris*), striped skunk (*Mephitis sp.*), mule deer (*Odocoileus hemionus*) and moose (*Alces alces).* In addition, coyotes (*Canis latrans*) and red fox (*Vulpes vulpes*) have been noted in the area. The project area, and more specifically the reservoir, likely support the insect population that serves as a prey base for multiple bat species. There are also reptiles and amphibians in the area, including: gopher snake (*Pituophis melanoleucus*), garter snake (*Thamnophis spp.*), striped chorus frog (*Pseudacris triseriata*) and other common amphibians.

Migratory Birds
The protection of migratory birds is regulated by the Migratory Bird Treaty Act (MBTA). Any activity, intentional or unintentional, resulting in take of migratory birds, including eagles, is prohibited unless otherwise permitted by the USFWS. Eagles are also protected under the Bald and Golden Eagles Protection Act (BGEPA), and will be discussed in Section 3.13 of this EA.

According to one birding website, ebird.org (accessed 3 March 2022), well over 100 migratory bird species have been sighted in the vicinity of the Project area and Hyrum Reservoir over the last several years. Data from the site shows some of the most common species being shorebirds, waterfowl, waterbirds, song birds, and swallows. During site visits that took place over the summer and fall of 2022, several species were documented in or around the Project area including, Western tanager (*Piranga ludoviciana*), Lazuli bunting (*Passerina amoena*), Clark's grebe (*Aechmophorus clarkii*), osprey (*Pandion haliaetus*), ring-billed gull (*Larus delawarensis*), black-billed magpie (*Pica hudsonia*), and Swainson's hawk (*Buteo swainsoni*).

3.12.1 No Action
Under the No Action Alternative, there would be no change to reservoir operations or conditions, and fish, wildlife, and migratory birds would remain unaffected.

3.12.2 Proposed Action
Under the Proposed Action Alternative, there would be minor impacts to fish and wildlife such as displacement during the mobilization, construction, and restoration phases of the project. Impacts to migratory birds would be minimized by implementing the environmental commitments shown in Section 4.7.3. The overall impacts to fish, wildlife, and migratory birds would be minor and relatively short-lived.

3.13 Threatened, Endangered, and Sensitive Species

During the environmental review process for the Project area, several sources were reviewed to determine the impact on threatened, endangered, and sensitive species. In reviewing the U.S. Fish and Wildlife Service's (USFWS) Information for Planning and Consultation (IPaC) website, it was determined there was potential for two species to occur in the Project area that are protected by the Endangered Species Act (ESA) of 1973; yellow-billed cuckoo (*Coccyzus americans*) and Ute ladies'-tresses (*Spiranthes diluvialis*). An official IPaC species list was acquired on 25 July, 2022. The species database from the Utah Natural Heritage Program was also consulted to determine what sensitive species had potential to occur in the area (Table 3-3).

Table 3-3 Threatened, Endangered, and Sensitive Species

Species	Last Observed	Status*	Habitat Requirements	Potential to Occur in Project Area
Yellow-billed Cuckoo *Coccyzus americanus*	2016, approximately eight miles outside of project area (ebird.org sighting)	T	Found in mixed native and non- native riparian woodlands. Patches vary in size and shape but must be ≥12-acres and 100m wide or more in at least one location. Quality habitat is structurally diverse with a multi- layered overstory and dense understory.	Low
Ute Ladies'-tresses *Spiranthes diluvialis*	-	T	Primarily found in moist meadows associated with perennial streams, floodplains, lakeshores, and river terraces between 4,300-ft and 7,000-ft. Also found in human modified wetland habitats such as berms, levees, irrigated meadows, canals, barrow pits, and reservoirs.	Low
Bald Eagle *Haliaeetus leucociphalus*	2022 (Reclamation biologist surveys)	SGCN	Nests are typically placed in cottonwood or conifer forests near open water. Large winter concentrations of Bald Eagles occur along the shores of the Great Salt Lake, in associated roost sites of the Wasatch Mountains, in the desert valleys of northcentral Utah, and along the major rivers in eastern and southern Utah.	High

