

Fort Field Diversion Dam Reconstruction

Final Environmental Assessment



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United States Department of the Interior
Central Utah Project Completion Act Office

Utah Reclamation Mitigation and Conservation Commission

And

Central Utah Water Conservancy District

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Chapter 1

Purpose and Need for Action

Introduction

The Utah Reclamation Mitigation and Conservation Commission (Mitigation Commission), the Central Utah Water Conservancy District (District) and the U.S. Department of the Interior (Department), collectively referred to as the **Joint Lead Agencies**, are proposing to modify the Fort Field Diversion structure located on the Provo River approximately 3.8 miles upstream of Utah Lake, just downstream of I-15. This work is authorized by Section 302(c) of the Central Utah Project Completion Act.

Project Background

The Provo River, located in Summit, Wasatch and Utah Counties, Utah, is extensively used as a source for domestic drinking water, irrigation water, and hydroelectric power production. The lower portion of the Provo River between the mouth of Provo Canyon and Utah Lake is heavily diverted for irrigation purposes. There are eight diversion structures on the Provo River from the Murdock Diversion Dam, near the mouth of Provo Canyon, to Utah Lake (Figure 1). The Provo River also provides habitat for many aquatic species, including the June sucker (*Chasmistes liorus*), a fish endemic to Utah Lake. Historically, the June sucker used the lower portion of the Provo River for spawning habitat. However, along with many other factors, the diversion and alteration of the flows of the Provo River have significantly

impacted this species. On April 30, 1986, the U.S. Fish and Wildlife Service (Service) listed this species as Endangered under the Endangered Species Act (7 U.S.C. 136; 16 U.S.C. 460 et seq. 1973), and designated the lower 4.9 miles of the Provo River as critical habitat (51 FR 10857). The species had a documented wild population of fewer than 1,000 individuals at the time of listing and in 1987 the wild spawning population was estimated at only 300 to 500 individuals. The Service designated June sucker as a species with a high risk of extinction and identified water development and operations as one of the primary threats to their survival.

Diversion structures used to divert the flows of the Provo River into water delivery systems are often barriers to upstream fish migration. The Fort Field Diversion, the lowest diversion on the Provo River and the first diversion encountered by spawning June sucker, often restricts their spawning to only the lowest 3.8 miles of the Provo River (Figure 2). The upper 1.1 miles of the 4.9 mile reach designated as critical habitat, is often inaccessible during May and June when June sucker spawn.

The Fort Field Diversion not only restricts access to a portion of the June sucker critical habitat, it also significantly compromises the quality of the spawning habitat in the lower 3.8 mile reach. The Fort Field Diversion, like many of the other diversions on the river, often functions as a “dry dam” which diverts the entire stream flow of the Provo River, with the exception of small quantities of water that leak through the diversion structure. These

diversion structures are not capable of bypassing a measured amount of water for downstream users. As a consequence, the amount of water that bypasses the diversion is minimal and the amount of available spawning habitat is limited. Significant investments have been made to acquire the water rights to provide seasonal instream flows in the lower Provo River to benefit June sucker and continued investments will be made to provide a year-round minimum instream flow. However, the value of these investments is significantly compromised by the inability to bypass a measured amount of water at the diversion structures.

The Service, in cooperation with other Federal and State entities, developed the *June Sucker Recovery Plan* in 1999 and subsequently the *June Sucker Recovery Implementation Program*. The document and program identify the removal of fish passage barriers, including the Fort Field Diversion, as a high priority action item.

Need for Action

The proposed project is **needed** to provide unimpaired fish migration particularly for spawning June sucker.

Project Purposes

The proposed Federal action is intended to achieve the following purposes, which will address the underlying need for the project.

- Maintain the ability to meet diversion requirements for canal companies and legal water users who divert water from the river at the Fort Field Diversion

- Provide capability for bypass and measurement of instream flows
- Minimize disruption to and/or restore natural stream channel and flow characteristics and riparian and wetland habitats
- Provide for low operation and maintenance costs and simplicity of operation

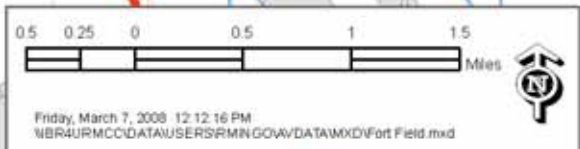
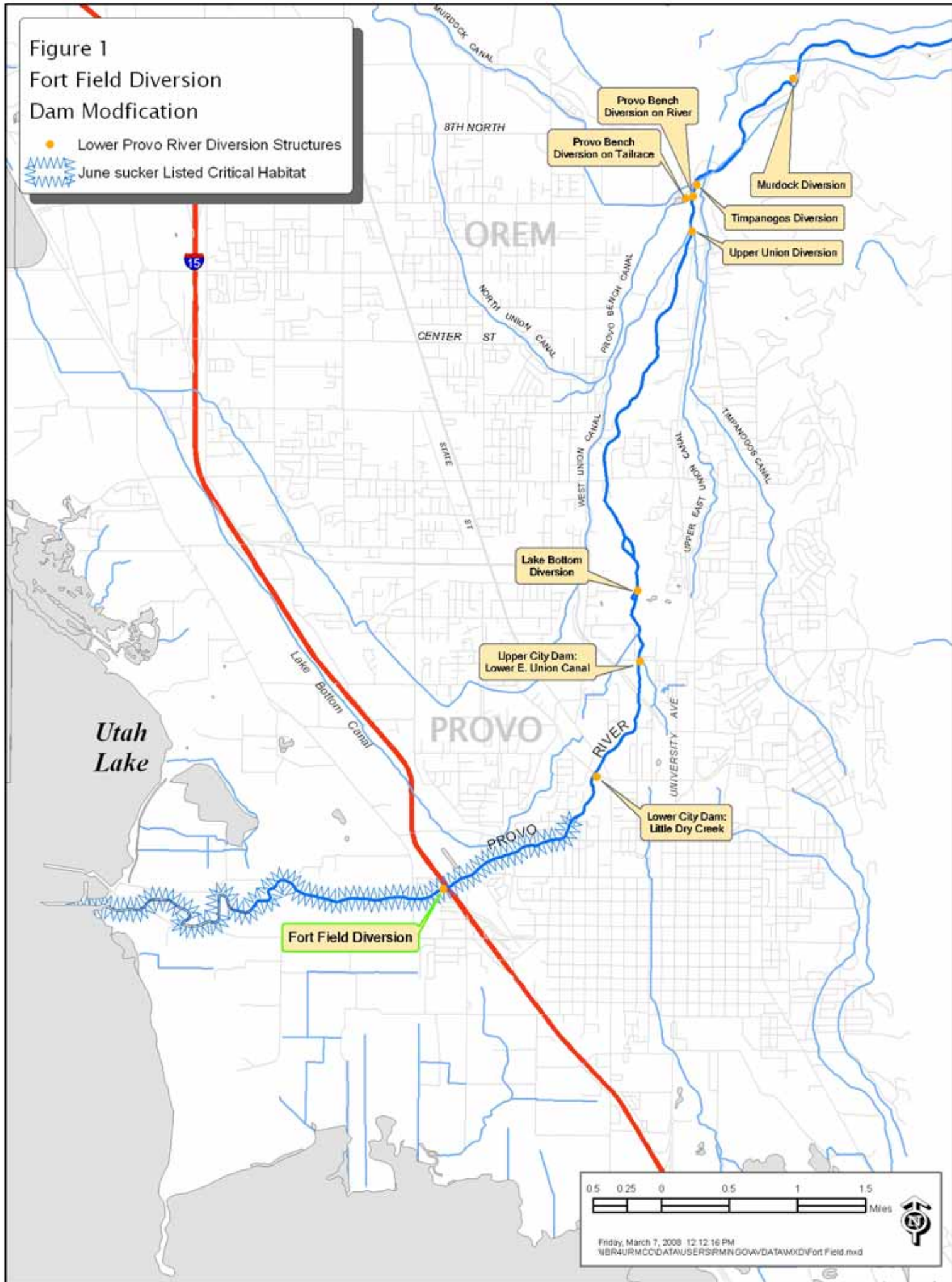
Purpose of this Document

The National Environmental Policy Act of 1969 (NEPA) requires all Federal agencies to analyze and disclose the environmental impacts of their actions. The purpose for NEPA is twofold. First, NEPA requires Federal agencies to be well informed of the environmental consequences of their actions. Second, NEPA requires Federal agencies to inform and involve the public in the decision making process. These two procedural requirements are intended to help agency officials make better decisions as they implement their programs. The Federal action that is “triggering” NEPA in this instance is the expenditure of Federal funds to remove or modify the Fort Field Diversion structure.

The NEPA process is a planning process in which alternative solutions to an underlying problem are formulated, the merits of which are identified and evaluated. The Joint Lead Agencies inform the public of the underlying need or problem that requires action (for example, degraded and inaccessible habitat for the endangered June sucker resulting from the Fort Field Diversion). The Joint Lead Agencies convene an Interdisciplinary Team (ID) of resource specialists to develop a range of

