USDA NRCS
United States Department of Agriculture
Natural Resources Conservation Service

McMILLEN, LLC

Draft Environmental Assessment for the Little Weber River Cutoff Channel

Weber County, Utah

Sponsoring Local Organization:
Weber County, Utah

Prepared by:
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Prepared for:
U.S. Department of Agriculture
Natural Resources Conservation Service

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Lead Agency: U.S. Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS)

Sponsoring Local Organization: Weber County, Utah (Weber County)

Abstract: The lower Weber River flowing through western Weber County, Utah does not have sufficient capacity within the bankfull limits to convey flood flows to provide protection to the surrounding agricultural and residential areas. The Little Weber River Cutoff Channel is a drainage channel in western Weber County that has historically conveyed flood flows to the Great Salt Lake, but currently contains numerous flow restrictions due to agricultural activities, construction of roads and dikes, and residential development. An earthen embankment on the west bank of the Weber River broke on June 9, 2011 and this drainage channel was activated. In response to this embankment break, Weber County intentionally breached restrictions (roads and embankments containing undersized culverts) to convey flood water through this historic drainage. The NRCS and Weber County are analyzing alternatives to reduce future flood damage which includes the modifications to the channel to upsize channel restrictions in the Little Weber River Cutoff Channel, the creation of levees/dikes along the Weber River, the installment of floodplain easements on adjacent properties to the Weber River, and other alternatives to reduce flooding adjacent to the Weber River.

Comments: NRCS has completed this Draft EA in accordance with the National Environmental Policy Act (NEPA). Reviewers should provide their comments to NRCS during the allotted Draft EA review period. Comments need to be submitted by August 16, 2013. Please send comments to:

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CHAPTER 1.0
INTRODUCTION

1.1 Introduction

The Natural Resources Conservation Service (NRCS) is proposing to partially fund the Little Weber River Cutoff Channel (Cutoff Channel) project located on the lower Weber River in Weber County, Utah (Appendix B-Figure 1). The Cutoff Channel is a historic drainage that conveys water out of the Weber River and adjacent floodplain to the Great Salt Lake during flood events. During the spring 2011 flood event, an earthen embankment on the western side of the Weber River broke and allowed flood water in the river to spill into the adjacent agricultural land. Emergency response measures by Weber County attempted to plug the breach, but efforts were unsuccessful. Weber County subsequently mechanically breached roads and embankments that were restricting flow in the Cutoff Channel to help convey water out of the floodplain to the Great Salt Lake.

Deficiencies regarding the ability of the lower Weber River to pass large flood flows within the existing embankments were identified by NRCS and Weber County as a result of the flood event and embankment failure. Since the Cutoff Channel was used as a flood conveyance route to reduce flood effects in 2011, the creation of a stabilized conveyance channel and other facilities is being examined by NRCS and Weber County to help the lower Weber River safely convey flood flows and potentially reduce damage to roads, structures, property, infrastructure, and life.

A National Environmental Policy Act (NEPA) Programmatic Environmental Impact Statement (PEIS) was prepared by NRCS (2004) for the Emergency Watershed Protection Program (EWPP); however, the creation of a stabilized conveyance channel to divert flood flows out of the lower Weber River does not fit within the analysis parameters of the PEIS. NRCS has initiated an additional NEPA analysis in the form of this Draft Environmental Assessment (Draft EA) for the Cutoff Channel. The primary goal of this document is to analyze impacts to the human environment from the proposed project.

1.2 Authority

This Draft EA has been prepared under the authority of EWPP, (authorized by Section 216 of the Flood Control Act of 1950, Public Law 81–516, 33 U.S.C. 701b–1; and Section 403 of the Agricultural Credit Act of 1978, Public Law 95–334, as amended by Section 382, of the Federal Agriculture Improvement and Reform Act of 1996, Public Law 104–127, 16 U.S.C. 2203). The EWPP provides funding for technical assistance to design and complete environmental compliance as well as provide 75% of the construction cost to construct the Cutoff Channel.

This Draft EA complies with the requirements of NEPA 1969, PL 91-190, as amended (42 U.S.C. 4321 et seq.), and its implementing regulations, which are set forth in the Council on Environmental Quality Regulations 40 CFR Parts 1500-1508; and NRCS policy and guidelines (NRCS 2006 and 2011). NEPA requires an evaluation of potential environmental impacts associated with federal actions and will assist NRCS in determining impacts to the environment from the alternatives considered for detailed study.

1.3 Purpose and Need Statement

In accordance with the provisions of EWPP, modifications to the Cutoff Channel are eligible for funding to reduce future damage that may be incurred during a flood event similar to the spring 2011 event. Modifications to the existing conveyance channel and diversion of up to 1,000 cubic feet per second (cfs) would mitigate the need to riprap extensive segments of the lower Weber River banks.

The purpose of the Project is to modify the existing conveyance channel by increasing the capacity of the flow restrictions allowing up to 1,000 cfs to be diverted out of the lower Weber River through a historic drainage to the Great Salt Lake. This modified channel would convey flood water out of the surrounding floodplain reducing the inundation depth and time that property would be under water. In addition to stabilizing this channel, the EWPP requires that any structures that are modified be updated to current technology and design standards as specified in the EWPP, Title 390, Part 511.4.A(12) (NRCS 2012).

The need for the Project is to reduce water surface levels in the lower Weber River during flood events, and reduce potential damage to roads, structures, property, infrastructure, and life.