			Foraging preferences in Utah are unknown, although in general eagles primarily feed on fish and waterfowl and will also scavenge dead fish and mammals, including rabbits and deer.	
Burrowing Owl *Athene cunicularia*	1992	SGCN	Burrowing owls live in open, treeless areas with low, sparse vegetation. Can be found in grasslands, deserts, and steppe environments. Often associated with high densities of burrowing mammals such as prairie dogs, ground squirrels, and tortoises.	Low
Columbian Sharp-tailed Grouse *Tympanuchus phasianellus columbianus*	2003	SGCN	Sharp-tailed grouse find shelter in areas of dense shrubs. Occasionally nest in crop stubble but normally will nest in shrubby areas with vegetation at least one foot high. Grasslands are important for foraging birds, especially in summer. Croplands, woodland habitats, and shrubby streamside areas are more likely to be used in winter (Connelly et al. 1998).	Low
Pilose Crayfish *Pacifastacus gambelii*	1982	SGCN	Only crayfish native to Utah. Found in lentic and lotic habitats. Believed to be intolerable of warmer waters or of warmer water fish populations (Johnson 1986).	Low
Whooping Crane *Grus americana*	1981	EXPN	Whooping cranes breed, migrate, winter, and forage in a variety of wetland and other habitats, including coastal marshes and estuaries, inland marshes, lakes, ponds, wet meadows and rivers, and agricultural fields.	Low

*T=Threatened (Federal listing), EXPN=Experimental Population, Non-Essential (Federal listing), SGCN=Species of Greatest Conservation Need (State)

Reclamation reviewed potential species and habitats in the project area, it was determined that burrowing owl, pilose crayfish, and whooping crane do not have suitable habitat within the project area or are not likely to occur in or near the project area.

Ute ladies'-tresses (ULT)

The only potentially suitable habitat exists below the dam near the stilling basin at the bottom of the spillway chute. The plant species observed in and around the historical canal were a mix of riparian and upland species. Most were not riparian obligate species found only around riparian or wetland areas. For example, the dominant shrub along the canal bank was wild rose, which can be found in upland areas and along disturbed areas in the mountain shrub communities throughout Utah. Immediately adjacent to those shrubs was sagebrush and other grass species including cheatgrass. Orchard grass and reed canary grass were the two most common riparian grass species found at the site. The densities of those grasses would make it difficult for ULT to compete for light and resources (Fertig et al. 2005). The area contains many native and non-native plants that make the potential habitat for ULT marginal at best.

Yellow-billed cuckoo

Within the project area footprint, there are only a few trees and very little riparian vegetation. The vegetation at the site is not multi-layered and would not qualify as suitable habitat for yellow-billed cuckoo. There is not suitable habitat for this species within the project area, however, after consulting with USFWS, it was determined that the Project's Action area would include a two-mile buffer due to potential noise impacts. Habitat surveys were conducted in 2022 and it was determined that the Action area does have potentially suitable nesting and stopover habitat for the yellow-billed cuckoo.

Bald Eagle

Using guidelines from USFWS bald eagle nest survey protocol (USFWS 2020), bald eagle nest surveys were completed in 2022 where one active nest was found outside of the Project area but within the Action area for the project (two-mile buffer). According to Utah Division of Wildlife Resources (UDWR), there is a known winter roost site at the inlet end of the reservoir. Previous winter eagle counts have shown 5-8 eagles in the area.

Columbian Sharp-tailed Grouse

The UNHP shows the southwest side of Hyrum Reservoir to be part of Columbian sharp-tailed grouse habitat, though UNHP's last known observation recorded within two miles of the project area was in 2003. The southern end of the Project's disturbance area is included in UNHP's habitat for the sharp-tailed grouse, but the construction area is not considered habitat. There have been more recent sightings reported on the ebird.org website by birders in the area. These sightings were not within the Project area.

3.13.1 No Action

Under the No Action Alternative, the Project would not be built and therefore, threatened, endangered, and sensitive species would not be impacts.

3.13.2 Proposed Action

There are no known occurrences of ULTs in the Project area and data from the UNHP did not show any occurrences within two miles. Three consecutive years of species surveys were completed (per USFWS protocol) in the Project area and no ULTs were found. Therefore, Reclamation has made a "no effect" determination for Ute ladies'-tresses.

There is no suitable yellow-billed cuckoo habitat in the Project area, however it was determined that construction noise has the potential to impact the species in suitable habitat within the Action area. To determine whether construction activities could cause nest disturbance to yellow-billed cuckoo, Reclamation conducted a noise test to determine how quickly projected construction noise attenuated beyond the Project area. Full results of the noise test are in Appendix A and after consulting with USFWS on results, Reclamation has made a "no effect" determination for the yellow-billed cuckoo.

