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Managing Water in the West

Hyrum Dam Spillway Replacement Project Final Environmental Assessment

PRO-EA-14-003

Cache County, Utah
Provo Area Office
Upper Colorado Region

U.S. Department of the Interior
Bureau of Reclamation
Provo Area Office
Provo, Utah

August 2016

Mission Statements

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

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

Hyrum Dam Spillway Replacement Project Final Environmental Assessment

Cache County, Utah
Provo Area Office
Upper Colorado Region

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Chapter 1 Purpose of and Need for Proposed Action

1.1 Introduction

The South Cache Water Users Association (Association) was notified by the Bureau of 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 repairing to the standard of Reclamation; the spillway, chute, and stilling basin, or 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.

Reclamation has prepared the Environmental Assessment (EA) to comply with procedural requirements of the National Environmental Policy Act of 1969 (NEPA), Public Law 91-90, as amended, the Council on Environmental Quality, and the Department of Interior regulations implementing NEPA. This EA analyzes the potential impacts of two Proposed Alternatives (all addressing the repair of the existing spillway or construction of a new spillway and its associated parts) in comparison with a 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).


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

1.2 Background

Hyrum Dam and Reservoir are the water storage features of the Hyrum Project, and are located on the Little Bear River, approximately 9 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 18,700 acre-feet at the top of the active conservation pool, elevation 4,672.5 feet.

Hyrum Dam is a modified homogeneous earthfill embankment with a maximum structural height of 116 feet. 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 feet.

The existing spillway is located approximately 900 feet 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-feet-wide by12-feet-high radial gates to control flow at a crest elevation 4,660.00 feet, a 16-foot-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 elevation 4,672.5 feet. 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 (R&B) 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 four 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

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 repairing, replacing, or taking no action on the current spillway.

1.3 Purpose and Need for the Proposed Action

The purpose of the Project is to minimize the risk of dam and spillway failure. The Federal Action being considered is whether or not Reclamation should authorize the Association to modify, replace, or do nothing to the existing spillway at Hyrum Reservoir.

1.3.1 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.

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

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 (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.

1.3.3 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.

1.4 Scoping

The Proposed Action is being presented to the public and cooperating agencies through mailings. A letter was sent to many different landowners, multiple municipalities, non-governmental organizations (NGOs), state and Federal agencies, and other interested stakeholders. The letter invited the recipients to respond to Reclamation on or before August 1, 2015, and included a brief description of the Project and area map.

Comments will be accepted by e-mail, facsimile, telephone, and standard mail. Using the comments, the interdisciplinary team will identify and consider issues of public concern. The Project file at Reclamation's Provo Area Office, would contain the comment letters, as well as a summary of how these comments were addressed. A complete record of all public involvement and consultation activities are also kept in the Project file.

1.5 Permits, Licenses, and Authorizations Required

Implementation of the Proposed Action may require a number of authorizations or permits from state and Federal agencies. Reclamation would be responsible for obtaining all permits, licenses, and authorizations required for the Project.

Potential authorizations or permits may include those listed in Table 1-2 and others not listed.

Table 1-2
Permits and Authorizations 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.

1.6 Related Projects and Documents

There are no other related projects or documents in the action area.

1.7 Scope of Analysis

The purpose of this EA is to determine whether or not Reclamation should authorize the Association to modify, replace, or do nothing to the existing spillway at Hyrum Reservoir. That determination includes consideration of whether there would be significant impacts to the human environment. In order to modify the existing spillway, this EA must be completed and a FONSI issued. Analysis in the EA includes temporary and permanent impacts from construction

activities and operations and maintenance of any of the proposed action alternatives within the project area boundary.

1.8 Document Organization

This EA consists of the following chapters:

1. Purpose and Need for Proposed Action
2. Alternatives
3. Affected Environment and Environmental Consequences
4. Environmental Commitments
5. Consultation and Coordination
6. References
7. Preparers
8. List of Acronyms
9. Figures

Chapter 2 Alternatives

2.1 Introduction

This chapter describes the features of the No Action and Proposed Action Alternatives, and presents a comparative analysis. It includes a description of each alternative considered. This section also presents the alternatives in comparative form, defining the differences between the two alternatives.

2.2 No Action Alternative

Under the No Action Alternative, the existing spillway would remain as is. Spillway operations would continue unchanged. The aging condition of the spillway as discussed above, as well as the associated risks incurred by not taking action would increase. Risk of failure addressed in the CAA report, as well as the risk of loss of human life would increase. Over time, conditions would worsen and ultimately, failure of the spillway would occur and decreased public safety and loss of life could become probable.

2.3 Proposed Action Alternatives

There are three different Proposed Action Alternatives being considered as part of this NEPA analysis. Each alternative was developed as a result of the Value Planning and Baseline Risk Analysis for this project. Based on costs and the screening-level risk reduction analysis, three of the alternatives were carried forward to feasibility-level development. They include the following:

- Alternative 3 – Replace the chute of the existing spillway only. The existing crest structure would remain in place.
- Alternative 1 – Construct a new straight spillway alignment skewed to the existing alignment as shown in Figure 2. There are two proposed gate configurations (1a and 1b) on this alternative.
- Alternative 2 – Construct a new shorter spillway on an alignment that drops off the slope that is connected to a rip rap channel, connecting it to the existing spillway as shown in Figure 2. There are two proposed gate configurations (2a and 2b) on this alternative.

Figure 2. Drawing of all the original Action Alternatives alignments, with a backdrop of aerial imagery and topography for the Hyrum spillway.

2.3.1 Alternative 3

This alternative includes removal and replacement of most of the spillway downstream of the crest section, with the exception of the new floor in the steep chute section that was constructed in 2004. The chute and stilling basin would be designed for a discharge capacity of 8,000 ft^3/s. This design discharge would result in a total annual failure probability just below Reclamation's guidelines (1.0 by 10-4).

No modifications would be made to the crest structure, although grouting of the foundation beneath the inlet walls and the crest structure would be necessary to reduce risk to acceptable levels. The goal of the grouting program would be to fill any voids and provide a "consolidated" foundation, as well as prevent any future movement resulting from foundation erosion and piping. An 8-foot-deep trapezoidal seepage cutoff barrier would be constructed to prevent future foundation erosion and piping. Additional grouting and modifications would be added, depending on what is discovered during excavation near the crest structure.

There is still a concern with the integrity of the existing crest structure during a seismic event and further analysis is recommended for feasibility.

The existing downstream channel would be replaced with a 40-foot-wide rectangular shaped chute with cantilevered retaining walls to diminish the potential for unfavorable wave action during spillway operation. Concrete cutoffs, spillway drains, and Polyvinyl Chloride (PVC) waterstops will be included in the chute design as defensive features.

The existing stilling basin would be removed and replaced with a 118-foot-long, 40-foot-wide Type II basin, at invert elevation 4,551.0 feet, and sized to accommodate the design flow and dissipate the energy in the flow to provide downstream erosion protection.

Voids currently found under the chute floor likely extend underneath the walls as well. If this is true, these conditions would pose a significant risk to construction workers. In addition the unknowns regarding the crest structure could increase the amount of time and could cause multiple costly change orders.

Disturbance (Figure 3) would be limited to the area immediately south of the spillway and along either side of the existing spillway. Replacement of the existing spillway would take approximately 4 to 5 years during the time of year when water could be kept off the gates.

2.3.2 Alternative 1a

This Alternative would include construction of a new spillway located to the left of the existing spillway, with the alignment skewed to it using three new

15 by 12.5-foot gates (Figures 2 and 3). Conventional concrete would be used for the chute and stilling basin structures. The three new 15 by 2.5-foot gates would be designed to have the same discharge capacity at elevation 4,672.5 feet as the existing gates (6,000 ft^3/s) with a new ogee crest. This would result in a chute design capacity of 10,300 ft^3/s at elevation 4,679.0 feet. The downstream chute would have vertical walls and flow into a Type II stilling basin. This would be sized to accommodate the design flow and discharge into the existing downstream channel. This design would result in a total annual failure probability (6.3E-05) just below Reclamation's guidelines (1 by 10-4).