Figure 1 Fort Field Diversion Dam Modification

- Lower Provo River Diversion Structures
- 🌿 June sucker Listed Critical Habitat



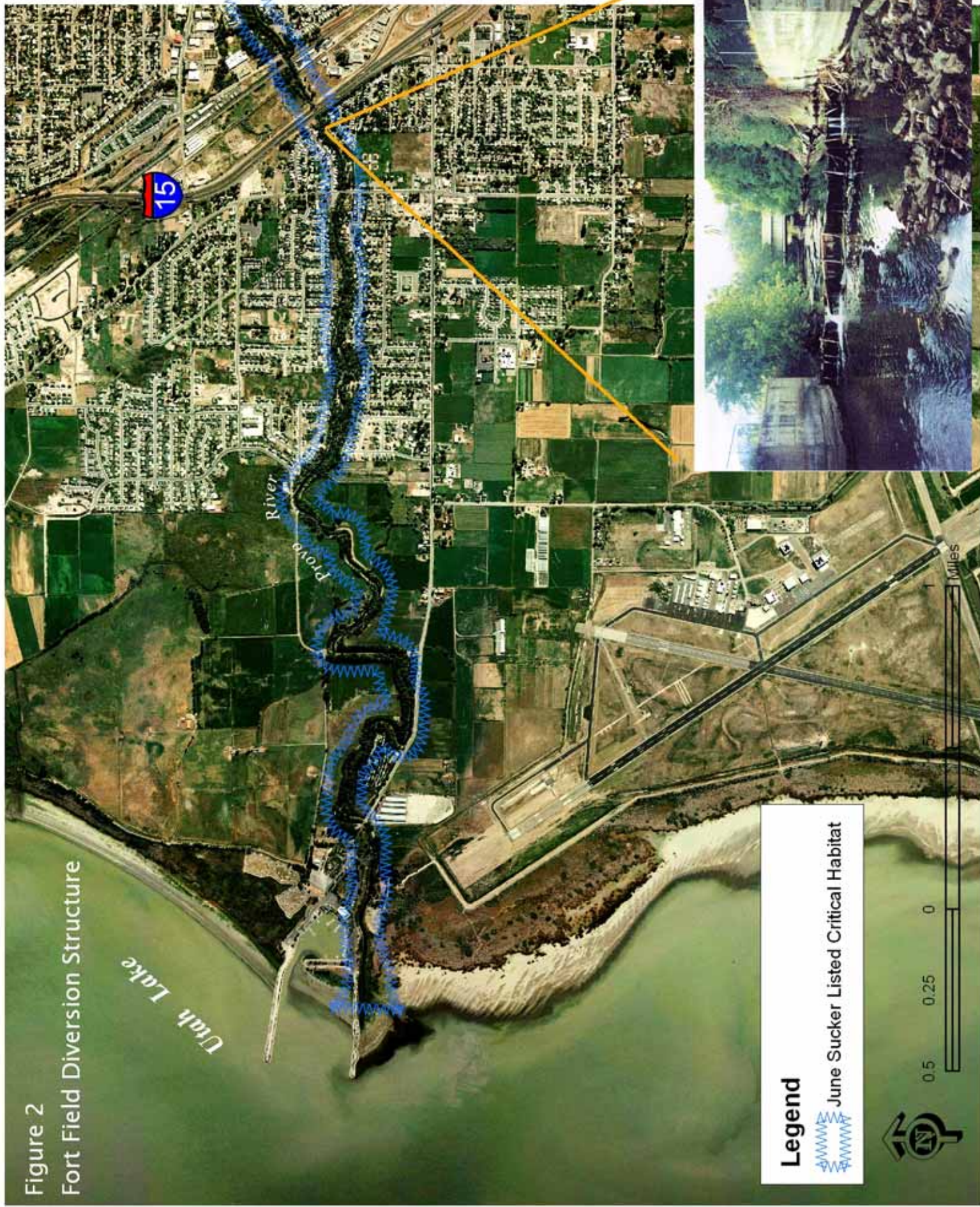


Figure 2
Fort Field Diversion Structure

Legend

- June Sucker Listed Critical Habitat

0.5 0.25 0 Miles



alternatives that could be implemented to address the underlying need. The ID team analyzes the environmental impacts of the alternatives, considering the issues raised by the public. A Draft Environmental Assessment (EA) is prepared describing the alternatives and their environmental effects. The Draft EA is sent to the public and other interested Federal, State and local agencies for their review and comment. Comments are considered, the EA modified as necessary and a Final EA prepared (this document). Based on the findings in the Final EA, the responsible Federal officials will decide on an alternative to implement, or, if environmental impacts are found to be significant, they will prepare an Environmental Impact Statement (EIS).

This chapter of the EA provides background information and describes the need for this project. Chapter 2 describes the Proposed Action and No Action alternatives and summarizes the environmental impacts of each alternative. Together, Chapters 1 and 2 provide the information necessary to understand the need for the project, the action being proposed to address the underlying need and a summary of the environmental effects of the alternatives. These two chapters provide the necessary information and rationale to make an informed decision as to which alternative to implement. Chapter 3 provides readers with more detailed information and analysis supporting the conclusions of environmental effects summarized in Chapter 2. Chapter 4 describes consultation and coordination undertaken in the analysis and the measures to inform and involve the public in the decision making process.

Chapter 5 is a description of the measures that will be implemented to minimize the impacts of the Proposed Action Alternative, if selected.

Chapter 2 Alternatives

Introduction

The purpose of this chapter is to describe the Proposed Action and No Action alternatives and to summarize the environmental effects of these alternatives.

Existing Condition

The Fort Field Diversion is located on the Provo River, approximately 3.8 miles upstream of Utah Lake, east of Geneva Road, and west of I-15. The Fort Field Diversion is the first diversion structure located upstream of Utah Lake, and thus serves as the first barrier to adult fish migrating upstream from Utah Lake.

The Fort Field Diversion structure consists of a “kick-leg” dam, concrete sidewalls and a flat concrete sill that lies flush with the bed of the stream. Despite the poor condition of the structure, it still functions as designed and periodically operates as a dry dam. The diversion creates a barrier to upstream fish migration during low flow conditions. Under the existing conditions, aquatic habitat below the dam can become extremely limited during critical spawning periods for June sucker.

The head works, or intake structure, is composed of a 32-inch metal slide gate set in the south sidewall of the diversion facility. Removable flashboards extend 30 inches above a concrete sill that is embedded in the river channel and spans its width. The sill and flashboards back

river flows up to an elevation where they enter the intake structure.

After flow enters the intake, it is conveyed by a 30-inch reinforced concrete pipe approximately 500 feet to where it daylights into the Fort Field Canal. A 2-foot Parshall Flume, located on the east side of Geneva Road, on the Fort Field Canal is used to measure diverted flows. A gated structure at Geneva Road allows water users to divert excess flows from the canal back to the river.

The Utah Division of Water Rights (Water Rights) identifies two water rights associated with the Fort Field Diversion managed by the Fort Field-Little Dry Creek Irrigation Company (55-11012 & 55-11009). Water Rights reports that the diversion serves a total acreage of 833.20 acres with combined water rights as follows, measured in cubic feet per second (cfs):

- 15.61 cfs May 10 to June 20
- 14.05 cfs June 20 to July 20
- 12.49 cfs July 20 to Sept. 1
- 11.34 cfs Sept. 1 to May 10

While the maximum combined water right at this diversion is 15.61 cfs, diverted flows typically do not exceed 8 or 9 cfs. The District and Provo City have purchased water shares from the Fort Field-Little Dry Creek Irrigation Company for segregation amounting to approximately 6.1 cfs. Even though typical flows do not exceed 9 cfs, the capacity to divert the entire 15.61 cfs water right needs to be protected.

No Action Alternative

NEPA requires the No Action Alternative be described in the Environmental Analysis process. The No Action Alternative serves as a baseline against which to compare other alternatives. Under the No Action, the Fort Field Diversion would remain in the Provo River and would continue to present a barrier to fish movement. Regular maintenance activities, such as tree removal would likely continue. June sucker would not have unimpaired access to the upper 1.1 miles of the 4.9 mile reach of the Provo River designated as critical habitat to the species. The ability to bypass and measure instream flows would not be provided and the benefits of Federal investments for instream flows might not be realized. The recommendations made in 1999 *June Sucker Recovery Plan* and by the *June Sucker Recovery Implementation Program* would not be implemented and the species would remain imperiled.

Proposed Action Alternative

Under this alternative, the Fort Field Diversion would be reconstructed at its existing location in order to allow June sucker and other fish species unrestricted movement past the diversion. Approximately 5 trees would be removed near the diversion intake and the pipeline from the diversion to the open ditch would be lined and/or replaced. The new diversion would consist of a cobble bar constructed across the majority of the width of the river channel that would direct river flows into a concrete sluiceway on the south side of the river channel (Figure 3). The concrete sluiceway would be approximately 4 feet wide by 25 feet

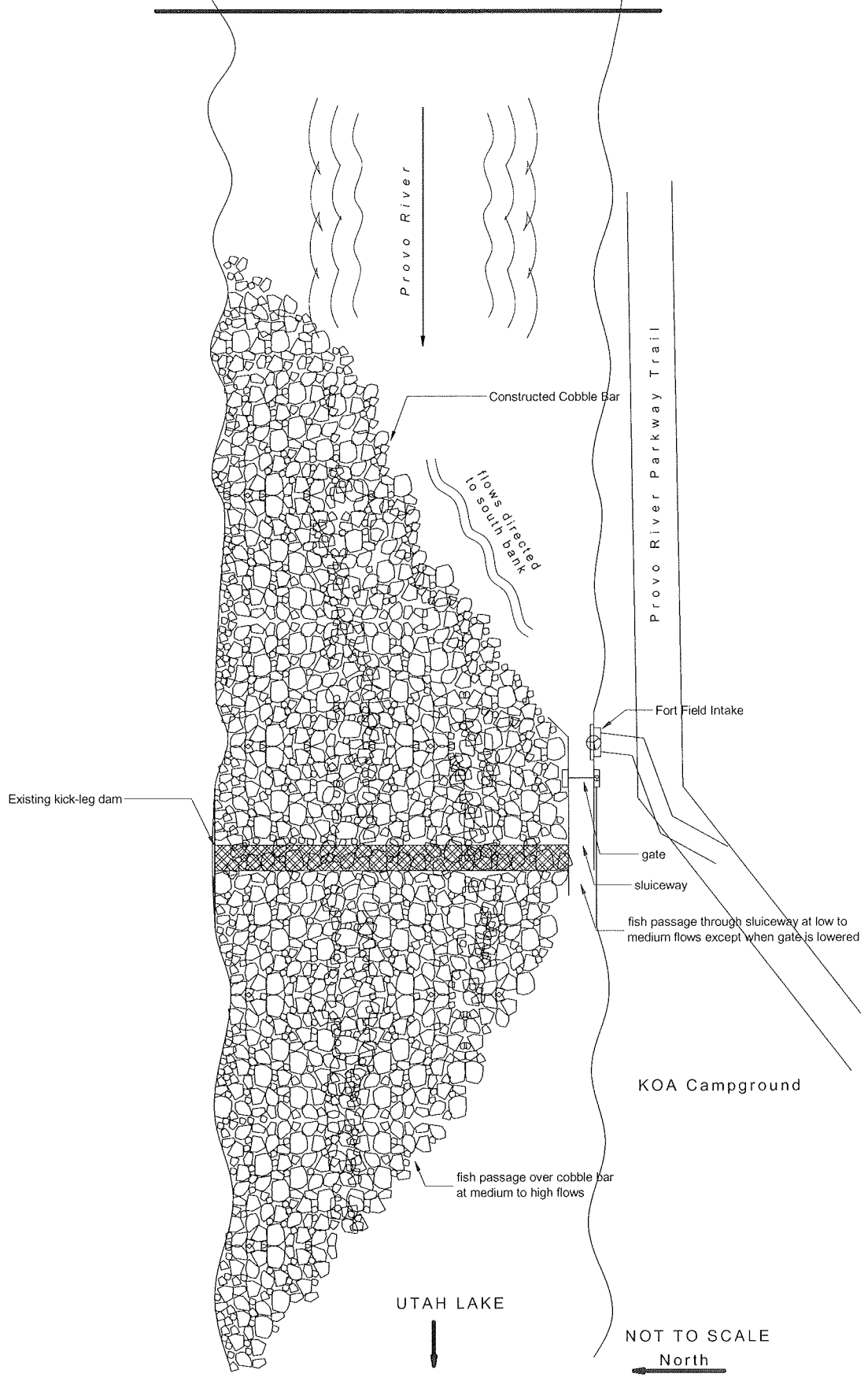
long. A gate would be constructed at the head of the sluiceway and would be used to back water into the diversion outlet at low flows. The actual dimensions of the feature would be determined during final design.