Reclamation discussed the Proposed Action alternative and its potential impacts to the bald eagle winter roost site with UDWR. Due to distance from the Project area, construction noise is not expected to impact eagles at the winter roost site (A. Brewerton, personal communication, Aug 8, 2022). Guidance from USFWS regarding incidental take permits state that if project activity is more than half a mile away for loud activities, a permit may not be recommended. In BGEPA, take is defined as "pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest, or disturb". To determine whether construction activities could cause take to eagles known to nest in the Action area, Reclamation conducted a noise test to determine how quickly project construction noise would attenuate outside of the Project area. Results of the noise test are in Appendix A. The area surrounding the nest is active farm fields and roadways which suggests the pair is already tolerant of human disturbance. Additionally, after discussing the noise test results with USFWS, Reclamation determined that the Proposed Action alternative would not cause nest abandonment or take for the bald eagle.

The Proposed Action alternative may cause minimal impacts to Columbian sharp-tailed grouse. Although there is no habitat within the Proposed construction boundary, there is minimal habitat within the Project's disturbance limits. Disturbance in the habitat area would include equipment moving through the area on established roads. No vegetation removal or grading would occur in these areas and any impacts to Columbian sharp-tailed grouse would be negligible.

3.14 Cultural Resources

Cultural resources are defined as physical or other expressions of human activity or occupation. Such resources include culturally significant landscapes, prehistoric and historic archaeological sites as well as isolated artifacts or features, traditional cultural properties, Native American and other sacred places, and artifacts and documents of cultural and historic significance.

Section 106 of the National Historic Preservation Act (NHPA) of 1966, mandates that Reclamation take into account the potential effects of a proposed Federal undertaking on historic properties. Historic properties are defined as any prehistoric or historic district, site, building, structure, or object included in, or eligible for, inclusion in the National Register of Historic Places (NRHP). Potential effects of the described alternatives on historic properties are the primary focus of this analysis.

The affected environment for cultural resources is identified as the area of potential effects (APE), in compliance with the regulations to Section 106 of the NHPA (36 CFR 800.16). The APE is defined as the geographic area within which Federal actions may directly or indirectly cause alterations in the character or use of historic properties. The APE for this proposed action includes

the maximum limit of disturbance that could be physically affected by any of the proposed project alternatives (see Figure 2).

A Class I literature review and a Class III cultural resource inventory were completed for the APE, defined in the action alternative and analyzed for the proposed action, by Certus Environmental Solutions, LLC (Certus) in June 2015. Additional surveys for cultural resources were conducted by Reclamation personnel as the project progressed. These were filed under categorical exclusions PRO-CE-16-031, PRO-CE-16-092, and PRO-CE-17-002 with corresponding Utah SHPO numbers: U16BE0156, U16BE0650, and U16BE1042 respectively. Four cultural resources were identified during the cultural inventories: a cement slab, site no. 42CA51; Wellsville-Mendon Lower Canal, site no. 42CA174; Wellsville-Mendon Upper Canal, site no. 42CA184; Hyrum Feeder Canal, site no. 42CA199; Hyrum Spillway, site no. 42CA200; Wellsville-East Field Canal, site no. 42CA198; and an Agriculture Complex, two historic structures located at approximately 450 S. 1800 W.

In accordance with 36 CFR 800.4, these sites were evaluated for significance in terms of NRHP eligibility. The significance criteria applied to evaluate cultural resources are defined in 36 CFR 60.4 as follows:

The quality of significance in American history, architecture, archeology, engineering, and culture is present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association and

1. that are associated with events that have made a significant contribution to the broad patterns of our history; or
2. that are associated with the lives of persons significant in our past; or
3. that embody the distinctive characteristics of a t1pe, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or
4. that have yielded, or may be likely to yield, information important in prehistory or history.

Based upon these considerations, Certus recommended, with Reclamation's agreement, that the Wellsville-East Field Canal and the Hyrum Spillway are historic resources eligible for inclusion on the NRHP, while the other cultural resources are not considered eligible. The Utah State Historic Preservation Office (SHPO) concurred with these findings on July 30, 2015. Additional survey was completed by Reclamation in 2016, as part of U16BE1042 for an expansion of the APE, that determined Wellsville-Mendon Upper Canal and Wellsville-Mendon Lower Canal as eligible for inclusion on the NRHP. SHPO concurred with the findings on March 30, 2017. As eligible resources, any changes made to these structures that are not in keeping with their historic integrity would result in an adverse effect to these historic resources.