Disturbance (Figure 3) due to project construction would be limited, at its maximum extent, to the area of disturbance polygon (Figure 3) south and west of the existing spillway. Disturbance of the soil surface would occur due to mobilizing and parking heavy equipment, excavation, and storage of earthen and man-made materials, and standard construction activities that occur. Construction would occur over approximately a 3 year period, during the time of year when water could be kept off the gates of the existing spillway.

2.3.3 Alternative 1b

This Alternative would have the same alignment as Alternative 1a, but in contrast, it would use three new 12 by 12.5-foot gates (Figures 2 and 3). This would increase the discharge capacity to 8,000 ft^3/s at elevation 4,679.0 feet, with a new ogee crest. Conventional concrete would be used for the chute and stilling basin structures. The downstream chute would have vertical walls and water would flow into a Type II stilling basin. This would be sized to accommodate the design flow and discharge into the existing downstream channel. This design would result in a total annual failure probability (7.1E-05) just below Reclamation's guidelines (1 by 10-4).

Disturbance (Figure 3) due to project construction would be limited, at its maximum extent, to the area of disturbance polygon (Figure 3) south and west of the existing spillway. Disturbance of the soil surface would occur due to mobilizing and parking heavy equipment, excavation and storage of earthen and man-made materials, and standard construction activities that occur. Construction would occur over approximately a 3 ft^3/s year period during the time of year when water could be kept off the gates of the existing spillway.

2.3.4 Alternative 2a

This alternative would include a new spillway located to the left of the existing spillway with the alignment angled, similar to Alternative 1 but shortened, with the stilling basin located at the low spot at the bottom of the hill. Three new 15 by 12.5-foot gates would be designed to have the same discharge capacity at elevation 4,672.5 feet as the existing gates (6,000 ft^3/s) with a new ogee crest. This results in a chute design of 10,300 ft^3/s at elevation 4,679.0 feet. The downstream chute would have vertical walls and flow into a Type II stilling basin. This would be sized to accommodate the design flow and discharge into a riprap lined channel flowing toward the existing downstream channel.

Disturbance (Figure 3) due to project construction would be limited, at its maximum extent, to the area of disturbance polygon (Figure 3) south and west of the existing spillway. Disturbance of the soil surface would occur due to mobilizing and parking heavy equipment, excavation and storage of earthen and man-made materials, and standard construction activities that occur. Construction would occur over approximately a 3 year period, during the time of year when water could be kept off the gates of the existing spillway.

2.3.5 Alternative 2b

This alternative would include a new spillway located to the left of the existing spillway with the alignment angled, somewhat similar to 1a and 1b but shortened (Figure 3), with the stilling basin located at the low spot at the bottom of the hill. Three new 12 by 12.5-foot gates would be designed to have a discharge capacity of 8,000 ft^3/s at elevation 4,679.0 feet, with a new ogee crest. The downstream chute would have vertical walls and flow into a Type II stilling basin. This would be sized to accommodate the design flow and outlet into a rip rap lined channel into the existing downstream channel.

Disturbance (Figure 3) due to project construction would be limited, at its maximum extent, to the area of disturbance polygon (Figure 3) south and west of the existing spillway. Disturbance of the soil surface would occur due to mobilizing and parking heavy equipment, excavation and storage of earthen and man-made materials, and standard construction activities that occur. Construction would occur over approximately a 3 year period, during the time of year when water could be kept off the gates of the existing spillway.

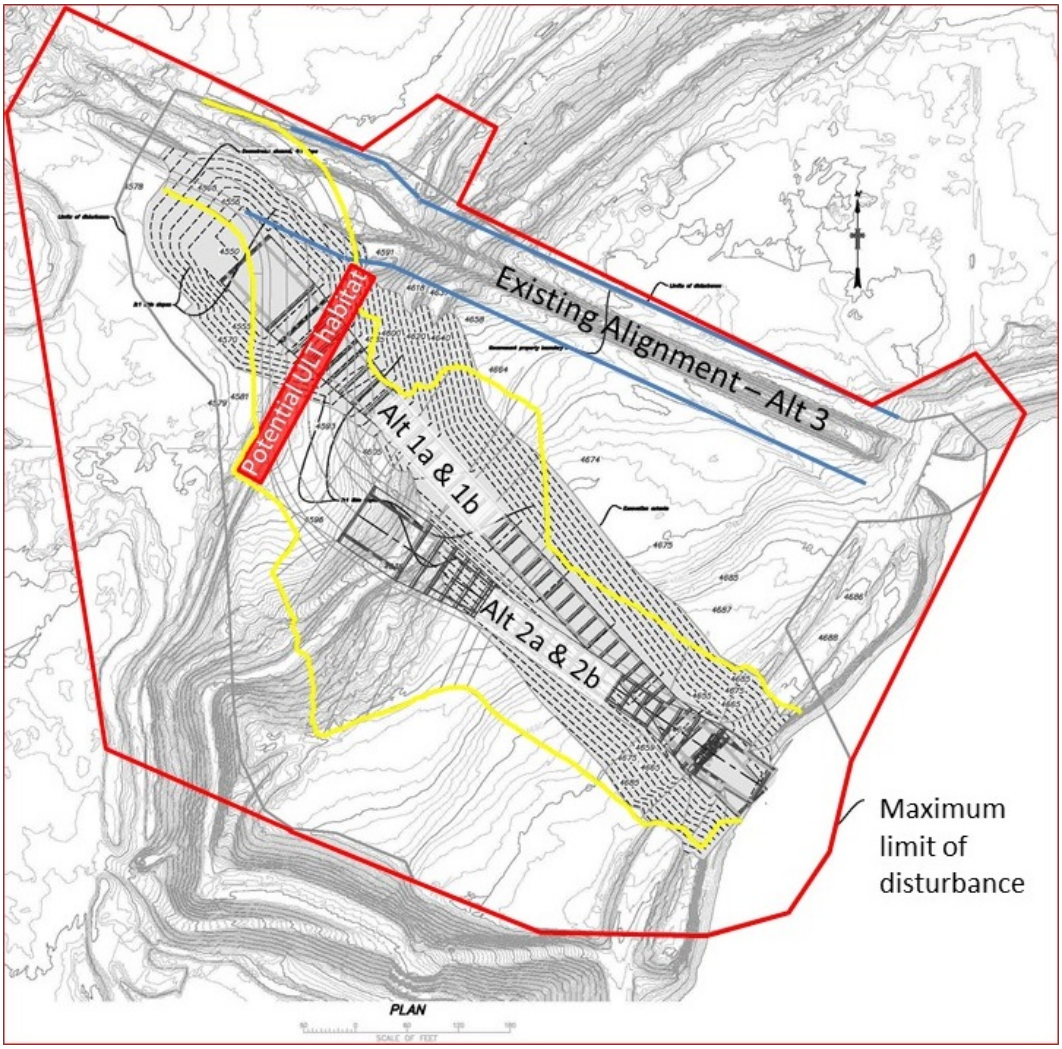

Figure 3. The maximum disturbance limits are shown in a grey line around the outside of the entire project area. Corresponding disturbance limits are noted for each Proposed Action Alternative. Please note blue for Alternative 2, dotted lines with a grey background for Alternative 1, and yellow lines for Alternative 2.

2.4 Project Design

Currently, the engineering design for each Alternative is approximately 30 percent complete. Final design will occur later in the process. Potential impacts, as a result of each alternative, can and will be analyzed based on the spatial extent, timing, and duration of the construction project.