The existing kick-leg dam and concrete sill would remain in place and be incorporated into the constructed cobble bar. Construction of the cobble bar would begin approximately 200 feet upstream of the existing sill and would angle from the north bank of the river towards the sluiceway located on the south bank. The cobble bar would consist of boulders and large cobble “keyed” into the river bed. As the cobble bar extends to the south and downstream it will increase in elevation until it reaches the existing sill and kick-leg dam at which point the top of the cobble bar will be at the same elevation as the top of the boards on the kick-leg dam. The kick-leg dam and boards will not be visible. The cobble bar would then gradually decrease in elevation and recess back towards the north bank until it reaches the natural bed of the river channel.

The constructed cobble bar would direct river flows to the south river bank and into the sluiceway. At low flows, the gate structure would be lowered to back water up and into the outlet works. As flows increase, the natural stage of the river would provide sufficient head to direct flow into the outlet without the need to lower the gate. As flows increase, the river would overtop the cobble bar and would provide a smooth bed surface allowing June sucker and other species unrestricted movement past the diversion. The only time fish

Figure 3 Fort Field Conceptual Design

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movement would be restricted would be during low flows when the gate structure is lowered. This would normally only occur late in the irrigation season after spring runoff and well after June sucker have spawned. In the future as additional instream flow water is acquired, the frequency and duration of the need to lower the gate to maintain irrigation diversions would diminish. The diversion would include design features to provide bypass and measurement of instream flows. The Harbor Drive Gaging Station, operated by the U.S. Geological Survey (USGS), is located a short distance downstream of the Fort Field Diversion. Real time data from this gaging station will be used to monitor the flow rate of the river and passage of water below the Fort Field Diversion. A measurement weir, or some type of monitoring device will be placed on the irrigation system, as those flows need to be monitored as well.

Construction

Construction would begin in late fall and would be completed in approximately six weeks. The preferred access to the construction site would be through the KOA campground. Access would require a temporary construction easement through the campground and rental of the north eastern most campsite on a temporary basis. The removal of approximately five trees as well as the minor trimming of other adjacent trees will occur. The pipeline from the intake to the open ditch on the KOA property will be lined and/or replaced. The construction site will be rehabilitated along with any portions of the asphalt road damaged during construction.

A temporary by-pass and coffer dam would be constructed in the river channel to temporarily divert flows from the south bank. This would allow for the construction of the cobble bar and sluiceway and reconstruction of the outlet works. The cobble bar would be constructed by excavating into the existing river channel approximately 18"- 24" and keying a row of large boulders 30" to 36" in diameter parallel to and on both the upstream and downstream sides of the existing sill. Keyed in boulders would be backfilled and compacted with smaller natural stockpiled materials. Approximately 1,275 tons of large cobbles would need to be imported to the construction site. Rock work will be completed over the course of approximately two weeks. It is expected that 11 to 16, 16-yard dump-truck deliveries will be made per day for a period of approximately five days to deliver the estimated 1,275 tons of rock required for the project, depending on the rock source. Rock deliveries will be made no earlier than 8:00 a.m. and no later than 6:00 p.m.

Alternatives Considered But Dismissed From Detailed Analysis

Several other Alternatives were considered but dismissed from detailed analysis for a variety of reasons. These alternatives are summarized in Appendix 1 along with a brief explanation of the reason they were dismissed from consideration.

Other Related Projects

The Joint Lead Agencies are also proposing to modify or replace the other

seven diversion structures on the lower Provo River, which will be the subject of a separate analysis. The Fort Field Diversion is being analyzed separately in order to complete the project as soon as practical to facilitate the recovery of the endangered June sucker. Although not part of this project, the modification of the other diversion structures will be considered as a cumulative impact and addressed in the environmental analysis of this document. Other projects might include the continued effort to acquire additional water for instream flows and for the Utah Lake Drainage Basin System water. This would increase the minimum flows from historical levels, that is, since diversions have been made from the river.

Table 1 – Summary of Environmental Effects

Resource	Proposed Action Impact Summary	No Action Alternative
Fisheries	Would provide upstream fish passage and make an additional 1.1 miles of the lower Provo River accessible to spawning June sucker. The Proposed Action will also allow the accurate bypass and measurement of instream flows to support a healthy riverine ecosystem. Impact to fisheries is beneficial.	Diversion would not be replaced and would continue to present a barrier to spawning June sucker. The ability to accurately measure and bypass instream flows needed to support a healthy riverine ecosystem would not be met.
Wildlife	One small elm tree would be removed to access the river channel with heavy equipment and approximately five trees would be removed to keep tree roots from out of the diversion structure.	The removal of approximately five trees would likely occur under the No Action alternative to prevent tree roots and debris from blocking the diversion outlet.
T&E Species	No T&E species would be adversely affected by the Proposed Action. The June sucker will be positively impacted by providing access to 1.1 miles of the lower Provo River under all flow conditions.	June sucker would be restricted from upstream movement within a portion of the Provo River that has been designated as critical habitat. Recommendations made in the 1999 June Sucker Recovery Plan and by the Recovery Implementation Program for June sucker would not be implemented and the species would remain imperiled.
Water Quality	Impacts to water quality would be short term and localized to surface water quality through increased suspended sediment loading during in-stream construction. There would be no long term impacts.	No impacts would occur under the No Action Alternative.
Wetland and Riparian Resources	Less than 0.1 acres of riparian vegetation would be impacted under the Proposed Action.	No impacts would occur under the No Action Alternative.

Table 1 – Summary of Environmental Effects

Resource	Proposed Action Impact Summary	No Action Alternative
Recreation	The impact on the Provo River Parkway trail would be of short duration and would only affect a short section of trail, less than 500'. Impacts on sport fishing would also be of short duration with numerous alternative locations readily available.	No impacts would occur under the No Action Alternative.
Noise	Under the Proposed Action, noise impacts from the heavy machinery will be temporary and will occur only during the construction period. Impacts will be mitigated by following local noise ordinances (Utah County Code Chapter 12-3) and suspending construction work from 7:00 p.m. to 7:00 a.m. daily.	No impacts would occur under the No Action Alternative.
Cultural Resources	The Fort Field Diversion is eligible for listing to the National Register of Historic Places. The Proposed Action would result in an Adverse Action as defined by the National Historic Preservation Act. Pending consultation with the State Historic Preservation Officer, the impact would be mitigated by photo documentation of the structure in accordance with Secretary of the Interior guidelines and the Historic American Buildings Survey (HABS) and the Historic American Engineering Record (HAER) standards.	No impacts would occur under the No Action Alternative.

Chapter 3

Affected Environment and Environmental Consequences

Introduction

This chapter describes the environment that could be affected by the proposed project and the environmental effects that could be anticipated if the proposed project were implemented. A summary of the Environmental Effects is provided at the end of Chapter 2.

Affected Environment and Environmental Consequences

Issues

Federal regulations for implementing NEPA state that, “NEPA documents must concentrate on the issues that are truly significant to the action in question, rather than amassing needless detail.” This EA focuses on relevant issues raised by the public through public scoping and interaction with an ID Team of resource specialists assembled for this project. Some issues or resources were determined to have no relevance to the decision and were therefore eliminated from further analysis. Those issues and resources eliminated from further analysis and the rationale for their dismissal are summarized in Appendix 2.

Issues for consideration

Fisheries

Affected Environment

The project area is within fish management Section I of the Provo River, as designated by the Utah Division of Wildlife Resources (Wildlife). It is managed under a Special Fish Species concept, that is, the management focus is on conservation and population enhancement for genetically unique special fish species within their historic habitats and their use for recreational value in the sport fish program when possible. The fish species of interest is June sucker. This section of the Provo River is also classified as a Class 4, Wild Fish Water – sport fish maintained by natural reproduction only.

Wildlife has monitored fish in this section of the Provo River during 2004-2006. Fish species collected in this section of the river were: common carp (*Cyprinus carpio*), brown trout (*Salmo trutta*), mottled sculpin (*Cottus bairdii*), speckled dace (*Rhinichthys osculus*), white bass (*Morone chrysops*), green sunfish (*Lepomis cyanellus*), largemouth bass (*Micropterus salmoides*), cutthroat trout (*Oncorhynchus clarki*), mountain sucker (*Pantosteus platyrhynchus*), mountain whitefish whitefish (*Prosopium williamsoni*) and walleye (*Sander vitreus vitreus*) (M. Mills, Wildlife, personal comments and Wildlife files).

In 2004 and 2005, a total 61 and 57 brown trout, respectively, were collected from this reach of the Provo River.

Mottled sculpin numbers for that same period were 25 and 29, respectively.

In 2006, 2 stations in the vicinity of the diversion structure were added. Fish were collected from 100 meter long stations above and below the Fort Field diversion structure. Brown trout, mottled sculpin and largemouth bass were collected both above and below the diversion, while white bass, sunfish and suckers (not identified to species) were collected only below the diversion. White bass were most abundant (56%), and brown trout were the next most abundant (26 %). Brown trout numbers were 94 above and 30 below the diversion. Mottled sculpin numbers were 15 above, and 42 below the diversion (Wildlife 2007 draft report).

Environmental Consequences

Proposed Action

Implementation of the Proposed Action will provide upstream fish passage and make an additional 1.1 miles of the lower Provo River accessible to spawning June sucker. The Proposed Action will also allow the accurate bypass and measurement of instream flows to support a healthy riverine ecosystem.