3.14.1 No Action

Under the No Action Alternative, there would be no adverse effects to cultural resources. There would be no need for ground disturbance associated with construction activities and existing conditions would continue.

3.14.2 Proposed Action

As stated in Section 3.14, during the Class III cultural resource inventory, the Hyrum Spillway, the Wellsville-East Field Canal, Wellsville-Mendon Lower Canal, and Wellsville-Mendon Upper Canal were found to be eligible for the NRHP. The proposed action would cause an alteration to the characteristics of the Hyrum Spillway and the Wellsville-Mendon Lower Canal which make it eligible for the NRHP and will, therefore, have an effect on the property according to 36 CFR 800.16(i).

Pursuant to 36 CFR 800.5, the criteria of adverse effect were applied to the Hyrum Spillway and the Wellsville-Mendon Lower Canal. An adverse effect is defined as, an effect that could diminish the integrity of a historic property's location, design, setting, materials, workmanship, feeling, or association. The proposed action will diminish the integrity of the Hyrum Spillway and will have an adverse effect to the historic property.

In compliance with 36 CFR 800.4(dX2) and36 CFR 800.11(e), a copy of the cultural resource inventory report and a determination of historic properties affected, was submitted to the SHPO, the Advisory Council on Historic Preservation (ACHP), and tribes which may attach religious or cultural significance to historic properties possibly affected by the proposed action for consultation. On July 30, 2015, SHPO sent a letter concurring with the determination of eligibility and effect.

Consequently, a memorandum of agreement was developed to mitigate the adverse effect on these historic properties (see Section 5.3 and Appendices B and C). Additional consultation with SHPO via email on 3/22/2023 alerted SHPO to the revival of this project. SHPO agreed via email that no additional consultation was needed on this project.

3.15 Paleontological Resources

The Utah Geological Survey has determined that there are no known paleontological resources in the vicinity of the project area. Their letter of November 30, 2015, states that: There are no paleontological localities recorded in our files within this project area. Quaternary and Recent alluvial and lacustrine deposits that are exposed here have a low potential for yielding significant fossil localities (PFYC 2). Unless fossils are discovered as a result of construction activities, this project should have no impact on paleontological resources.

3.15.1 No Action

Under the No Action Alternative, there would be no adverse effects to paleontology. There would be no need for ground disturbance associated with construction activities. Existing conditions would continue.

3.15.2 Proposed Action

The Proposed Action Alternative would include ground disturbing activities which have the potential to disturb subsurface fossil material. Unless fossils are discovered as a result of construction activities, the Proposed Action Alternative would have no effect on paleontological resources.

3.16 Indian Trust Assets

Indian Trust Assets (ITAs) are legal interests in property held in trust by the United States for Indian tribes or individuals. The Department of the Interior's policy is to recognize and fulfill its legal obligations to identify, protect, and conserve the trust resources of federally recognized Indian tribes and tribal members, and to consult with tribes on a government-to-government basis, whenever plans or actions affect tribal trust resources, trust assets, or tribal safety (see Departmental manual, 512 DM 2). Under this policy, as well as Reclamation's ITA policy, Reclamation is committed to carrying out its activities in a manner which avoids adverse impacts to ITAs when possible, and to mitigate or compensate for such impacts when it cannot. All impacts to ITAs, even those considered nonsignificant, must be discussed in the trust analyses in NEPA compliance documents and appropriate compensation or mitigation must be implemented.

Trust assets may include lands, minerals, hunting and fishing rights, traditional gathering grounds, and water rights. Impacts to ITAs are evaluated by assessing how the action affects the use and quality of ITAs. Any action that adversely affects the use, value, quality or enjoyment of an ITA is considered to have an adverse impact to the resources. There are no known ITAs in the project area vicinity, and no ITA concerns were identified by potentially affected tribes during the tribal consultation process.

3.17 Environmental Justice

Executive Order 12898 sets the goal of Environmental Justice as the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. Construction of the Hyrum spillway would affect all individuals equally, both visitors and residents of the area. Completion of the Proposed Action would benefit those in the area and region by improving public health and safety. These benefits would happen regardless of race, minority, or poverty level and would meet the goal of Executive Order 12898. Impacts from construction would be temporary and are not anticipated to burden any group of people disproportionately.