2.5 Comparison of Alternatives

Alternative 3 would create the least amount of on-the-ground disturbance. Repairing and replacing the existing spillway would minimize some of the

excavation and stockpiling of soils that would have to occur with Alternatives 1 and 2. The area of disturbance would likely be similar for either Alternative 1 or 2. The upper bench area, northwest of the road 300 South, would be used to stockpile soil, place equipment and materials and construct the project. Generally, the differences between Alternatives 1 and 2 would be the length of the spillway chute, location of the stilling basin, and approach to the existing channel. The only differences between 1a and 1b and between 2a and 2b are the gate configurations, our analysis will group the gate configurations together. In other words, we will analyze the following Alternatives: No Action, Alternative 3, Alternative 1 and Alternative 2.

2.6 Alternatives Considered and Eliminated From the Study

Other alternatives were evaluated early in the process, but were eliminated because they did not meet the purpose and need for the project, or they were too expensive to implement.

Chapter 3 Affected Environment and Environmental Consequences

3.1 Introduction

This chapter will discuss the direct, indirect, and cumulative effects on physical, biological, and socioeconomic resources within the project area. Some of the resources may not be analyzed in-depth because there may be no or negligible effects to that resource or it may be absent in the Project area (Table 1).

3.2 Resources Eliminated from Analysis

Table 1. Resources that have been eliminated from further analysis. Impacts to these resources were considered, but not analyzed in detail, because they were determined to not be affected directly, indirectly, or cumulatively by the No Action or Proposed Action Alternatives.

Resource	Rationale for Elimination from Further Analysis
Wilderness Areas and Wild and Scenic Rivers	There are no designated Wilderness Areas or Wild and Scenic Rivers within the project area; Wilderness Areas and Wild and Scenic Rivers would not be affected by implementing the No Action or Proposed Action Alternatives.
Floodplains/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.
Water Quality Water Rights	There is no anticipated change to water quality as a result of the No Action or Proposed Action Alternatives.
Environmental Justice	No Environmental Justice population has been identified that would disproportionately bear impacts of the Proposed Action Alternative. It would not result in the denial of, reduction in, or substantial delay in the receipt of the benefits of any Federal programs, policies, or activities.

The present condition or characteristics of each included resource are discussed first (Chapter 3.3), followed immediately by a discussion of the predicted impacts

caused by the No Action and Proposed Action Alternatives. The environmental effects are summarized in Table 3-4.

3.3 Public Health and Human 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 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 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.

3.3.1 No Action Alternative

Taking no corrective action to repair or replace the current spillway would increase the risk of loss of human life. Over time, conditions would continue to degrade and the risk of dam failure would increase. Taking no action would eventually put human health and safety, even human lives, at risk. In addition, properties, possessions, and domestic livestock below the spillway or dam would also be at a higher risk of damage, loss or death.

3.3.2 Alternative 3

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. If the spillway was repaired in place, the area of disturbance would be minimized, but the duration of construction in the area around the spillway would likely be at least one or two more constructions seasons than Alternative 1 or 2, because of the need to use the spillway in the case of an emergency. Currently the outlet works is not capable, even at very low starting levels to drain the reservoir in the case of a 10 year heavy rain or flood event.

Additionally, longer construction periods would mean more mobilization of equipment in and out of the area and an increased chance of accidents on the job site and in the public.

3.3.3 Alternative 1

Impacts associated with Alternative 1 are similar to Alternative 3, but they differ slightly. The area of disturbance would increase, but the duration of construction and the associated activities would be less, because the existing spillway could be used in the case of an emergency to drain water and maintain dam safety. One to

two years less construction would likely minimize other risks of accident, injury, or death to workers, or the public.

3.3.4 Alternative 2

Impacts described above for Alternative 1 would be very similar to impacts associated with Alternative 2.

3.4 Air Quality and Noise

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 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).

3.4.1 No Action Alternative

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

3.4.2 Alternative 3

The direct impacts to air quality and noise from repairing the existing spillway include increased air and noise pollution during construction. As described in the Alternatives section above it would take approximately 4 to 5 years to construct this alternative, making the approximate duration of the decrease in air quality and increase in noise pollution longer lived than Alternatives 1 or 2. This would likely contribute to the overall air pollution in the valley by increasing particulate matter; despite this increase the overall effect would be minor.

3.4.3 Alternative 1

Impacts to air quality and noise from implementing Alternative 1 would be similar to Alternative 3 on a year to year basis. However, the effects would not be as long lasting. With construction on this alternative lasting an estimated 3 years,

there would be at least 1 year less of noise and pollution created at the site. Though this would be minor, it represents less pollutants in the area over time.

3.4.4 Alternative 2

Effects to air quality and noise as a result of Alternative 2 are likely the same as for Alternative 1.

3.5 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 some private farm land below the dam and spillway.

3.5.1 No Action Alternative

Under the No Action Alternative there would be no change to roads or transportation. Current conditions would remain the same.

3.5.2 Alternative 3

Under this Alternative, the direct impacts include: closing down 300 South during the demolition and reconstruction phases, temporary increases in traffic of workers, concrete trucks and heavy equipment, and overall disruption of use for those who use the road frequently.

3.5.3 Alternative 1

Under Alternative 1, the direct impacts include those mentioned in Alternative 3 (above) plus temporary (approx. 4 to 5 years) lack of access to the private land below the dam and spillway. In order to construct the spillway in this location, they would likely have to build 3 small bridges to span the spillway.

3.5.4 Alternative 2

Impacts to transportation and roads for Alternative 2 would be the same as those impacts described for Alternative 1 above.

3.6 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, as long as it is irrigated. The majority 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 20 acre polygon was drawn in the Web Soil Survey Application, (http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx) around the footprint of the project. Of those 20 acres, 3.4 acres were considered prime farmland if irrigated. The other 16.6 acres were considered farmland of statewide 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 insure the safety of approaching vehicles. This road is considered a Reclamation road and can be closed at the discretion of the Bureau.

3.6.1 No Action Alternative

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.

3.6.2 Alternative 3

Under Alternative 3, there would be approximately 1.5 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.

3.6.3 Alternative 1

Direct impacts to the prime farmland and farmlands of statewide importance as a result of Alternative 1, would likely encompass all 20 plus acres of the project area. The area will be highly disturbed during construction, staging of equipment

and materials, and restoration. The footprint of the project area that does not contain the spillway will be restored to its original condition. Despite the disruption of the farmlands and soils, this area represents a very small proportion of the total farmland in south Cache County. Therefore, the effects to farmlands and soils will be minor.

In addition, because the new spillway apron would likely span the area of erosion, the impacts of the eroded area would be ameliorated. This would produce a net positive benefit on the soils and roads in the area.

3.6.4 Alternative 2

Impacts associated with Alternative 1 would be very similar to impacts associated with Alternative 2.

3.7 Socioeconomics

In 2010, Hyrum City's population was 7,609 people, showing a 20.5 percent increase from the 2000 Census. Hyrum and its surrounding areas are included in the Logan Metropolitan Statistical Area, which comprises over 100,000 people. The median annual income per household in Hyrum was $43,981. The area's main employers include Utah State University, ICON Health & Fitness, and the JBS meat processing plant.

3.7.1 No Action Alternative

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

3.7.2 Alternative 3

The proposed alternatives would require significant amounts of man-power and materials, some of which would undoubtedly be sourced from local entities. The most significant differences between the proposed alternatives are cost and source of materials. With the most expensive alternatives injecting the most money into the local economy and where the materials would be sourced, would dictate where funds were spent, as well.

3.7.3 Alternative 1

The assumptions and effects associated with Alternative 2 would be similar for Alternative 1.

3.7.4 Alternative 2

The assumptions and effects associated with Alternative 3 would be similar for Alternative 2.