Construction during the fall may affect brown trout spawning downstream of the Fort Field Diversion structure. Brown trout spawn in the fall and construction in the river would increase the amount of suspended sediments in the river, potentially reducing the viability of incubating eggs. However, based on the number of trout observed in the 2006 survey, spawning levels are considered to be low and impacts would only occur to the 2008 spawning season. These

impacts are not considered to be significant. Similarly, whitefish also spawn in the fall and may be affected by construction. Since impacts would be limited to only one spawning season and since the fish surveys showed limited use in the project area by whitefish, the impact is considered insignificant.

Construction will not affect spawning June sucker since it will take place well after spawning and incubation periods. After construction, entrainment of drifting June sucker larvae into the Fort Field Diversion works is expected to take place only during periods of extremely low flows in the Provo River when flows will be directed toward the Fort Field Diversion works on the south bank of the river. It is expected that during low flow years, the number of drifting larvae in the river will be very low, so entrainment losses are not expected to be significant. Any entrainment losses would be more than offset by the gain in June sucker access to spawning habitat attributed to the Proposed Action.

No Action Alternative

Under the No Action Alternative, Fort Field Diversion would not be replaced and would continue to present a barrier to upstream and downstream movement of fish, particularly spawning June sucker. The recommendations made in *1999 June Sucker Recovery Plan* and by the *June Sucker Recovery Implementation Program* would not be implemented and the species would remain imperiled. In addition, the ability to accurately measure and bypass instream flows needed to support a healthy riverine ecosystem would not be met.

Wildlife

Affected Environment

The Provo River corridor in the project area, while highly urbanized, provides some riparian habitat for birds and small mammals. Channelization and urban development has eliminated wetlands adjacent to the river.

Environmental Consequences

Proposed Action

The Proposed Action may adversely affect birds and mammals in the project area with increased noise and human traffic during the construction period. One small elm tree would be removed from the edge of the river at the northeast corner of the KOA campground in order to get heavy equipment into the river channel required for construction of the cobble bar. In addition, approximately five trees will need to be removed near the outlet works in order to keep tree roots out of the diversion works and pipeline. Tree roots entrain river debris and block flow through the diversion system. No mitigation is proposed.

The noise and traffic impacts are not considered significant as they are

temporary and will occur well after sensitive nesting periods. The small number of trees to be removed under the Proposed Action is considered an insignificant impact.

No Action Alternative

Under the No Action Alternative approximately five trees would need to be removed in order to keep tree roots out of the outlet works. As with the Proposed Action, the small number of trees removed is considered an insignificant impact.

Threatened, Endangered, Candidate And State-Sensitive Species

Affected Environment

A list of 6 Threatened, Endangered and Candidate species that may occur in the project area was developed from the Service information. The potential occurrence for these species has been evaluated and is listed. Potential project impacts on those that are likely to occur or have habitat in the project area are discussed.

As of August, 2007, the following listed species may be found in Utah County:

Table 2 – Listed Species in Utah County 2007		
Species	Status ¹	Occurrence Potential
Canada Lynx <i>Lynx canadensis</i>	T	Unlikely
Clay Phacelia <i>Phacelia argillacea</i>	E	Unlikely
Deseret Milk-vetch <i>Astragalus desereticus</i>	T	Unlikely
June Sucker <i>Chasmistes liorus</i>	E	High, particularly during the spawning and incubation season, project is located in critical habitat reach

¹ T=threatened species, E=endangered species, C=candidate species.

Ute Ladies'-tresses <i>Spiranthes diluvialis</i>	T	No occurrence likely in project area
Yellow-billed Cuckoo <i>Coccyzus americanus</i>	C	"Western" Yellow-billed Cuckoo = distinct population segment in Utah. Record of occurrence near the mouth of the Provo River, but not known to occur in the project area; dense riparian understory is lacking there.

The Utah Natural Heritage Program database shows records of occurrence near the Fort Field diversion structure for species listed as State-Sensitive: June sucker, Columbia spotted frog (*Rana luteiventris*) and long-billed curlew (*Numenius americanus*).

The Columbia spotted frog is not known to occur or have suitable habitat within the project area (D. Sakaguchi, Wildlife, personal comments).

The long-billed curlew nesting habitat requirements are described by the Division having four requirements: 1. short grass, 2. bare ground, 3. shade, and 4. abundant vertebrate prey (<http://dwrcdc.nr.utah.gov/rsgis2/Search/Display.asp?FINm=numeamer> March 2008). They appear to be most successful nesting in mixed fields with grass cover and fields with elevated areas. With these habitat requirements, they are not expected to be present in the project area.

Of all of the threatened, endangered and sensitive species listed above, the only species known to be found in the project area is the June sucker. The June sucker was federally listed as an endangered species with critical habitat on April 30, 1986 (USFWS 1999). Included as critical habitat was the lower 7.8 km (4.9

mi) of the main channel of the Provo River, from the Tanner Race diversion downstream to Utah Lake. This reach of the Provo River was identified as critical habitat because this was the only known spawning location for the species and is vital to its reproduction. The Tanner Race diversion represents a barrier to any further upstream movement (50 CFR Part 17; FR Vol 51 No. 61, March 31, 1986).

Environmental Consequences

Proposed Action

A “may affect” determination is made if certain conditions may potentially occur as a result of the Proposed Action. This analysis is based on the potential of the Proposed Action to:

- Take a threatened, endangered or candidate species
- Cause a loss of habitat of a threatened, endangered or candidate species and/or
- Disturb a species migration, dispersal, breeding, or pollination that would affect the viability of the population of a threatened, endangered or candidate species.

With implementation of the Proposed Action, June sucker will gain access to

1.1 miles of the lower Provo River within the designated critical habitat, under all flow conditions. Adverse impacts to June sucker critical habitat and decreased water quality due to increased suspended sediments will occur during construction, but these impacts are considered temporary and localized, and will be kept to a minimum by working in the low flow conditions and using construction practices such as coffer dams. Impacts to spawning and incubating June sucker life stages will be avoided by restricting the construction to late fall, well after the spawning season. To avoid any potential impacts to the endangered June sucker the following conservation measures will be taken:

- In-channel work will be conducted during low flow conditions and using construction practices such as coffer dams
- Project construction will take place in late fall, after the June sucker spawning and incubation seasons.

The Joint Lead Agencies conclude that the proposed action will not affect the Canada lynx, clay phacelia, desert milk vetch, Ute ladies' tress and yellow billed cuckoo. The Joint Lead Agencies also conclude that with the conservation measures the Proposed Action may affect, but is not likely to adversely affect, the endangered June sucker. The June sucker may be positively impacted by providing access to 1.1 miles of the lower Provo River under all flow conditions. Section 7 Endangered Species Act (ESA) consultation has been ongoing through informal discussions with the Service staff. The above information was submitted to the Service for their review, and concurrence on the

not likely to adversely effect determination was received in a September 25, 2007 letter.

No Action Alternative

Under the No Action Alternative, June sucker would still be restricted from upstream movement within a portion of the Provo River that has been designated as critical habitat. The recommendations made in *1999 June Sucker Recovery Plan* and by the *Recovery Implementation Program for June sucker* would not be implemented and the species would remain imperiled.

Water Quality

Affected Environment

As designated by the Utah Division of Water Quality, Department of Environmental Quality, Section 1 of the Provo River (USGS Cataloging Unit: 16020203) is the 10.2 miles from Utah Lake to the Murdock diversion. In this section of the river, the water quality designated uses are cold water fishery, secondary recreational contact, and agriculture. Based on the 2002 305(b) list, this stream section partially supports these uses. It is impaired based on pH or acidity and is listed as having caustic conditions, with probable sources unknown

(http://iaspub.epa.gov/tmdl/enviro_v2.wcontrol?p_id305b=UT16020203-001_00 March 2007).

Water quality data are collected by the Utah Division of Water Quality at a station near Geneva Road-Highway 114, just downstream of the Fort Fields Diversion location and by the District at the gage at Harbor Drive. Water quality can be poor in the vicinity of these two sites during the summer months, due to

low flows, high temperatures and low dissolved oxygen levels (BIO-West Draft Report, 2007).

Environmental Consequences

Proposed Action

As stated in the Fisheries Discussion, implementation of the Proposed Action will cause short term, localized impacts to surface water quality through increased suspended sediment loading during construction. These impacts will be kept to a minimum by working in the river channel during low flow conditions and through the use of construction practices, such as the use of coffer dams. Impacts are not considered to be significant.

No Action Alternative

Under the No Action Alternative no impacts to water quality will occur.

Wetland and Riparian Resources

Affected Environment

The Provo River in the project area has been diked and there is no active connection to a flood plain. Wetland and riparian vegetation is limited to a very narrow strip along the inside base of the dike about 1 meter in width. Vegetation consists primarily of mature cottonwood (*Populus angustifolia*) and box elder (*Acer negundo*).

Environmental Consequences

Proposed Action

Construction activities will occur primarily in the river corridor with the construction of the large cobble bar, sluiceway and gate structure. There will be temporary impacts in the river channel with the construction of the temporary coffer dam and bypass channel. The constructed cobble bar

will have a footprint approximately 1.15 acres in size and will encompass the existing footprint of the kick-leg dam. Construction within the Provo River channel is regulated by the U.S. Army Corps of Engineers and is anticipated to be covered by Nationwide Permit 40 – Stream and Wetland Restoration Activities, with no additional permits required. Consultation with the Utah Division of Water Quality and U.S Army Corps of Engineers will take place concurrent with the release of this EA.

There will be less than 0.1 acres of riparian vegetation that would be cleared as part of construction. One small elm tree would be removed from the edge of the river at the northeast corner of the KOA campground in order to get heavy equipment into the river channel. In addition, approximately five trees will need to be removed near the outlet works in order to keep tree roots out of the diversion works and pipeline. No other riparian or wetland habitats will be impacted from the project.

No Action Alternative

Under the No Action Alternative, routine operation and maintenance of the existing diversion would require periodic removal of riparian trees to keep tree roots and debris out of the diversion works, similar to what will be required under the Proposed Action.

Recreation

There are two primary recreational activities that occur in the project area that could potentially be affected by the project; the Provo River Parkway trail and fishing.

Affected Environment

The Provo River Parkway is a paved, multi-use pathway used by walkers, joggers, bicyclists and in-line skaters. The Parkway follows the Provo River for 15 miles from Utah Lake State Park to Vivian Park in Provo Canyon (Figure 4). The Parkway is quite popular and has an estimated use of approximately 450,000 users per year (Utah Mountain Land Association of Governments). The Fort Field Diversion pipeline runs for a short distance under the Provo River Parkway trail.