3.18 Cumulative Effects

In addition to Project-specific impacts, Reclamation analyzed the potential for significant cumulative effects to resources affected by the Project and by other past, present, and reasonably foreseeable activities within the watershed. The Council on Environmental Quality's regulations for implementing NEPA (40 CFR 1508.1(g)(3)) state that cumulative effects "are effects on the environment that result from the incremental effects of the action when added to the effects of other past, present, and reasonably foreseeable actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative effects can result from individually minor but collectively significant actions taking place over a period of time." A cumulative effects analysis focuses on whether the Proposed Action, considered together with any known or reasonably foreseeable actions by Reclamation, other Federal or state agencies, or some other entity combined to cause an effect. There is no defined area for potential cumulative effects.

3.18.1 Methodology

The majority of the lands surrounding the Project area are managed by Reclamation, State Parks, and private lands. Therefore, Reclamation searched agency websites and contacted agency/organization staff to identify past, present, or reasonably foreseeable projects with potential for cumulative effects.

- Reclamation—Reclamation internally reviewed projects and activities that Reclamation was planning, implementing, or cooperating on.
- State—Reclamation reviewed known State of Utah projects and activities in the area.
- NRCS – Reclamation reviewed NRCS' project website to determine if there were any projects in the area that may contribute to cumulative effects.
- Private—Reclamation searched the Cache County development Services website (https://www. cachecounty.org/devserv/) to determine if there were any projects in the area that may contribute to cumulative effects.

3.18.1.1 State – Utah Division of Parks and Recreation

No Utah Division of Parks and Recreation projects were identified that would contribute to cumulative effects.

3.18.1.2 Natural Resources Conservation Council

Wellsville-Mendon Watershed Plan

The NRCS and project sponsor, Cache Water District is proposing improvements within the Wellsville Canyon and Three-mile Creek Watersheds in Cache County, Utah.

3.18.1.3 Private

Spring Ranch Subdivision 1st & 2nd Amendment

South Spring Ranch Subdivision is an approved subdivision on private land less than half a mile west of the disturbance limits for the project. Subdivision 1st Amendment changed the subdivision boundary and reoriented lots within an existing 5-lot subdivision to increase in size. Subdivision 2nd Amendment amended the boundary between a lot of the subdivision with an adjacent parcel.

3.18.1.4 Cache County

Cache County Trail Feasibility Study

Cache County is conducting a preliminary planning and feasibility analysis for shared-use pathways along US 91 between Richmond and Smithfield and SR 165 between Hyrum and Paradise.

3.18.2 Cumulative Effects Analysis

Reclamation reviewed the potential for there to be additive or interactive effects from the Proposed Action in combination with the projects listed above. The proposed action will result in no cumulative effects.

3.18.3 Conclusion

The Proposed Action would not have significant cumulative effects when combined with other past, present, and reasonably foreseeable projects, as described in the sections above.

4 Environmental Commitments

Environmental Commitments, along with Minimization Measures in Section 2.5 have been developed to further lessen the potentially minimal effects of the Proposed Action. The following environmental commitments will be implemented as an integral part of the Proposed Action.

4.1 Additional Analyses

If the Proposed Action were to change significantly from that described in this EA because of additional or new information, or if other spoil, or work areas beyond those outlined in this analysis are required outside the defined Project area, additional environmental analyses will be completed as determined necessary.

4.2 Standard Reclamation Best Management Practices

Standard Reclamation BMPs will be applied during Project activities to minimize environmental effects and will be implemented by Project work forces or included in Project activity specifications. Such practices or specifications include erosion control, public safety, dust abatement, air pollution, noise abatement, water pollution abatement, waste material disposal, archaeological and historical resources, vegetation, wildlife, and flood control. Excavated material and debris may not be wasted in any stream or river channel in flowing waters. This includes material such as grease, oil, joint coating, or any other possible pollutant. Excess materials must be wasted at a Reclamation approved upland site well away from any channel. All materials, including bedding material, excavation material, etc. may not be stockpiled in riparian or water channel areas. If necessary, silt fencing will be appropriately installed and left in place until after revegetation becomes established, at which time the silt fence can then be carefully removed. Machinery must be fueled and properly cleaned of dirt, weeds, organisms, or any other possibly contaminating substances offsite prior to commencing the Project.