3.8 Recreation

Estimated yearly visitation at Hyrum Reservoir has been around 48,300 persons (Reclamation Use Data Reports). Monthly summer season data generated by Utah State Parks Resort suggests July to be the busiest month.

The four primary reasons guests visit Hyrum Reservoir are, in order of visitor preference: l) boating, 2) water skiing, 3) fishing, and 4) swimming (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.

3.8.1 No Action Alternative

The No Action Alternative would have no effect on the existing recreation. It would remain as is.

3.8.2 Alternative 3

In order to complete the work described in alternative 2, the reservoir would have to be drained to a level that would allow for the capture of flood events. This would have a significant impact on the recreation of Hyrum Reservoir through the reduction of visitors to the park for fishing, camping, water skiing, and swimming.

3.8.3 Alternative 1

Alternative 1 will have minimal impacts to the recreation at Hyrum Reservoir and State Park. Construction of this new spillway will leave the current spillway in usable condition so that in the event of a flood during the construction period, the extra water will be able to exit the reservoir through the existing spillway. Work is proposed to be completed during the months when the reservoir is low. This will allow the construction to take place while the water is normally low and the recreation will not change.

3.8.4 Alternative 2

Alternative 2 will have minimal impacts to the recreation at Hyrum Reservoir and State Park. Construction of this new spillway will leave the current spillway in usable condition so that in the event of a flood during the construction period, the extra water will be able to exit the reservoir through the existing spillway. Work is proposed to be completed during the months when the reservoir is low. This will allow the construction to take place while the water is normally low and the recreation will not change.

3.9 Visual Resources

Hyrum State Park is in the northeastern part of Utah. It lies at 4,700 feet 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.

3.9.1 No Action Alternative

The No Action Alternative would have no effect on Visual Resources.

3.9.2 Alternative 3

This alternative has the potential to have the most impacts to the visual resources due to the lowering of the reservoir water levels. In order to complete the work described in Alternative 3, the reservoir would have to be drained to a level that would allow for the capture of flood events. This would have a significant impact on the visual resources of Hyrum Reservoir through the reduction of visitors to the park for fishing, camping, water skiing, and swimming. The impacts will be temporary, though only lasting the time that the spillway is being repaired. Once the construction is complete the viewshed of the reservoir will return to its previous state. The constructions scar from the equipment will also eventually revegetate and return to its normal state.

3.9.3 Alternative 1

Alternative 1 will have minimal impacts to the visual resources and they will be limited to the viewshed close to the construction site. The impacts to the visual resources will be loss of some vegetation on the downstream side of the dam. These impacts will be short-term and will be fixed once the construction is complete and reseeding can take place.

3.9.4 Alternative 2

Alternative 2 will have minimal impacts to the visual resources and they will be limited to the viewshed close to the construction site. The impacts to the visual resources will be loss of some vegetation on the downstream side of the dam. These impacts will be short term and will be fixed once the construction is complete and reseeding can take place.

3.10 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 acre-feet, with 47,000 acre-feet (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 feet 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.

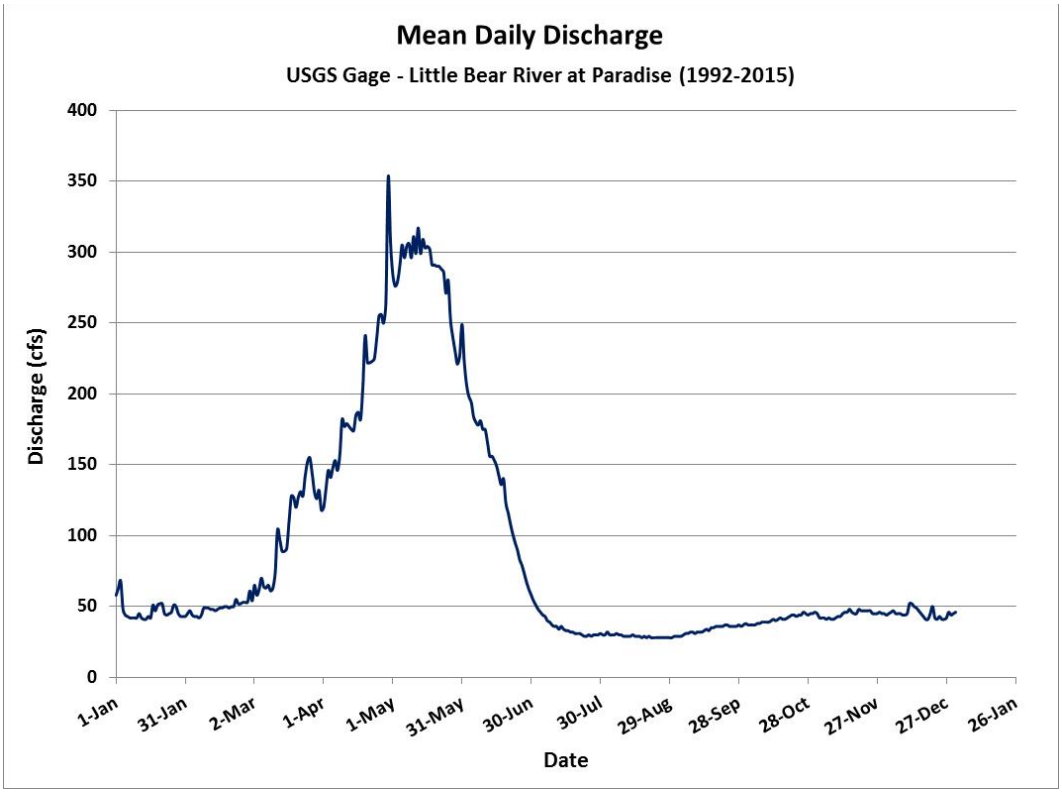

Figure 4. Mean daily discharges at the Little Bear River at Paradise from 1992 to 2015.

3.10.1 No Action Alternative

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.

3.10.2 Alternative 3

Long term, Alternative 3 would help to mitigate the current risks at Hyrum Dam and Spillway, likely resulting in a safer facility and ensuring future water supplies.

3.10.3 Alternative 1

Long term, Alternative 1 would help to mitigate the current risks at Hyrum Dam and Spillway, likely resulting in a safer facility and ensuring future water supplies.

3.10.4 Alternative 2

Long term, Alternative 2 would help to mitigate the current risks at Hyrum Dam and Spillway, likely resulting in a safer facility and ensuring future water supplies.

3.11 Operations

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

At elevation 4,672.5 feet, the spillway is designed to discharge 6,000 cfs. At elevation 4,666 feet, 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 (2015 CAAS Report).

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 1 mile and discharges into a lateral of the Hyrum Irrigation Company. The 14-mile-long 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-long Wellsville Canal receives water from a pumping plant, and supplies lands on the west side of the valley, which lie about 70 feet 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 feet; 12,316 acre-feet). This is 12.5 feet below the top of the spillway gates (4,672.5 feet; 17,746 acre-feet), and leaves 5,430 acre-feet of space for flood control. Additional winter runoff is then discharged through the spillway via the center radial gate, which is opened sufficiently (2 to 3 feet) to allow discharge of typical low winter inflows. During this period, reservoir levels are typically maintained at 4,661 to 4,662 feet, 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

8 feet. The reservoir is allowed to fill freely to within a few feet (e.g. 4 feet) 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 feet) just prior to initial irrigation releases, without overtopping the gates. Observed reservoir elevation data for the period WY 1999 – WY 2013 is shown in Figure 5.