Figure 4 Provo River Parkway Trail

Environmental Consequences

Proposed Action

Under the Proposed Action, the diversion outlets connection with the pipeline will be reconstructed. This will require approximately 500 feet of the trail to be closed for approximately two weeks during construction. Since this represents only a very small portion of the trail's total length (less than 1%) and will only be of short duration, the impact is insignificant. Coordination is ongoing with the City of Provo Parks and Recreation Department. The Provo River Parkway Trail in the vicinity of the project area was evaluated for

alternative routes around the project area during replacement of the pipeline and tree removal. None were found as the area includes private property and the Interstate highway. It was recommended by the Parks and Recreation Department staff that the Joint Lead Agencies work with them to define the period of trail closure as early as possible and that closure signs be posted to notify the public.

No Action Alternative

There would be no impacts to the Parkway trail under the No Action Alternative although maintenance of the existing structure may also require closure the trail for short durations.

Fishing

Affected Environment

There is limited sport fishing opportunities in the project area. Better quality fish habitat occurs upstream and angler use is limited in the project area.

Environmental Consequences

Proposed Action

Public access to the river corridor in the project area will be closed during construction under the Proposed Action for public safety concerns. Because there are other angling opportunities available in close proximity and because the closure will only be of short duration, the impact is insignificant.

No Action Alternative

There would be no impacts to the existing angling opportunities in the project area under the No Action Alternative. The Fort Field Diversion would not be removed and would still present a barrier to upstream and

downstream fish movement within the river corridor.

Socioeconomics

Affected Environment

The construction site would be accessed through the KOA campground and would require the acquisition of temporary construction easements through the campground and rental of the north eastern most campsite during construction.

Environmental Consequences

Proposed Action

Construction is anticipated to occur in the fall, after local schools are back in session and after the traditional high use season for camping. The campground owner would be compensated for the value of the temporary construction easement in addition to the repair of any facilities that may be damaged during construction. It is anticipated that the asphalt roadway near the north eastern most campsite will need to be resurfaced and the occupied campsite reclaimed. Rental of the upper campsite might provide additional revenue to the campground owner that might not otherwise occur.

The Fort Field Little Dry Creek Irrigation Company, owners of the Fort Field Diversion, would benefit from a new low-maintenance diversion.

No Action Alternative

The existing diversion would continue to require frequent maintenance by the irrigation company to clear debris collected on kick-leg dam.

Noise

Affected Environment

Reconstruction of the existing diversion dam would require the delivery and placement of approximately 30 tons of large cobbles in addition to the reconstruction of a portion of the diversion outlet works. This will require the use of heavy equipment during the six-week construction period including a backhoe and dumptrucks. It is anticipated that the cobbles required for the project would be delivered over the course of approximately five days, with 11 to 16 truck deliveries per day, depending on the rock source.

Environmental Consequences

Under the Proposed Action, noise impacts from the heavy machinery will be temporary and will occur only during the construction period. Impacts will be mitigated by following local noise ordinances (Utah County Code Chapter 12-3) and suspending construction work from 7:00 p.m. to 7:00 a.m. daily.

No Action Alternative

There would be no noise impacts under the No Action Alternative.

Cultural Resources

Affected Environment

Section 106 of the National Historic Preservation Act requires all Federal Agencies to identify the impacts their actions would have on cultural and historical resources. Historic resources include buildings, structures or objects that are at least 50 years of age and are included in or eligible for inclusion in the National Register of Historic Places (NRHP). Historic properties also include properties of traditional religious and cultural importance to tribes and other communities that meet one or more of the NRHP criteria for evaluation (see 36

CFR 60). To determine the potential impacts of the Proposed Action on cultural and historical resources, a cultural resource inventory of the Area of Potential Effect was conducted in 2007.

Water from the Provo River has been diverted from the Fort Field Diversion location since at least 1903, although the diversion structure has been modified and replaced many times since then. The Fort Field Diversion is eligible for listing to the National Register of Historic Places under criteria a; structures associated with events that have made a significant contribution to the broad patterns of our history.

Environmental Consequences

Proposed Action

The Proposed Action would result in an Adverse Action as defined by the National Historic Preservation Act. Pending consultation with the State Historic Preservation Officer, the impact would be mitigated by photo documentation of the structure in accordance with Secretary of the Interior Guidelines and the Historic American Buildings Survey (HABS) and the Historic American Engineering Record (HAER) standards.

No Action Alternative

There would be no impacts to cultural resources under the No Action Alternative.

Executive Orders

As a Federal Agency, the Joint Lead Agencies must comply with the requirements of various Presidential Executive Orders relating to the natural and human environment. This section

documents the Joint Lead Agencies' consideration of these requirements.

EXECUTIVE ORDER 13186 - RESPONSIBILITIES OF FEDERAL AGENCIES TO PROTECT MIGRATORY BIRDS

This Executive Order requires Federal agencies to describe the effects of their actions on migratory birds in the environmental analyses required by NEPA (this document), with an emphasis on species of concern. Proposed, Threatened and Endangered Species and State of Utah Sensitive Species are described starting on page 12.

EXECUTIVE ORDER 13175 AND SECTION 106 OF THE NATIONAL HISTORIC PRESERVATION ACT - CONSULTATION AND COORDINATION WITH INDIAN TRIBAL GOVERNMENTS

These regulations require Federal Agencies to consult with Indian Tribes regarding potential impacts on sites with religious or cultural significance. A letter was sent to the Ute Tribe in March, 2006 and by copy of this document, the Joint Lead Agencies will continue the consultation process.

EXECUTIVE ORDER 12898- ENVIRONMENTAL JUSTICE

This Executive Order requires Federal Agencies to consider and disclose any disproportional effect their actions may have on minority and low income populations. There would be no disproportional environmental effects on minority and low income populations resulting from the Proposed Action.

Cumulative Impacts

Cumulative impacts are the incremental impact of an action when considered with other past, present, and reasonably foreseeable future actions. Cumulative effects can result from individually minor, but collectively significant actions taking place over a period of time. The potential cumulative impacts resulting from the Proposed Action are

summarized below. The analysis of cumulative impacts focuses on relevant issues raised by the public through public scoping and interaction with an Interdisciplinary Team. Issues and resources eliminated from further analysis and the reason they were eliminated are summarized in Appendix 2.

Table 3 – Summary of Cumulative Impacts

Resource	Proposed Action Impact Summary	Potential Cumulative Impacts Summary
Fisheries	Would provide upstream fish passage and make an additional 1.1 miles of the lower Provo River accessible to spawning June sucker. The Proposed Action will also allow the accurate bypass and measurement of instream flows to support a healthy riverine ecosystem. Impact to fisheries is beneficial.	Since impact is beneficial, there would be no adverse cumulative impacts.
Wildlife	One small elm tree would be removed access to the river channel with heavy equipment and approximately five trees would be removed to keep tree roots from out of the diversion structure. The removal of approximately five trees would likely occur under the No Action alternative as well as the Proposed Action.	Only 1 tree would be removed compared to baseline conditions. This loss is immeasurable when compared to impacts that have already occurred on the historic Provo River corridor or when compared to riparian habitat present on the river. The Proposed Action would not add significantly to the cumulative impacts on wildlife habitat.
T&E Species	No T&E species would be adversely affected by the Proposed Action. Impact to June sucker would be beneficial.	Because no T&E species will be affected, there would be no adverse cumulative impacts on T&E species.
Water Quality	Impacts to water quality would be short term and localized to surface water quality through increased suspended sediment loading during in-stream construction. There would be no long term impacts.	Because no long-term impacts to water quality would occur, there would be no adverse cumulative impacts to long-term water quality.

Table 3 – Summary of Cumulative Impacts

Resource	Proposed Action Impact Summary	Potential Cumulative Impacts Summary
Wetland and Riparian Resources	Less than 0.1 acres of riparian vegetation would be impacted under the Proposed Action.	Historically, the Provo River corridor meandered across the valley floor as it flowed to Utah Lake. Thousands of acres of wetlands and riparian habitat have been lost as the valley was settled and developed to its present day highly urbanized condition. Although the historical impact on riparian and wetland resources within the project area has certainly been significant, a loss of less than 0.1 acres does not add significantly to this historical loss nor does it contribute significantly to future cumulative losses.
Recreation	The impact on the Provo River Parkway trail would be of short duration and would only affect a short section of trail, less than 500'. Impacts on sport fishing would also be of short duration with numerous alternative locations readily available.	Because no long-term impacts on recreation would occur, there would be no adverse cumulative impacts.
Noise	Under the Proposed Action, noise impacts from the heavy machinery will be temporary and will occur only during the construction period. Impacts will be mitigated by following local noise ordinances (Utah County Code Chapter 12-3) and suspending construction work from 7:00 p.m. to 7:00 a.m. daily.	The Federal Highway Administration and the Utah Department of Transportation initiated an Environmental Impact Statement for widening Geneva Road (SR-114) between I-15 at Center Street in Provo and State Street (US-89) in Pleasant Grove. This project has the potential to contribute to noise impacts. However, noise impacts under the Proposed Action will be temporary and will not overlap in time with the Geneva road widening project. Therefore, there will be no cumulative noise impacts.
Cultural Resources	The Fort Field Diversion is eligible for listing to the National Register of Historic Places. The Proposed Action would result in an Adverse Action as defined by the National Historic Preservation Act. Pending consultation with the State Historic Preservation Officer, the impact would be mitigated by photo documentation of the structure in accordance with Secretary of the Interior guidelines and the Historic American Buildings Survey (HABS) and the Historic American Engineering Record (HAER) standards.	The Joint Lead Agencies are proposing to modify or replace seven other diversion structures on the lower Provo River. The Fort Field Diversion is being analyzed separately in order to complete the project as soon as practical to facilitate the recovery of the endangered June sucker. It is anticipated that most of the seven other diversion structures on the lower Provo River are also eligible for listing to the National Register of Historic Places. It is also anticipated that removal of the structures will result in an adverse action and mitigation will be accomplished through HABS/HAER recordation and photo documentation. Since the impacts will be fully mitigated, it is not anticipated that cumulative impacts will result. However, since all the diversion

Table 3 – Summary of Cumulative Impacts

Resource	Proposed Action Impact Summary	Potential Cumulative Impacts Summary
		Structures on the lower Provo River will be removed or reconfigured, it is anticipated that mitigation will also include a more programmatic element in addition to HABS/HAER documentation of each structure. This might include interpretive signing at one or more sites, the details of which will be formulated in consultation with the State Historic Preservation Office.