4.3 Utah Stormwater Permit

A Utah Pollution Discharge Elimination System (UPDES) Permit will be required from the State of Utah before any discharges of water, if such water is to be discharged at a point source into a regulated water body. Appropriate measures will be taken to ensure that Project activity related sediments will not enter the stream either during or after Project activity. A Storm Water Pollution Prevention Plan (SWPPP) is required in order to obtain a UPDES Permit. A Spill Prevention Control and Countermeasures (SPCC) plan will also be prepared as part of the Permit application process.

4.4 Fugitive Dust Control Permit

The Division of Air Quality regulates fugitive dust from Project activity sites, requiring compliance

with rules for sites disturbing greater than one-quarter of an acre. Sensitive receptors include those individuals working at the site or motorists that could be affected by changes in air quality due to emissions from Project activity. The BMP's will be followed to mitigate for temporary impacts on air quality caused by Project related activities. These may include the application of dust suppressants and watering to control fugitive dust; minimizing the extent of disturbed surface; during times of high wind, restricting earthwork activities; and limiting the use of, and speeds on, unimproved road surfaces.

4.5 Cultural Resources

In the case that any cultural resources, either on the surface or subsurface, are discovered during construction, Reclamation's Provo Area Office archeologist shall be notified and construction in the area of the inadvertent discovery will cease until an assessment of the resource and recommendations for further work can be made.

Any person who knows or has reason to know that he/she has inadvertently discovered possible human remains on Federal land, he/she must provide immediate telephone notification of the discovery to Reclamation's Provo Area Office archaeologist. Work will stop until the proper authorities are able to assess the situation onsite. This action will promptly be followed by written confirmation to the responsible Federal agency official, with respect to Federal lands. The Utah SHPO and interested Native American Tribal representatives will be promptly notified. Consultation will begin immediately. This requirement is prescribed under the Native American Graves Protection and Repatriation Act (43 CFR Part 10); and the Archaeological Resources Protection Act of 1979 (16 U.S.C. 470).

4.6 Paleontological Resources

Should vertebrate fossils be encountered during ground disturbing actions, Project activity must be suspended until a qualified paleontologist can be contacted to assess the find.

4.7 Wildlife Resources

4.7.1 Bald and Golden Eagles

If new bald and/or golden eagles are observed within the Project area other than the known nesting bald eagles, Reclamation's Provo Area Office wildlife biologist shall be notified and Project activities in the area shall cease until an assessment of eagle presence can be made by a professional wildlife biologist. The Bald and Golden Eagle Protection Act (16 U.S.C. 668-668d) prohibits anyone, without a permit issued by the Secretary of the Interior, from "taking" eagles, including their parts, nests, or eggs. "Take" means "pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest or disturb." "Disturb" means "to agitate or bother a bald or golden eagle to a degree that causes, or is likely to cause, based on the best scientific information available, 1) injury to an eagle, 2) a decrease in its productivity, by substantially interfering with normal breeding, feeding, or sheltering behavior, or 3) nest abandonment, by substantially interfering with normal breeding, feeding, or sheltering behavior." In addition to immediate impacts, this definition also covers impacts that result

from human-induced alterations initiated around a previously used nest site during a time when eagles are not present, if, upon the eagle's return, such alterations agitate or bother an eagle to a degree that interferes with or interrupts normal breeding, feeding, or sheltering habits, and causes injury, death, or nest abandonment.

4.7.2 Other Raptors

If raptors are identified in the project area during construction, the Association and/or its contractor(s) shall follow the "Utah Field Office Guidelines for Raptor Protection from Human and Land Use Disturbances" (Romin and Muck 2002). No non-eagle raptors were identified in the project area during the 2022 survey season.

4.7.3 Migratory Birds

The Proposed Action shall follow the "Project Recommendations for Migratory Bird Conservation" from the Utah Field Office of the USFWS (May 2020), which are outlined below.

a. Wherever possible we recommend that projects be completed outside the migratory bird nesting season to avoid and minimize impacts to migratory birds.

b. If the project includes the loss or degradation of migratory bird habitat then complete all portions of the project that could impact migratory birds outside the maximum migratory bird nesting season. This includes ground-disturbing activities, habitat removal, clearing or cutting of vegetation, grubbing, burning, etc. If that is not feasible, we recommend that you complete the project outside the minimum migratory bird nesting season.