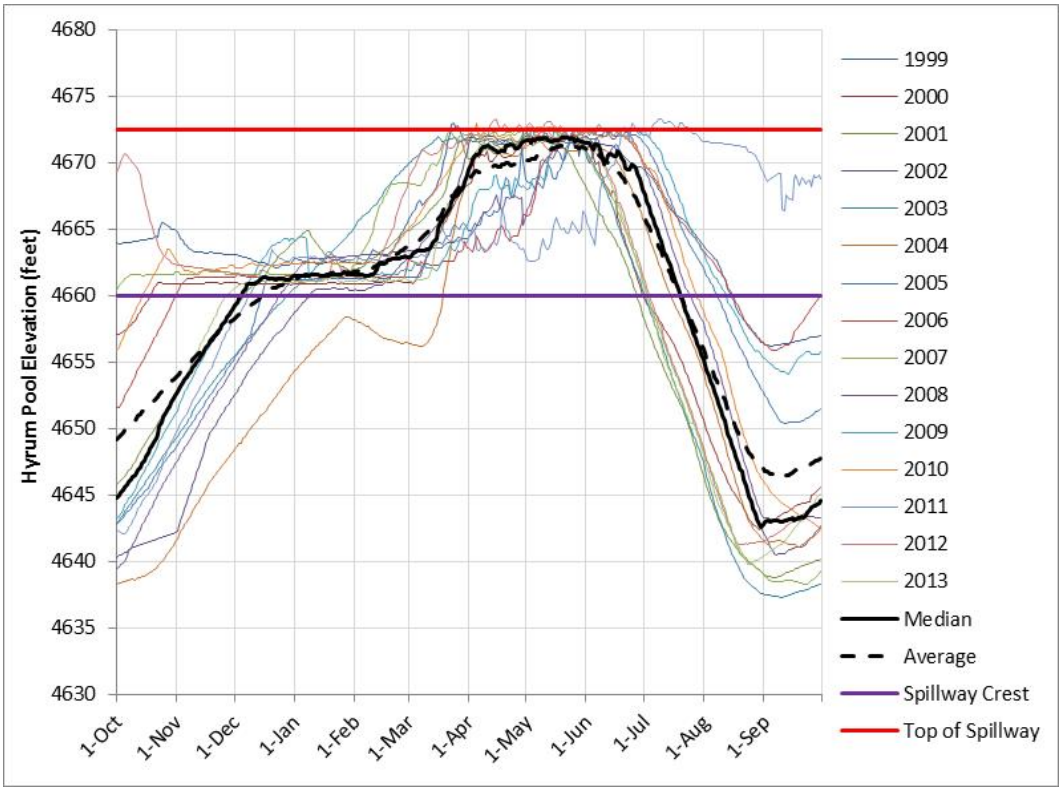

Figure 5. Pool elevation of Hyrum Reservoir throughout the calendar year.

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. Figure 6 shows reservoir elevation data from WY 1999 – WY 2015.

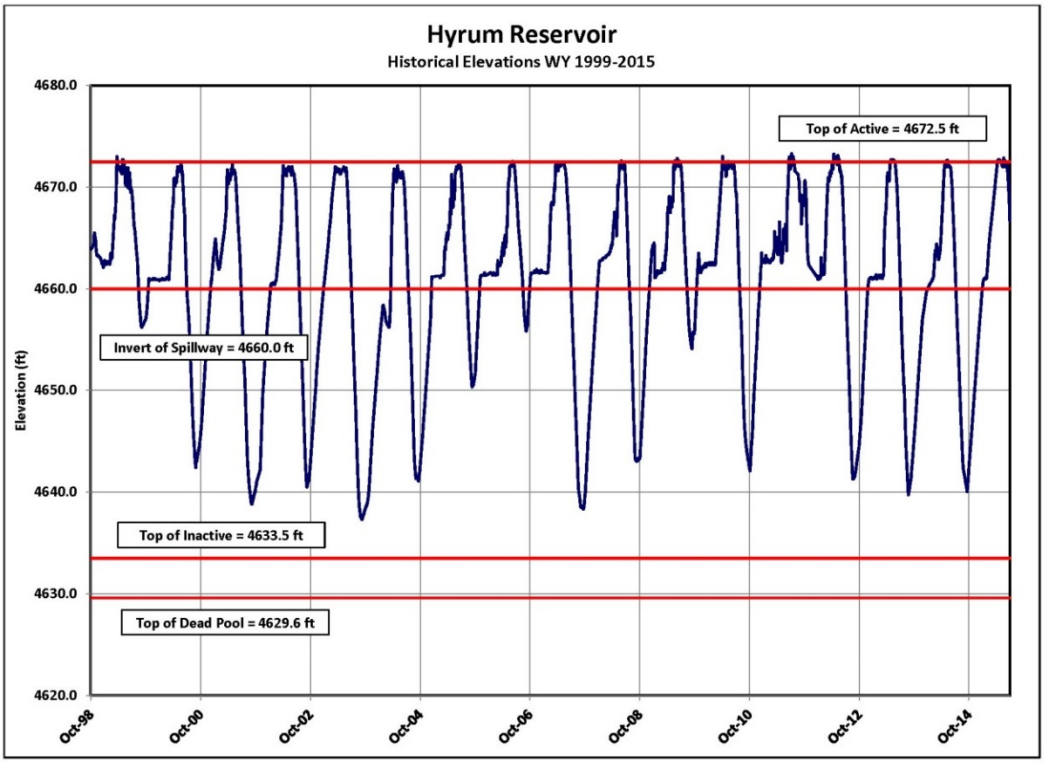

Figure 6. Historical annual reservoir elevations of Hyrum Reservoir from 1999 to 2015.

3.11.1 No Action Alternative

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.

3.11.2 Alternative 3

As a result of Alternative 3, there would likely be short-term impacts to operations during project construction, mostly associated with potential reservoir restrictions to ensure dam safety. Following construction, there are no anticipated negative 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.

3.11.3 Alternative 1

As a result of Alternative 1, there would likely be short-term impacts to operations during project construction, mostly associated with potential reservoir restrictions to ensure dam safety. Following construction, there are no anticipated negative 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.

3.11.4 Alternative 2

As a result of Alternative 2, there would likely be short-term impacts to operations during project construction, mostly associated with potential reservoir restrictions to ensure dam safety. Following construction, there are no anticipated negative 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.

3.12 Wetlands

The majority of the hydrology within the project area is derived from irrigation waters that are diverted from the Little Bear River, which runs through the project area. Two irrigation canals cross through the proposed project location. The Hyrum Feeder Canal consists of a buried pipeline and the East Field Canal is an unlined earthen canal.

The United States Fish and Wildlife Service (USFWS) National Wetland Inventory identifies one mapped wetland within the maximum limits of disturbance. This wetland has a classification of PABFx. Paulustrine, Aquatic Bed, Semi-permanently Flooded, Excavated. Due to the location of this mapped wetland lying within the existing concrete spillway channel, and the lack of wetland characteristics, there would be no effect upon any potentially jurisdictional wetlands.

3.12.1 No Action Alternative
The No Action Alternative would have no impacts to jurisdictional wetlands.

3.12.2 Alternative 3
There are no anticipated impacts to jurisdictional wetlands under Alternative 3.

Under Alternative 3 temporary impacts would occur within the Little Bear River channel which may be deemed a jurisdictional waterway by U.S. Army Corps of Engineers (USACE). Consultation with USACE through the State of Utah Division of Wildlife Resources (DWR) is warranted prior to any construction within the Little Bear River channel to confirm whether the proposed project qualifies for a Stream Alteration Permit, or if the project would require a Nationwide Permit for construction. Consultation pending.

3.12.3 Alternative 1
Impacts associated with Alternative 1 would be the same as Alternative 3.

3.12.4 Alternative 2
Impacts associated with Alternative 2 would be the same as Alternative 3.

3.13 Vegetation and Noxious Weeds

Dominant vegetation in the project area includes agricultural crops, bunch grasses, thistles, and riparian vegetation such as cottonwoods, willows, and rose associated with irrigation canals and perennial rivers. Within the maximum limit of disturbance there are approximately 0.50 acres of riparian vegetation, 0.35 acres along the East Field Canal, and 0.15 acres along the Little Bear River. Soils have been substantially disturbed through historical agricultural use.