Chapter 4 Consultation and Coordination

One of the primary purposes of NEPA is for Federal Agencies to inform and involve the public and other relevant Federal, State, and local entities of the likely environmental impacts of their proposed actions. In this regard the following agencies have been consulted

in the preparation of this environmental analysis.

Fort Field Little Dry Creek Irrigation
Company
Provo City
United States Fish and Wildlife Service
United States Army Corps of Engineers
Utah Division of Wildlife Resources
Utah Department of Transportation

Chapter 5

Environmental Commitments and Mitigation Measures

1. Project construction will take place in late fall, after the June sucker spawning and incubation seasons.
2. Adverse impacts to instream habitat and decreased water quality due to increased suspended sediments will be kept to a minimum by working in the low flow conditions and using construction practices such as a by-pass channel and coffer dams.
3. The construction site will be rehabilitated along with any portions of the asphalt road damaged during construction.
4. Pending consultation with the State Historic Preservation Officer, photo documentation of the diversion in accordance with Secretary of the Interior guidelines and the Historic American Buildings Survey (HABS) and the Historic American Engineering Record (HAER) standards would be completed to mitigate the impact on the historical value of the diversion structure.
5. Noise impacts will be mitigated by following local noise ordinances (Utah County Code Chapter 12-3) and suspending construction work from 7:00 p.m. to 7:00 a.m. daily. Rock deliveries will be made no earlier than 8:00 a.m. and no later than 6:00 p.m.
6. Standard Operating Procedures for construction would be implemented.
7. The Joint Lead Agencies will work with Provo City Parks and Recreation Department regarding the potential closure of a small section of the Provo River Parkway trail. Signs will be posted notifying the public of closed river reaches and Parkway Trail during construction.
8. The Joint Lead Agencies will consult with the Provo City Public Works Department regarding any project-related change to the Provo River water surface elevation in the project area during the final design process.

Chapter 6

Responses to Comments on the Draft EA

Comment letters and emails were received on the Draft EA. These were received from:

1. Utah Division of Wildlife Resources, Department of Natural Resources, State of Utah
2. City of Provo, Public Works Department
3. Utah Division of Water Rights, Department of Natural Resources, State of Utah
4. Utah Division of Water Resources, Department of Natural Resources, State of Utah

A copy of each of these letters is included at the end of this chapter. Comments requiring a specific response are presented here in a comment and response format. Some comments are paraphrased. Recommended editorial changes have been made in the EA text where appropriate.

City of Provo, Public Works Department

Comment 1: Verification needs to be made that the water surface profile of the river during high flows is not elevated as a result of the proposed reconstruction.

Response: Modeling of the water surface elevations of the conceptual design in the EA, with data from Bowen and Collins Engineering, indicates that the water surface elevation immediately upstream of the Fort Fields Diversion structure will increase approximately 2.5 ft over existing levels at the 2,300 cfs high flow, as identified by the Provo City Public Works Department. This increase is contained within existing banks at that location and diminishes to nearly zero at a distance of approximately 1,000 ft upstream (at a point located between the Union Pacific Railroad and Highway I-15 bridges).

Additional field data will be gathered to fine tune these models; and the final design will include an iterative process of designing the structure elevation and modeling of resulting water surface elevations to minimize any increase to the extent possible. A final design model of the expected water surface elevation will be run and, if needed, any berms or other appurtenances to prevent overbank flooding will be incorporated into the design. Consultation with the Provo City Public Works Department will be ongoing during the design process.

Comment 2: Given the shallow ground water problems experienced in nearby residential areas during moderate to high flows in the river, we would recommend the provision of a clay layer under the cobble bar in disturbed areas of the river bed to minimize potential exacerbation of those ground water problems.

Response: It is anticipated that the construction of the bar will not worsen the groundwater problems. However, the addition of a clay layer to the diversion structure design will be considered during the final design phase.

Utah Division of Water Rights, Department of Natural Resources, State of Utah

Comment 3: Is the structural design of the kick-leg dam such that it could withstand high flows? Higher flow rates typically cause an increased structural load on the removable dam components. Are the water users required to maintain this structure in order to divert during low flows?

Response: The kick-leg dam will be incorporated into the cobble bar under the proposed action. Once the project is complete there will be no removable dam components. The sluice gate channel will be operated in an open position during periods of high flow. The water users would maintain this structure as they do with the existing structure. See also the response to Comment 7.

Comment 4: It appears that the cobbles would actually increase the maintenance associated with the kick leg dam structure.

Response: See comment 3 response.

Comment 5: Replacing the kick leg dam with a permanent concrete wall dam would prevent the need for maintenance of the existing kick leg dam preventing seepage losses through the dam and enabling a better measurement of flows.

Response: See comment 3 response. A permanent concrete wall dam would not allow fish passage at low flows and the purpose of providing fish passage would not be met.

Comment 6: There would be a resulting increased sediment load into the diversion if sediment doesn't pass under the proposed sluice gate, particularly during high flows. It is important that the diversion inlet be somewhat higher than the bottom of the channel so more sediment will pass downstream.

Response: The sluice gate would be open during high flows to pass sediment load and prevent silt from accumulating near the diversion intake pipe. The purpose and design of the sluiceway is to pass sediment bed load in the river. During late summer when the river is low and there is less sediment in the river, the sluice gate would be closed and all water would either enter the diversion pipe or pass over the rock sill. The invert of the sluiceway would be lower than the invert of the diversion pipe.

Comment 7: The higher the elevation of the diversion dam above the riverbed the more potential for channel degradation downstream. In this situation it appears that the proposed cobble material particularly on the downstream side of the dam will need to be attached to the floor of the structure and/or the bottom of the streambed in order to remain in place during high flows. Alternatively the cobbles could be replaced after each high flow event in order to allow fish migration over the dam.

Response: The rock used in the sill will be essentially immobile even at high flows. Some smaller material will move into and out of the area during high flows. Maintenance of the rock sill will not be needed during most years.

Comment 8: It appears that the proposed structure could increase the migration of the river channel towards the left bank. The proposal should include channel armoring such as gabions along this left bank where there is potential for bank erosion or scouring.

Response: Increased protection along the left bank is included in the existing conceptual design, but only below the structure. The need for additional protection upstream of the structure has been discussed in the field, and will be included in the final design if it is deemed necessary.

Comment 9: The document indicates that the flow will be measured as it passes the diversion. Water measurement is an important part of the project. In order to measure fishery storage water passing the diversion dam, the dam should not leak. If the diversion dam doesn't leak then bypass flow would need to be measured downstream at the Harbor Drive Gage. We request that the measuring device(s) be equipped to enable real-time data collection via the CUWCDs SCADA system. This real-time data is then made available to the river commissioner via our database or the SCADA system, with real-time records available on our database.

Response: The Harbor Drive Gaging Station, operated by the USGS, is located a short distance downstream of the Fort Field Diversion. Real time data from this gaging station will be used to monitor the flow rate of the river and passage of water below the Fort Field Diversion. A measurement weir or some type of measuring device will also be placed on the irrigation system. The text on P. 6 of the EA has been edited to reflect this.

Comment 10: Removable weirs serving as a fish ladder in the sluiceway would likely enable fish movement with significantly less flow when the sluice gate is open.

Response: Various fishway designs were evaluated during planning for this project. However, due to the lack of space in the project area, and the requirement for low gradients and velocities, these options were not considered to meet the purpose and need of providing fish passage for species such as June sucker.

Comment 11: Water right 55-1350 is downstream diligence claim that may need to be taken into account.

Response: The project purposes include maintaining the ability to meet diversion requirements for canal companies and legal water users who divert water from the Provo River. Implementation of the Proposed Action will maintain the present conditions to operate diversions; the downstream diligence claim should not be impacted.

Comment 12: Would it be more cost effective and accomplish the purpose of enhancing fish passage by removing the diversion dam entirely and supplying the Fort Field water through a well(s) & sprinklers?

Response: The use of a well, as well as pumping from the Provo River was considered during planning. Due to concerns of operation and maintenance costs, and acceptability by the water users, these options were not considered in the detailed analysis, or considered to be a reasonable alternative at this time. See Appendix 1 for more information.

Comment 13: As indicated, a stream alteration permit from the Division of Water Rights is needed. Please contact Chuck Williamson of our Division for more information regarding this permit.

Response: Thank you for the comment, Mitigation Commission staff members have been in contact with Chuck Williamson at the Division of Water Rights on this stream alteration permit application.

Utah Division of Water Resources, Department of Natural Resources, State of Utah

Comment 14. On page 4 in the second column at the bottom, 15.61 cfs

Response: The text has been revised.

Comment 15. On page 5 I had a couple of questions about the design. Will the fish get directed into the intake as they swim by? Would sediment back up behind the cobble bar?

Response: It is not anticipated that spawning June sucker moving upstream near the Fort Fields diversion structure will be directed into the diversion intake. Entrainment of downstream drifting larval June sucker may occur, but these small losses are thought to be offset by the increased access to spawning habitat. In response to sediment backing up behind the cobble bar, see the response to Comment 7.

Comment 16: On page 6, Are the cobbles going to be keyed in as well or just the boulders? When will the construction begin since it is already late fall? In column 2 at the bottom should it read "This would increase the minimum flows to historical levels"?

Response: Cobbles will not be keyed in, but will be placed among the interstices of the keyed-in boulders. The construction schedule is determined by the June sucker staging, spawning, egg incubation and larval drift periods, and the acquisition of the appropriate agreements and permits. It is now planned for the Fall of 2008. The historical levels referenced in column 2 on this page are those that have occurred since the river has been diverted. The text has been edited to reflect this.

Comment 17: On page 7, column 2, there are 2 typo's in the Wildlife row. Add to "One small elm tree would be removed to access ..." and remove from "... to keep tree roots from out of the diversion structure."

Response: The text has been revised.

Comment 18: On page 10, column 1, Add the "Other fish species found by the Division in the 2004-2005 June Sucker..."

Response: The text has been revised.

Comment 19: On page 13, column 1, the bald eagle was not in table 2 but it is mentioned in this section. In column 2, under Water Quality I would put a period after Murdock diversion and start a new sentence "In this section of the river..."

Response: The text has been revised.

Comment 20: On page 14, column 2, Add the "...1.15 acres in size and will encompass the existing footprint..."

Response: The text has been revised.

From: "Doug Sakaguchi" <dougsakaguchi@utah.gov>
To: <RMINGO@uc.usbr.gov>
Date: 10/10/2007 10:06:47 AM
Subject: Fort Field Diversion Dam Reconstruction EA

Richard,

We have reviewed the draft Environmental Assessment for the Fort Field Diversion Dam Reconstruction on the Provo River in Utah County. The reconstruction of the Fort Field Diversion in the manner described as the Proposed Action will provide opportunity for the endangered June sucker to migrate upstream past this dam to utilize the full reach of that portion of the Provo River which has been designated as critical habitat for the species.