   The time period associated with the maximum migratory bird nesting season is approximately December to August. The time period associated with the minimum migratory bird nesting season is April 1 to July 15 (timeframe when the majority of annual bird nesting occurs).

c. If the project needs to occur during the migratory bird nesting season, impacts to birds can be avoided or minimized by completing vegetation treatments and vegetation clearing and removal actions during the fall and winter (outside the migratory bird nesting season per above) prior to the nesting season when the project will begin.

d. If a project may impact migratory birds and/or cause the loss or degradation of migratory bird habitat, and such work cannot occur outside the migratory bird nesting season, we recommend surveying impacted portions of the project area to determine if migratory birds are present and nesting. Surveys should emphasize detecting presence of USFWS Birds of Conservation Concern, take place during the nesting season the year before the nesting season in which project is scheduled to occur, and should document presence of migratory birds at least throughout the entire minimum migratory bird nesting season (April 1 to July 15). Nest surveys should be conducted by qualified biologists using accepted survey protocols.

e. If your project must occur during the maximum migratory bird nesting season, implement

measures to prevent migratory birds from establishing nests in the potential impact area. These steps could include covering equipment and structures and hazing birds away from the project footprint. Migratory birds can be hazed to prevent them from nesting until egg(s) are present in the nest. However, we acknowledge that hazing migratory birds away from a project site is likely only practical for projects with a relatively small footprint (i.e., projects about 5 to 10 acres in size or smaller). Do not haze or exclude access to nests for bald or golden eagles or any migratory bird species federally listed under the Endangered Species Act (ESA), as these actions are prohibited without a permit for these species.

f. If your project must be scheduled during the maximum migratory bird nest season, and vegetation clearing and removal work cannot be completed prior to the nesting season, then we recommend performing a site-specific survey for nesting birds no more than 7 days prior to all ground-disturbing activities or vegetation treatments.

   If you document active migratory bird nests during project nest surveys, we recommend that a spatial buffer be applied to these nests for the remainder of the nesting season. Vegetation treatments or ground-disturbing activities within the buffer areas should be postponed until after the birds have fledged from the nest. A qualified biologist should confirm that all young have fledged.

4.8 Wetland Resources

Any and all wetlands will be avoided where practical. Where impacts to wetlands are unavoidable, Reclamation will obtain a Section 404(d) permit from USACE prior to any dredged or fill material being discharged into jurisdictional wetlands.

4.9 Public Access

Project activity sites will be closed to public access. Temporary fencing, along with signs, will be installed to prevent public access. The Association will coordinate with landowners or those holding special permits and other authorized parties regarding access to or through the Project area.

4.10 Previously Disturbed Areas

Project activities will be confined to previously disturbed areas where possible.

4.11 Newly Disturbed Areas

All disturbed areas resulting from the Project will be smoothed, shaped, contoured, and rehabilitated to as near the pre-Project condition as practicable. After completion of the Project and restoration activities, disturbed areas will be seeded at appropriate times with weed-free, native seed mixes having a variety of appropriate species (especially woody species where feasible) to help hold the soil around structures, prevent excessive erosion, and to help maintain other riverine and riparian

functions. The composition of seed mixes will be coordinated with wildlife habitat specialists and Reclamation biologists. Weed control on all disturbed areas will be required. Successful revegetation efforts must be monitored and reported to Reclamation, along with photos of the completed Project.

4.12 Health, Safety, Noise and Dust

The Contractor would be responsible during Project activities for safety measures, noise control, dust control, and air and water pollution.

5 Scoping, Coordination, and Public Involvement

Scoping, as defined in 40 CFR 1501.9, is "an early and open process to determine the scope of issues for analysis…, including identifying the significant issues and eliminating from further study non-significant issues." Scoping includes all types of information-gathering activities and can occur throughout the NEPA process. The Proposed Action was presented to the public and interested agencies as outlined below.

5.1 Comment Period

Reclamation is holding a comment period beginning April 5, 2023 through April 20, 2023. Comments should be submitted to Ms. Brittany White via email (blwhite@usbr.gov) or standard mail at the following address.

Bureau of Reclamation
Re: Hyrum Spillway Replacement Project
c/o Brittany White
302 East Lakeview Parkway
Provo, UT 84606

5.2 U.S. Fish and Wildlife Service

Reclamation coordinated with USFWS in 2022 via email and virtual meetings regarding the nesting pair of bald eagles. No consultation pursuant to Section 7(a)(2) of the Endangered Species Act was necessary because Reclamation appropriately made a "no effect" determination for yellow-billed cuckoo and Ute ladies'-tress.