Noxious weeds are typically non-native invasive species that, when introduced, leave their natural controls and competitors behind (insects, diseases, grazers, and climate). This provides them with an adaptive advantage to be able to grow and proliferate in many areas, especially in human-disturbed areas. Cache County noxious and invading weeds are classified as follows:

CLASS 1A EDRR WATCH LIST

Qualifications for this class include: Common Crupina, African Rue, Small Bugloss, Mediterranean Sage, Spring Millet, Syrian Beancaper, North African Grass, Plumeless Thistle, Malta Thistle.

CLASS 1B EARLY DETECTION

Qualifications for this class include: Camelthorn, Garlic Mustard, Purple Starthistle, Goatsrue, African Mustard, Giant Reed, Japanese Knotweed, Vipers

Bugloss, Elongated Mustard, Common St. Johnswort, Oxeye Daisy, Cutleaf Vipergrass.

CLASS 2 CONTROL

Qualifications for this class include: Leafy Spurge, Medusahead Rye, Rush Skeletonweed, Spotted Knapweed, Purple Loosestrife, Squarrose Knapweed, Dyers Woad, Yellow Starthistle, Yellow Toadflax, Diffuse Knapweed, Black Henbane, Dalmation Toadflax.

CLASS 3 CONTAIN

Qualifications for this class include: Russian Knapweed, Houndstounge, Broad-leaved Peppergrass (Tall Whitetop), Phragmites, Tamarisk (Salt Cedar), Hoary Cress, Canada Thistle, Poison Hemlock, Musk Thistle, Quackgrass, Jointed Goatgrass, Bermudagrass, Perennial Sorghyum ssp. (including but not limited to Johnson Grass) , Scotch Thistle (Cotton Thistle), Field Bindweed, Puncturevine.

CLASS 4 PROHIBITED

Qualifications for this class include: Cogongrass (Japanese Blood Grass), Myrtle Spurge, Dame's Rocket, Scotch Broom, Russian Olive.

3.13.1 No Action Alternative

The No Action Alternative would have no impacts to vegetation and noxious weeds. However, the current conditions and baseline vegetation are a result of the cumulative impacts to date of use in the area.

3.13.2 Alternative 3

Under Alternative 3, disturbances to all vegetation types would be expected to be temporary and minimal. All construction activities would occur in areas that have been previously disturbed by the development of existing facilities, farming practices, and roadways.

The contractor would reestablish vegetated areas disturbed during construction to stabilize disturbed soils and control the presence and spread of noxious weeds. It is expected that these areas would be contained within the proposed spillway alignment and areas designated for stockpiling construction related items, not to extend beyond the maximum limits of disturbance. All seed used for restoration would be certified "noxious weed free" before use.

3.13.3 Alternative 1

Impacts associated with Alternative 1 would be the same as Alternative 3.

3.13.4 Alternative 2

Impacts associated with Alternative 2 would be the same as Alternative 3.

3.14 Wildlife and Fish, Sensitive Species, and Migratory Birds

Wildlife

The most common terrestrial wildlife species in and around the study area include: deer mouse (Peromyscus spp.), yellow-bellied marmot (Marmota flaviventris), striped skunk (Mephitis spp.), 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 (Hyrum Reservoir RMP 2004).

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. As water levels decrease, shoreline vegetation close to the high water level provides little cover along the north southwest and dam-site shores. The area of Hyrum Reservoir that provides the majority of fisheries habitat at mid- to low-water levels is the inflow area of the Little Bear River.

Migratory birds

There are a host of migratory birds that use the Hyrum Reservoir area. Some of the species potentially present include: American bittern (Botaurus lentiginosus), bald eagle (Haliaeetus leucocephalus), Brewer's sparrow (Spizella breweri), burrowing owl (Athene cunicularia), Calliope hummingbird (Stellula calliope), Cassin's finch (Carpodacus cassinii), eared grebe (Podiceps nigricollis), ferruginous hawk (Buteo regalis), fox sparrow (Passerella iliaca), golden eagle (Aquila chrysaetos), Lewis's woodpecker (Melanerpes lewis), loggerhead shrike (Lanius ludovicianus), long-billed curlew (Numenius americanus), olive-sided flycatcher (Contopus cooperi), pinyon jay (Gymnorhinus cyanocephalus), sage thrasher (Oreoscoptes montanus), short-eared owl (Asio flammeus), Swainson's hawk (Buteo swainsoni), and Williamson's sapsucker (Sphyrapicus thyroideus). Habitat requirements for each of these species varies widely.

3.14.1 No Action Alternative

Under the No Action Alternative there would be no change to reservoir operations or conditions around the reservoir. Therefore, fish composition, habitat

conditions, and water availability, for the aforementioned species around the reservoir, would not change.

3.14.2 Alternative 3

Under Alternative 3, there would be minor impacts to wildlife such as displacement during the mobilization, construction, and restoration phases of the project. In addition, the reservoir would need to be lowered and maintained at a lower level in order to accommodate the potential risk of flooding. This may decrease the pool size, and begin to slightly change the composition of fish in the reservoir. It will also cause less use at the reservoir edge, as hiding cover would be reduced. Nonetheless, the overall impacts to fish, migratory birds, and other wildlife would be minor and relatively short-lived (approx. 4 to 5 years).

3.14.3 Alternative 1

Impacts associated with Alternative 1 would be the same as those of the No Action Alternative because reservoir operations would be maintained at the current state.

3.14.4 Alternative 2

Impacts associated with Alternative 1 would be the same as those of the No Action Alternative because reservoir operations would be maintained at the current state.

3.15 Threatened and Endangered Species

According to the USFWS IPaC Trust Resource Report (dated 06-01-2016), there were three Endangered Species Act (ESA) listed (threatened or endangered) species that could potentially occur in the project, and they include: yellow-billed cuckoo, Canada lynx, and Ute ladies'-tresses.

Yellow-billed cuckoo

Habitat requirements for the yellow-billed cuckoo include multi-layered riparian vegetation, with riparian canopy trees and at least one layer of understory shrubby vegetation. Each patch of suitable habitat would have to be at least 12 acres in size and have a patch at least 100-meters-wide by 100-meters-long.

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. Therefore, there is not suitable habitat for this species, and it will not be addressed further.

Canada lynx

Suitable Canada lynx habitat is made up of multi-storied mixed conifer stands of multiple ages and diverse canopy covers to promote prey densities and provide hiding and thermal cover.

The project area contains no multi-storied mixed conifer stands. Therefore, there is not suitable habitat and this species will not be addressed further.

Ute ladies'-tresses (ULT)

This threatened orchid used to be found primarily in moist meadows associated with perennial stream terraces, floodplains, and oxbows at elevations between 4,300 to 6,850 feet (1310 to 2090-meters). Since its original listing it has now been found in seasonally flooded river terraces, sub-irrigated or spring-fed abandoned stream channels and valleys, lakeshores, irrigation canals, berms, levees, irrigated meadows, excavated gravel pits, roadside barrow pits, reservoirs, and other human-modified wetlands. New surveys have also expanded the elevational range of the species from 720 to 7,000 feet. Over one-third of all known Ute ladies'-tresses populations are found on alluvial banks, point bars, floodplains, or ox-bows associated with perennial streams, (https://ecos.fws.gov/speciesProfile/profile/speciesProfile.action?spcode=Q2WA).

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 (see Fertig et al. 2005). The area contains many native and non-native plants that make the potential habitat for ULT marginal at best.

3.15.1 No Action Alternative

Under the No Action Alternative there would be no change to any potential ULT habitat. So there would be no effect.