The proposed work schedule (fall of 2007) will not impact June sucker spawning. Although this time period does conflict with brown trout spawning, the number of brown trout in this part of the Provo River (from Fort Field Diversion to Utah Lake backwaters) is low, and brown trout spawning activity is minimal. There will not be significant impacts to the brown trout population in the lower Provo River if this project is conducted as scheduled.

In the long term, the project will still meet irrigation flows to the canal company, as well as ensure flows in the river so that June sucker can maneuver the new structure during both high and low flows.

If you have further questions, please feel free to contact me.

Douglas K. Sakaguchi
Habitat Biologist
Central Region
Utah Division of Wildlife Resources
1115 North Main St.
Springville, UT 84663
Phone: 801-491-5653
Fax: 801-491-5646
Email: dougsakaguchi@utah.gov

From: "Greg Beckstrom" <GBeckstr@provo.utah.gov>
To: <rmingo@uc.usbr.gov>
Date: 10/15/2007 4:34:06 PM
Subject: Fort Field Diversion Dam

Richard - Regarding the Draft Environmental Assessment for the Fort Field Diversion Dam Reconstruction, we have two comments:

- 1) Verification needs to be made that the water surface profile of the river during high flows is not elevated as a result of the proposed reconstruction.
- 2) Given the shallow ground water problems experienced in nearby residential areas during moderate to high flows in the river, we would recommend the provision of a clay layer under the cobble bar in disturbed areas of the river bed to minimize potential exacerbation of those ground water problems.

Any questions or feedback regarding these comments can be referred to:

Greg Beckstrom, P.E.
Deputy Public Works Director
Provo City Public Works Dept.
1377 South 350 East
Provo, UT 84606
801-852-6720

CC: "Merril Bingham" <MBingham@provo.utah.gov>



JON M. HUNTSMAN, JR.
Governor

GARY R. HERBERT
Lieutenant Governor

State of Utah

DEPARTMENT OF NATURAL RESOURCES

MICHAEL R. STYLER
Executive Director

Division of Water Rights

JERRY D. OLDS
State Engineer/Division Director

October 15, 2007

Richard Mingo
Project Coordinator
Utah Reclamation and Mitigation Commission
230 South 500 East #230
Salt Lake City, Utah 84102

RE: Fort Field Diversion Dam Reconstruction Draft Environmental Assessment; Comments from Utah Division of Water Rights

Dear Mr. Mingo

The Division of Water Rights has reviewed the proposed design of the fish passage and water measurement modifications to the Fort Field Diversion Dam on the Provo River and has prepared the following comments and observations. We propose that these comments be considered in making a final design and/or selection of the alternative.

- 1) Is the structural design of the kick-leg dam such that it could withstand high flows? Higher flow rates typically cause an increased structural load on the removable dam components. Are the water users required to maintain this structure in order to divert during low flows?
- 2) It appears that the cobbles would actually increase the maintenance associated with the kick-leg dam structure.
- 3) Replacing the kick-leg dam with a permanent concrete wall dam would prevent the need for maintenance of the existing kick-leg-dam preventing seepage losses through the dam and enabling a better measurement of flows.
- 4) There would be a resulting increased sediment load into the diversion if sediment doesn't pass under the proposed sluice gate, particularly during high flows. It is important that the diversion inlet be somewhat higher than the bottom of the channel so more sediment will pass downstream.
- 5) The higher the elevation of the diversion dam above the riverbed the more potential for channel degradation downstream. In this situation it appears that the proposed cobble material particularly on the downstream side of the dam will need to be attached to the floor of the structure and/or the bottom of the streambed in order to remain in place during high flows. Alternatively the cobbles could be replaced after each high flow event in order to allow fish migration over the dam.
- 6) It appears the proposed structure could increase the migration of the river channel towards the left bank. The proposal should probably include

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telephone (801) 535-7240 • facsimile (801) 535-7467 • TTY (801) 535-7458 • www.waterrights.utah.gov



Page 2

October 15, 2007

Subject: Fort Field Diversion Dam Reconstruction Draft Environmental Assessment; Comments from Utah Division of Water Rights

channel armor such as gabions along this left bank where there is potential for bank erosion or scouring.

- 7) The document indicates that the flow will be measured as it passes the diversion. Water measurement is an important part of the project. In order to measure fishery storage water passing the diversion dam the dam shouldn't leak. If the diversion dam doesn't leak then bypass flow would need to be measured both in the sluiceway and over the crest of the dam. If it does leak then the bypass flow will continue to be measured downstream at the Harbor Drive Gage. We request that the measuring device(s) be equipped to enable real-time data collection via the CUWCD's SCADA system. This real-time data is then made available to the river commissioner via our database or the SCADA system, with real-time records available on our database.
- 8) Removable weirs serving as a fish ladder in the sluiceway would likely enable fish movement with significantly less flow when the sluice gate is open.
- 9) Water right 55-1350 is a downstream diligence claim that may need to be taken into account.
- 10) Would it be more cost effective and accomplish the purpose of enhancing fish passage by removing the diversion dam entirely and supplying the Fort Field water through a well(s) & sprinklers?
- 11) As indicated, a stream alteration permit from the Division of Water Rights is needed. Please contact Chuck Williamson of our Division for more information regarding this permit.

Thank you for the opportunity to present our concerns and comments. Hopefully these comments are helpful in formulating a final design or alternative for the project. If you have questions regarding these comments please contact me at (801) 538-7469 or Email at BENANDERSON@Utah.Gov.

Sincerely,



Ben L. Anderson, P.E.
Utah Division of Water Rights

BLA

>>> "Ann Merrill" <annmerrill@utah.gov> 12/7/2007 10:06 AM >>>

Richard,

Our comments are minor and are as follows:

1. On page 4 in the second column at the bottom, 15.61 cfs
2. On page 5 I had a couple of questions about the design. Will the fish get directed into the intake as they swim by? Would sediment back up behind the cobble bar?
3. On page 6, Are the cobbles going to be keyed in as well or just the boulders? When will the construction begin since it is already late fall?

In column 2 at the bottom should it read "This would increase the minimum flows to historical levels" ?

4. On page 7, column 2, there are 2 typo's in the Wildlife row. Add to "One small elm tree would be removed to access ..." and remove from "... to keep tree roots from out of the diversion structure."
5. On page 10, column 1, Add the "Other fish species found by the Division in the 2004-2005 June Sucker..."
6. On page 13, column 1, the bald eagle was not in table 2 but it is mentioned in this section. In column 2, under Water Quality I would put a period after Murdock diversion and start a new sentence "In this section of the river..."
7. On page 14, column 2, Add the "...1.15 acres in size and will encompass the existing footprint..."

Thank you,
Anny Merrill

Ann Merrill
Engineer
Utah Division of Water Resources
801-538-7263
annmerrill@utah.gov

Appendix 1

Alternatives Considered But Dismissed From Detailed Analysis

Provo City Ground Water Collection Alternative

Provo City constructed a groundwater collection system and pump station in 2001 to mitigate flooding due to shallow groundwater infiltration in the project area. Homes located between Center Street and the Provo River west of Geneva Road experienced flooding problems for many years. During wet years, even a prolonged rainstorm would cause water to back up in residential basements. To mitigate these flooding problems, Provo City constructed a groundwater collection system that consists of a series of perforated and non-perforated pipe that collects shall groundwater. The collected groundwater flows by gravity to the Riverview pump station, located just north of 2710 West, where it is pumped into the Provo River (Figure 5). Tests of the collection system show that it has the capacity to supply approximately 6 cfs. Under this alternative, the groundwater collection would be re-routed from the Riverview pump station to the Fort Field canal *in lieu* of diverting from the Provo River at the Fort Field Diversion.

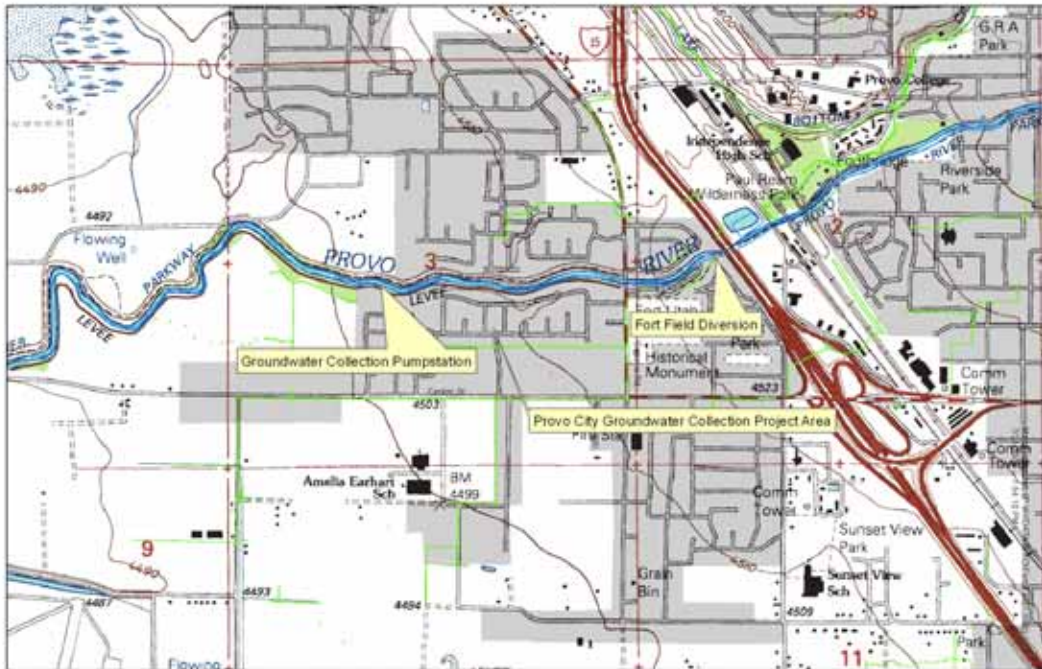


Figure 5 Groundwater Collection Area

This alternative was eliminated from detailed consideration because the system only has the capacity to supply 5.5 to 6 cfs as presently designed. This would not be sufficient to supply the required 15 cfs water right. Additionally, the system was not designed to collect water for delivery to another location. To collect and deliver water would require a significant commitment to clean and maintain the trashracks that prevent debris from clogging the collection system. The ability to deliver up to 15 cfs with low operation and maintenance requirements is a primary purpose of the project.