5.3 Utah State Historic Preservation Officer

Reclamation has determined, in consultation with the Utah State Historic Preservation Officer (SHPO), that the Undertaking will have an adverse effect on sites Hyrum Spillway and Wellsville-Mendon Lower Canal as defined in 36 CFR 800.5(a)(1). Thus, Reclamation entered into a Memorandum of Agreement with Utah SHPO, Cache Water Users Association, and Hyrum State Park to mitigate these adverse effects on February 9, 2016 (Appendix B).

On March 1, 2021, the agreement was amended to extend the original agreement from the duration of five years to fifteen years terminating in 2031. The MOA was amended under the spirit that the undertaking remains the same (Appendix C).

5.4 Utah Geological Survey

Reclamation requested a paleontological file search from the Utah Geological Service (UGS) to determine the nature and extent of paleontological resources within the APE. File search results and recommendations from the UGS showed no paleontological resources would be affected.

5.5 Native American Consultation

Reclamation conducted Native American consultation throughout the public involvement process for the 2016 EA. A consultation letter and copy of the Class III Cultural Resource Inventory Report was sent to the potentially affected tribes on September 22, 2015. This consultation was conducted in compliance with 36 CFR 800.2(c)(2) on a government-to-government basis. Through this effort the tribe was given a reasonable opportunity to identify any concerns about historic properties; to advise on the identification and evaluation of historic properties, including those of traditional religious and cultural importance; to express their views on the effects of the Proposed Action on such properties; and to participate in the resolution of adverse effects. We received no comment from the tribes.

6 Preparers

The following is a list of preparers who participated in the development of the draft EA.

Table 6-1 Reclamation Team, Environmental Preparers

Name	Title	Contribution
Peter Crookston	Environmental Group Chief	Review, Compliance, Approval
Maggie Erlick	Provo Area Office Archaeologist	Cultural Resources, Utah State Historic Preservation Officer, Native American Consultation
Jeff Hearty	Resource Management Specialist	Economics
Gary Henrie	Civil Engineer	Hydrology
Nicole Jacobson	Provo Area Office Archaeologist	Cultural Resources
Erik Kemp	Fish and Wildlife Biologist	Air Quality and Noise, Soils and Farmland
Zachary Nelson, Ph.D.	UCB Regional Archaeologist	Cultural Resources, Indian Trust Assets, Paleontology, Native American Consultation
Dave Snyder	Outdoor Recreation Planner	Recreation
Michael Talbot, PE Ph.D.	Resident Engineer	Operations, Public Health and Safety
Brittany White	Fish and Wildlife Biologist	NEPA Compliance, ESA/MBTA/BGEPA

7 Acronyms and Abbreviations

Table 7-1 Acronyms and abbreviations

Acronyms	Meaning/Description
AF	Acre-Feet
Association	South Cache Water Users Association
BMP	Best Management Practice
CAAS	Corrective Action Alternative Study
CFR	Code of Federal Regulations, Comprehensive Facility Review
CFS	Cubic Feet Per Second

Acronyms	Meaning/Description
EA	Environmental Assessment
EO	Executive Order
EIS	Environmental Impact Statement
FT	Feet
Feasibility Study	Hyrum Feasibility Study Summary
FONSI	Finding of No Significant Impact
HDPE	High Density Polyethylene
NEPA	National Environmental Policy Act
NRCS	Natural Resources Conservation Service
NHPA	National Historic Preservation Act
NRHP	National Register of Historic Places
RAP	Rammed Aggregate Piers
Reclamation	U.S. Bureau of Reclamation
RWS	Reservoir Water Surface
SHPO	State Historic Preservation Office
SPCC	Spill Prevention Control and Countermeasures
SWPPP	Stormwater Pollution Prevention Plan
UGS	Utah Geological Survey
U.S.C.	United States Code
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
USACE	U.S. Army Corps of Engineers
WOTUS	Waters of the United States
UPDES	Utah Pollutant Discharge Elimination System

8 References

Romin and Muck. 2002. Utah Field Office Guidelines for Raptor Protection from Human and Land Use Disturbances. U.S. Fish and Wildlife Service, Utah Field Office.

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9 Appendices

9.1 Appendix A – Noise Test Report

9.2 Appendix B – Memorandum of Agreement

9.3 Appendix C - Amendment to Memorandum of Agreement