3.15.2 Alternative 3

Due to the marginal habitat at the site and the fact that there is no hydrologic connection to other known populations of ULT, we determined that at the maximum extent of disturbance Alternative 3 "May Affect, but is Not Likely to Adversely Affect" ULT. We received concurrence on these findings from USFWS on July 21, 2015.

3.15.3 Alternative 1

Due to the marginal habitat at the site and the fact that there is no hydrologic connection to other known populations of ULT, we determined that at the maximum extent of disturbance Alternative 1 "May Affect, but is Not Likely to Adversely Affect" ULT. We received concurrence on these findings from USFWS on July 21, 2015.

3.15.4 Alternative 2

Due to the marginal habitat at the site and the fact that there is no hydrologic connection to other known populations of ULT, we determined that at the maximum extent of disturbance Alternative 2 "May Affect, but is Not Likely to Adversely Affect" ULT. We received concurrence on these findings from USFWS on July 21, 2015.

3.16 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 3).

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. Four cultural resources were identified during the inventory: these include Hyrum Feeder Canal, Hyrum Spillway, Wellsville-East Field Canal, and an Agriculture Complex.

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. 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.

3.16.1 No Action Alternative

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. Existing conditions would continue.

3.16.2 Alternative 3

As stated in Section 3.16, during the Class III cultural resource inventory, the Hyrum Spillway and the Wellsville-East Field Canal were found to be eligible for the NRHP. The proposed action would cause an alteration to the characteristics of the Hyrum Spillway 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. 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 (Appendix 2) concurring with the determination of eligibility and effect.

Pursuant to 36 CFR 800.6(c), a Memorandum of Agreement (MOA) was developed to resolve the adverse effects to the Hyrum Spillway. Signatories to the MOA included: Reclamation, SHPO, the South Cache Water Users Association, and Hyrum State Park.

3.16.3 Alternative 1

As stated in Section 3.16, during the Class III cultural resource inventory, the Hyrum Spillway and the Wellsville-East Field Canal were found to be eligible for the NRHP. The proposed action would cause an alteration to the characteristics of the Hyrum Spillway 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. 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 Utah SHPO, the 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 (Appendix 2) concurring with the determination of eligibility and effect.

Pursuant to 36 CFR 800.6(c), a MOA was developed to resolve the adverse effects to the Hyrum Spillway. Signatories to the MOA included: Reclamation, SHPO, the Association, and Hyrum State Park.

3.16.4 Alternative 2

As stated in Section 3.16, during the Class III cultural resource inventory, the Hyrum Spillway and the Wellsville-East Field Canal were found to be eligible for the NRHP. The proposed action would cause an alteration to the characteristics of the Hyrum Spillway 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. 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 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 (Appendix 2) concurring with the determination of eligibility and effect.

Pursuant to 36 CFR 800.6(c), a MOA was developed to resolve the adverse effects to the Hyrum Spillway. Signatories to the MOA included: Reclamation, SHPO, the Association, and Hyrum State Park.

3.17 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.

3.17.1 No Action Alternative

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.

3.17.2 Alternative 3

Under Alternative 3, there would be ground disturbing activities which have the potential to disturb subsurface fossil material. Unless fossils are discovered as a result of construction activities, however, Alternative 3 would have no effect on paleontological resources.

3.17.3 Alternative 1

Under Alternative 1, there would be ground disturbing activities which have the potential to disturb subsurface fossil material. Unless fossils are discovered as a result of construction activities, however, Alternative 1 would have no effect on paleontological resources.

3.17.4 Alternative 2

Under Alternative 2, there would be ground disturbing activities which have the potential to disturb subsurface fossil material. Unless fossils are discovered as a result of construction activities, however, Alternative 2 would have no effect on paleontological resources.

3.18 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.

3.18.1 No Action Alternative

The No Action Alternative would have no impact on ITAs.

3.18.2 Alternative 3

Because there are no ITAs within the project vicinity, implementation of Alternative 3 would have no effect on ITAs.

3.18.3 Alternative 1

Because there are no ITAs within the project vicinity, implementation of Alternative 1 would have no effect on ITAs.

3.18.4 Alternative 2

Because there are no ITAs within the project vicinity, implementation of Alternative 2 would have no effect on ITAs.

3.19 Summary of Environmental Effects

Table 3-4 summarizes environmental effects under the No Action Alternative and the Proposed Action Alternatives.

Table 3-4
Summary of Environmental Effects

Project Resource	No Action Alternative	Alternative 3	Alternative 1	Alternative 2
Public Health and Safety	Increased risk	Minimal Effect	Minimal Effect	Minimal Effect
Air Quality and Noise	No Effect	Minimal Effect	Minimal Effect	Minimal Effect
Transportation and Roads	No Effect	Minimal Effect	Minimal Effect	Minimal Effect
Prime and Unique Farmland	No Effect	Minimal Effect	Minimal Effect	Minimal Effect
Socioeconomics	No Effect	Minimal Effect	Minimal Effect	Minimal Effect
Recreation	No Effect	Minimal Effect	Minimal Effect	Minimal Effect
Visual Resources	No Effect	Minimal Effect	Minimal Effect	Minimal Effect
Hydrology	No Effect	Minimal Effect	Minimal Effect	Minimal Effect
Aquatic Resources	No Effect	Minimal Effect	Minimal Effect	Minimal Effect
Wetlands	No Effect	Minimal Effect	Minimal Effect	Minimal Effect
Vegetation and Noxious Weeds	No Effect	Minimal Effect	Minimal Effect	Minimal Effect
Wildlife, Sensitive Species, and Migratory Birds	No Effect	Minimal Effect	Minimal Effect	Minimal Effect
Threatened and Endangered Species	No Effect	Minimal Effect	Minimal Effect	Minimal Effect
Cultural Resources	No Effect	Major Effect	Minimal Effect	Minimal Effect
Paleontological Resources	No Effect	Minimal Effect	Minimal Effect	Minimal Effect
Indian Trust Assets	No Effect	Minimal Effect	Minimal Effect	Minimal Effect

3.20 Cumulative Effects

Cumulative effects are an aggregate of many direct and indirect effects, and include past, present actions, or actions that can reasonably be expected to occur. The potential for direct adverse effects to the environmental resources resulting from the alternatives is discussed in the previous sections.

Cumulative effects for this Project may include maintenance and repair work on the pipeline. Any impacts from this work would be temporary in nature with no long-term impacts.

Chapter 4 Environmental Commitments

4.1 Commitments

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

1. **Standard Reclamation BMPs** - Standard Reclamation Best Management Practice (BMPs) will be applied during construction activities to minimize environmental effects and will be implemented by construction forces, or included in construction specifications. Such practices or specifications include sections in the present EA on public safety, dust abatement, air pollution, noise abatement, water pollution abatement, waste material disposal, erosion control, archaeological and historical resources, vegetation, wildlife and threatened and endangered species. Excavated material and construction 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. Construction materials, bedding material, excavation material, etc. may not be stockpiled in riparian or water channel areas. 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 construction.

2. **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 construction area, additional environmental analyses may be necessary.

3. **UPDES Permit** - A Utah Pollutant Discharge Elimination System Permit will be required from the State of Utah before any discharges of water, if such water is to be discharged as a point source into a regulated water body. Appropriate measures will be taken to ensure that construction related sediments will not enter the stream either

during or after construction. Settlement ponds and intercepting ditches for capturing sediments will be constructed, and the sediment and other contents collected will be hauled off the site for appropriate disposal upon completion of the Project.

4. **Fugitive Dust Control Permit** - The Division of Air Quality regulates fugitive dust from construction sites, requiring compliance with rules for sites disturbing greater than one-quarter of an acre. Utah Administrative Code R307-205-5, requires steps be taken to minimize fugitive dust from construction activities. Sensitive receptors include those individuals working at the site or motorists that could be affected by changes in air quality due to emissions from the construction activity.