Pumping

Irrigation water deliveries would be made by pumping water directly from the Provo River into the existing Fort Field Canal. A pump house and well would be constructed on the south bank of the Provo River on the west side of Geneva Road. The pump would be approximately 15-horsepower (HP) operating with 80 percent efficiency; large enough to deliver 9 cfs. A rock weir would be constructed in the Provo River to direct river flows to the pump intake even at very low river flows. The rock weir would be constructed to allow for unrestricted fish passage. A trash rack and screening structure would be constructed to minimize entrainment of debris, sediment, and fish into the pump intake.

This alternative was not considered in detail because it would be very similar to the Proposed Action Alternative only with additional pumping costs. In order to collect water at low flows for pumping, similar features to the Proposed Action would need to be constructed to confine the streamflow to a narrow channel and direct flows into a pumphouse. It would be more efficient to divert flows directly into the existing delivery system as proposed rather than pumping water from a collection box into the delivery system.

Pond Bypass Pipe Alternative

This alternative would deliver water to the Fort Field irrigation ditch by storing water in an existing pond located on the east side of I-15. A new 24-inch pipeline, approximately 1,900 feet long, would begin at a new headwall constructed where the existing culvert crosses under I-15. The pipeline would follow an existing culvert, continue across Geneva Road and turn south, crossing the Provo River, and terminating at the existing collection box. A new diversion structure east of I-15 would be required to supply sufficient water to the pond to meet the diversion requirement of the Fort Fields Irrigation Company.. This alternative was not considered in detail because the construction of a new diversion dam on the Provo River just upstream of the removed Fort Field Diversion would not meet the Purpose and Need for the Project.

Orem City WWTP Effluent

This alternative proposes to replace all or part of the water diverted from the Provo River with treated effluent water from the Orem City WWTP. A pipeline originating at the treatment plant would convey water south along Geneva Road, and terminate at the irrigation turnout located at the southwest corner of the Provo River/Geneva Road intersection. This alternative was not considered feasible for a number of reasons, particularly the need for a larger pump station than what would be required under other alternatives and 4 miles of pressurized pipe and appurtenances. This alternative was significantly more expensive than any other alternative considered yet yielded no more benefits than other alternatives.

Lake Bottom Canal Pipe

This alternative would meet the Fort Field irrigation delivery requirements by constructing an outlet structure on the Lake Bottom Canal sized to divert 9 cfs. A new 24 inch pipeline, roughly 3,800 feet long, would begin at this outlet structure and travel in a southwesterly direction to the east side of I-15. New pipe would continue from the east side of I-15 at the existing culvert and terminate at the irrigation inlet box located west of Geneva Road, just south of the Provo River. This alternative was eliminated from detailed consideration because it would not supply the required 15.6 cfs water right.

Infiltration Galleries

Infiltration galleries are typically composed of a series of shallow wells and/or network of buried, perforated pipelines or well screens located in or adjacent to the river channel. These systems are appropriate for cobble and gravel bed rivers with low silt accumulation and adequate bed scour. They are commonly used for smaller diversion rates (< 15 cfs) to address fish passage, debris accumulation, and channel lateral instability problems. The alternative was not considered in detail for several reasons. Infiltration galleries should not be constructed in areas where spawning may occur because of potential impacts on larval fish. This is a concern since a major purpose of this project is to benefit spawning June sucker. In addition, infiltration galleries also have the potential for ongoing excavation and maintenance requirements to keep the system operating as designed.

Other In-stream Weirs

A variety of in-stream weir alternatives were evaluated including rehabilitation of the existing Fort Field Diversion structure, a Langemann Gate type weir, and an inflatable spillway gate. All of the weir alternative would include the construction of a fish passage notch or fish by-pass ramp to allow for fish passage upstream and downstream of the weir. These alternatives were not evaluated in detail for several reasons. First, very little information is known with regard to the swimming performance and behavior of the June sucker in its annual migration upstream. Bottom-oriented fish are often repelled by flow velocities and turbulence associated with traditional fish by-pass features. Although other agencies have successfully constructed by-pass features used by other bottom-oriented fish, it is still speculative whether June sucker would use such features. Other considerations were the maintenance required by instream diversion features to keep them free of silt and river debris, and potential land acquisition costs associated with the construction of certain fish by-pass features that require a certain length and width to construct.

Existing Irrigation Infrastructure

Under the Existing Irrigation Infrastructure Alternative, irrigation water deliveries would be made by connecting the Fort Field Diversion Pipeline with the existing Fort Field-Little Dry Creek Pipeline and Lower City Diversion.

Under existing conditions a portion of the Fort Field-Little Dry Creek water right is diverted at the Lower City Diversion Dam located at Columbia Lane approximately 8,100 feet upstream of the Fort Field Diversion. The Lower City Diversion Dam is

owned and operated by Provo City to serve irrigation calls on a 24 cfs water right owned by Provo City. The Fort Field-Little Dry Creek irrigation water diverted at the Lower City Diversion Dam is turned into the Fort Field-Little Dry Creek Pipeline via a control valve approximately 1,900 feet south of the Lower City Diversion Dam. This water is then conveyed southwesterly to meet the irrigation calls of approximately 12 Fort Field-Little Dry Creek. Under this alternative, the Fort Field-Little Dry Creek Diversion pipeline would be connected to the Fort Field Diversion Pipeline, thereby eliminating the need for the Fort Field Diversion. This would be accomplished by the construction of 2,100 feet of new 18 inch pipeline on the south west side of I-15 to connect the two systems. The new pipeline would tie into the Fort Field-Little Dry Creek Pipeline at 50th North and 1600 West, just west of I-15, and would then run west along the south side of 50th North to approximately 1840 West, the back lot line of existing residential development. At 1840 West the pipeline would turn south to the north side of Center Street. At Center Street the pipeline would turn west and tie into the Fort Field Diversion Pipeline on the west side of Geneva Road . In addition, three overland or open channel flow reaches located on the north east side of I-15, totaling approximately 1,040 feet would be piped to ensure an uninterrupted flow delivery. New pipeline construction would require the acquisition of easements and construction rights-of-way, as well as permits for the Geneva Road crossing. The exact pipeline alignment would depend upon final design considerations and rights-of-way acquisitions. This alternative was eliminated from detailed consideration because of complications in moving water rights upstream to a different diversion location.

Provo City Well

Under the Provo City Well alternative, irrigation deliveries would be made by utilizing a well owned by Provo City located near the Provo River at Geneva Road. A well pump, enclosure, and necessary piping would be constructed to deliver water from the well to the existing irrigation box on the Fort Field Canal. Well testing showed that this well can generate approximately 1,500 gallons per minute (gpm), or approximately 3.35 cfs. Therefore, this alternative would need to be combined with another alternative to meet the irrigation water right requirement.

The well was originally drilled by Provo City to supplement culinary water supplies in the area. The well water was found to supersaturated with CO₂ with respect to atmospheric pressure, and turns a cloudy-milky color when the gas is released to the atmosphere. While further treatment could eliminate the CO₂, Provo City has not elected to use this source for culinary water. Under the existing conditions, an artesian flow of approximately 1 cfs flows from the well into the Fort Field Canal.

The well drill log shows that the well was drilled through gray micrite and micrite sand and as a result a fine gray mud could be extracted when the well is pumped. There is a fine gray coating of mud in the Fort Field Diversion canal resulting from the 1 cfs artesian flow. It may be possible to chemically stabilize the micrite through an injection treatment down the casing to stop the fines from dispersing. Water quality testing shows the well meets irrigation water quality standards.

This alternative was dropped from dismissed from detailed consideration because of water quality concerns and the ability to meet the 15 cfs water right requirement.

Appendix 2

Issues Eliminated From Detailed Analysis

Some issues or resources were determined to have no relevance to the decision and were therefore eliminated from further analysis. Those issues and resources and the rationale for their dismissal are summarized below.

Issue	Rationale for Dismissal
Indian Trust Assets	Indian trust assets are defined as legal interests in property held in trust by the United States for Indian tribes or individuals, or property that the United States is otherwise charged by law to protect. The United States has a trust responsibility to protect and maintain rights reserved by or granted to American Indians or Indian individuals by treaties, statutes and executive orders. Executive Order 3215- Indian Trust Assets requires that all Federal agencies take all actions reasonably necessary to protect this trust. No Tribal Trust Assets are known to occur within the project location. A letter requesting tribal concerns was sent to the Ute Tribe, Business Committee and Tribal Cultural Office in March 2006. No response has been received.
Geological and Seismic Concerns	There are no unique geological or seismic concerns or resources associated with any of the alternatives.
Air Quality	Air quality impacts would be short term and limited to construction equipment and construction activities. Standard operating procedures would be implemented to reduce air pollution and would include periodic checking of operating equipment to ensure they are in proper working condition. None of the alternatives would violate any local, state or federal air quality standards.
Visual Quality	The visual resources of the project area are dominated by urban features such as I-15, residential development and a developed campground. The Provo River corridor provides natural elements in an urban setting although human modifications are

	evident such as the existing Fort Field Diversion. The Proposed Action does not include elements that would detract from the existing visual resources in the project area.
Public Health and Safety	The Proposed Action does not have the potential to impact public health and safety or community services.
Hazardous Materials	There are no known hazardous materials associated with the Proposed Action. Best Management Practices and Standard Operating Procedures would be implemented during construction, if any, to avoid and control any hazardous materials associated with construction equipment such as gasoline, oil.
Prime And Unique Agricultural Lands, Floodplain.	Prime and unique agricultural lands are lands suited to and available for farm production. There are no prime or unique agricultural lands within the project area. The Proposed Action is within the 100 year flood zone, but will be designed to convey the same flows as at present.
Wilderness Areas, Wild Or Scenic Rivers, Ecologically Significant Or Critical Areas	The project area of influence has been significantly altered by human use and does not qualify for Wilderness Area designation. The project area is not considered an Ecologically Significant Or Critical Areas. The Provo River has not been designated as a Wild, or Scenic River and the Proposed Action would not preclude future designations.
Transportation/Traffic	The Fort Field Diversion construction site would be accessed from Geneva Road through the KOA campground located on the southeast side of the river. Approximately 11, 16-yard dump-truck deliveries will be made per day for a period of approximately five days to deliver the estimated 30 tons of rock required for the project. This amount of traffic will not measurably increase traffic congestion on local roadways; therefore the impact is not significant.