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).

6. **Paleontological Resources** - Should vertebrate fossils be encountered by the proponent during ground disturbing actions, construction must be suspended until a qualified paleontologist can be contacted to assess the find.

7. **Wildlife Resources - Migratory Bird Protection**

   a. Perform any ground-disturbing activities or vegetation treatments before migratory birds begin nesting or after all young have fledged.

b. If activities must be scheduled to start during the migratory bird breeding season, take appropriate steps to prevent migratory birds from establishing nests in the potential impact area. These steps could include covering equipment and structures and use of various excluders (e.g., noise). Prior to nesting, birds can be harassed to prevent them from nesting on the site.

c. If activities must be scheduled during the migratory bird breeding season, a site-specific survey for nesting birds should be performed starting at least 2 weeks prior to groundbreaking activities or vegetation treatments. Established nests with eggs or young cannot be moved, and the birds cannot be harassed (see b., above), until all young have fledged and are capable of leaving the nest site.

d. If nesting birds are found during the survey, appropriate spatial buffers should be established around nests. Vegetation treatments or ground-disturbing activities within the buffer areas should be postponed until the birds have left the nest. Confirmation that all young have fledged should be made by a qualified biologist.

Raptor Protection

Raptor protection measures will be implemented to provide full compliance with environmental laws. Raptor surveys will be developed using the Utah Field Office Guidelines for Raptor Protection from Human and Land Use Disturbances (Romin and Muck 2002), to ensure that the proposed project will avoid adverse impacts to raptors, including bald and golden eagles. Locations of existing raptor nests and eagle roosting areas will be identified prior to the initiation of project activities. Appropriate spatial buffer zones of inactivity (as described in Romin and Muck 2002) will be established during breeding, nesting, and roosting periods. Arrival at nesting sites can occur as early as December for certain raptor species. Nesting and fledging can continue through August. Wintering bald eagles may roost from November through March.

8. **Wetland Resources** - No spoils, soil, or other fill material will be placed in wetland areas. Additionally, no motor vehicle or heavy equipment traffic are allowed to use wetland areas.

9. **Previously Disturbed Areas** - Construction activities will be confined to previously disturbed areas where possible for such activities as work, staging, and storage, waste areas and vehicle and

equipment parking areas. Vegetation disturbance will be minimized as much as possible.

10. **Public Access** - Construction 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.

11. **Disturbed Areas** - All disturbed areas resulting from the Project will be smoothed, shaped, contoured, and rehabilitated to as near the pre-Project construction condition as practicable. After completion of the construction 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.

Chapter 5 Consultation and Coordination

5.1 Introduction

Consultation with the USFWS pursuant to the ESA is discussed throughout this EA. This chapter details other consultation and coordination between Reclamation and other Federal, state, and local Government Agencies, Native American Tribes, and the public during the preparation of this EA. Compliance with NEPA is a Federal responsibility that involves the participation of all of these entities in the planning process. The NEPA requires full disclosure about major actions taken by Federal agencies and accompanying alternatives, impacts, and potential mitigation of impacts.

5.2 Public Involvement

The Proposed Action was presented to the public and cooperating agencies through mailings. A letter was sent to approximately 40 landowners, multiple municipalities, non-governmental organizations, state and Federal agencies, and other interested stakeholders. The letter invited the recipients to respond to Reclamation on or before July 18, 2014, and included a brief description of the Project and area map. Reclamation received two comment letters, carefully reviewed the comments and considered relevant comments in the environmental analysis.

5.3 Native American Consultation

Reclamation conducted Native American consultation throughout the public involvement process. A consultation letter and copy of the Class III Cultural Resource Inventory Report was sent to the potentially affected tribes. 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.

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 Utah State Historic Preservation Office

A copy of the Class III Cultural Resource Inventory Report and a determination of historic properties affected for the Proposed Action Alternative was submitted to the Utah SHPO. On July 30, 2015, Utah SHPO concurred with our determinations of eligibility and effect.

5.6 Bureau of Indian Affairs

A letter from the Reclamation archaeologist requested an evaluation of ITAs within the APE from the Bureau of Indian Affairs (BIA). Reclamation did not receive a response from the BIA identifying any ITAs impacted by the Proposed Action.

Chapter 6 References

Romin, L. A., and J. A. Muck. 2002. Utah field office guidelines for raptor protection from human and land use disturbances. The USFWS Field Office, Salt Lake City, UT.

Chapter 7 Preparers

The following is a list of preparers who participated in the development of the Draft EA. They include environmental summary preparers, Reclamation team members, and Federal, state and Association members.

Reclamation Team Members

Name	Title	Agency
Dr. Rick Baxter	Division Manager	Bureau of Reclamation
Mr. Scott Blake	Recreation and Visual	Bureau of Reclamation
Mr. Peter Crookston	Environmental Protection Specialist	Bureau of Reclamation
Mr. Jeff Hearty	Economist	Bureau of Reclamation
Dr. Calvin Jennings	Archaeologist	Bureau of Reclamation
Mr. Ryan Luke	Engineer/Hydrologist	Bureau of Reclamation
Dr. Zachary Nelson	Archaeologist	Bureau of Reclamation
Mr. Michael Talbot	Engineer	Bureau of Reclamation
Mr. Wayne Pullan	Area Manager	Bureau of Reclamation
Mr. Justin Record	Water Rights	Bureau of Reclamation

Federal, State or Association Members

Name	Title	Agency
Mr. Thomas Bailey	President	South Cache Water Users Association
Mr. Chris Merritt	Archaeologist	State Historic Preservation Office
Ms. Jena Lewinsohn	Terrestrial Botanist	U.S. Fish and Wildlife Service

Chapter 8 List of Acronyms

Acronym	Definition
APE	Area of Potential Effect
Association	South Cache Water User Association
BA	Biological Assessment
BIA	Bureau of Indian Affairs
cfs	Cubic Feet Per Second
CWA	Clean Water Act
DWR	State of Utah Division of Wildlife Resources
EA	Environmental Assessment
ESA	Endangered Species Act
FONSI	Finding of No Significant Impact
ITA	Indian Trust Assets
MBTA	Migratory Bird Treaty Act
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NRHP	National Register of Historic Places
O&M	Operation and Maintenance
Reclamation	U.S. Bureau of Reclamation
SHPO	Utah State Historic Preservation Office
SOPs	Standard Operating Procedures
UGS	Utah Geological Service
ULT	Ute-ladies'-tresses
UPDES	Utah Pollutant Discharge Elimination System
USACE	US Army Corps of Engineers
USFWS	U.S. Fish and Wildlife Service

Chapter 9 Figures

Appendix 1

Public Comment Summary

Comment letter date	Commenter	Comment	Response to comment
6/18/16	G Baxter	What is needed for proper evaluation on of the alternatives is an economic evaluation of the various alternatives and a discussion of funding sources. I realize that this would be outside of the purview of this document but it is essential information for proper evaluation of alternatives. I assume this information is forthcoming. The cost of water to the irrigation users is currently excessive on the Wellsville-Mendon canal. Water costs have made it so it is practically prohibitive to raise agricultural crops.	You are correct. This is outside the purview of the EA. We understand the desire to keep costs as low as possible, so as to minimize additional costs.
6/13/16	J Runhaar	Issues with ongoing erosion inside the reservoir near where the proposed spillway would be located. Also concerned with the road over the dam being one of two routes to the Mount Sterling area. Believes it will impact homes, farms, and recreational users. Also provided a new and updated county weed list.	See changes in 3.6 to soils and farmlands section. Added verbiage to address erosion issues and the positive impact of implementing Alternative 1 or 2 on the project. Added and updated the county weed list in the EA.

Appendix 2

SHPO Consultation Concurrence Letter