1.4 Scope of Draft EA

This section defines and explains the scope (boundaries/limits) of the Cutoff Channel project environmental analysis. It briefly describes the history of planning process, identifies the resource issues studied in detail, and identifies the issues eliminated from further detailed analysis. The scope of the project includes modifying the channel and structures to divert up to 1,000 cfs out of the lower Weber River during large flood events and installing new river gages to assess flow conditions in the river and Cutoff Channel at strategic locations.

This Draft EA has been organized into the following chapters:

- Chapter 1.0: Introduction – This chapter describes the purpose and need for the project and background information pertaining to the proposed project.
- Chapter 2.0: Affected Environment – This chapter contains the past and current conditions of the project area and describes relevant environmental resources that would be affected by the alternatives.
- Chapter 3.0: Alternatives – This chapter provides a summary of the alternatives considered for detailed study as well as alternatives considered for the project but were eliminated from detailed study. It also states which is the proposed alternative and provides a resource impact comparison of all alternatives considered.
- Chapter 4.0: Environmental Consequences – This chapter describes the analysis of impacts to resources from each of the alternatives considered for detailed study. These impacts include direct, indirect and cumulative impacts.
- Chapter 5.0: Consultation, Coordination, and Public Participation – This chapter summarizes the steps taken to involve government agencies, tribes and the public in the project. It also presents a summary of anticipated permits and approvals required prior to the start of construction that should be obtained outside of the NEPA process.
- Chapter 6.0: References – This chapter lists the references used in support of the information presented in the document.
- Chapter 7.0: List of Preparers – This chapter contains a list of the document preparers, respective agency or company, and their associated qualifications.
- Chapter 8.0: Distribution List – This chapter lists the government entities that the local notice of availability for this document was distributed to for comment.
- Chapter 9.0: Acronyms, Abbreviations and Short Forms – This chapter defines the acronyms, abbreviations and short forms used throughout the report.
- Appendices – This section of the document provides supporting documentation for the information presented in the report.

1.4.1 Planning and Scoping Process History

After the 2011 flood event receded in the Weber River, flood conveyance capacity deficiencies were identified within the river channel and the existing Cutoff Channel alignment by Weber County. Weber County requested financial assistance to modify the existing Cutoff Channel facilities through the EWPP in 2011. NRCS completed a Damage Survey Report (DSR) on these structures and determined that they are eligible for repair under the EWPP but that additional NEPA analysis was required. The planning of the project started in July 2012 with the kick-off of the NEPA EA preparation process.

1.4.2 Resource Issues Studied In Detail

The following resource considerations were determined to be relevant to the decisions that must be made concerning the Cutoff Channel project and require further analysis in this Draft EA. These resources were selected by internal project coordination and through public scoping.

- Climate
- Cultural/Historic
- Endangered and Threatened Species
- Fish and Wildlife
- Floodplain Management
- Land Use
- Migratory Birds
- Public Health and Safety
- Recreation
- Soil
- Water Resources
- Waters of the United States
- Vegetation

1.4.3 Resource Issues Eliminated From Further Study

As directed by CEQ regulations 1500.1(b), 1500.2(b) and other sections, the NRCS eliminated the following resource considerations from detailed study because the proposed action would cause only inconsequential or no effect to occur to these issues. In accordance with NRCS policy, a DSR was completed for the proposed project which documented the environmental conditions at the project site. This DSR was used in place of the Environmental Evaluation Worksheet (CPA-52) and additional information on the issues eliminated from detailed analysis is contained in the DSR. Other than the information presented below; this Draft EA contains no further information on these eliminated resource issues.

- Air Quality
- Coral Reefs
- Ecologically Critical Areas
- Environmental Justice and Civil Rights
- Essential Fish Habitat
- Forest Resources
- Geology
- Prime and Unique Farmlands
- Regional Water Resource Plans
- Scenic Beauty
- Scientific Resources
- Sole Source Aquifers
- Social Issues
- Socioeconomics
- Wild and Scenic Rivers

1.4.4 Decision Matrix

The NRCS must decide whether to implement one of the proposed action alternatives or the no-action alternative. The NRCS must also decide if the selected alternative would or would not constitute a major federal action significantly affecting the quality of the human environment. If the NRCS State Conservationist (responsible official) determines that the selected alternative would not significantly affect the quality of the human environment, then the NRCS State Conservationist will prepare and sign a Finding of No Significant Impact (FONSI), and the project may proceed. If the NRCS State Conservationist determines that the selected alternative would significantly affect the quality of the human environment, then an Environmental Impact Statement (EIS) and a Record of Decision (ROD) must be prepared and signed before the project can proceed.

1.5 Project Background

Beginning at the lower Weber River inlet, the Cutoff Channel is located on private property until it reaches the Harold S. Crane Waterfowl Management Area (WMA) which is owned and operated by the Utah Division of Wildlife Resources (UDWR). Once it passes through the WMA, it flows onto land owned by the Great Salt Lake Minerals Company (GSL). The channel contains standing water throughout the majority of the year due to localized runoff and the presence of shallow groundwater. During the summer months, private landowners and UDWR retain water using their water rights for agricultural and wildlife habitat purposes. The existing channel, culverts, and berms in the channel alignment restrict the conveyance capacity of flow to less than 100 cfs in numerous locations.

Weber County has coordinated with NRCS to identify conceptual design alternatives that may reduce water surface levels in the lower Weber River during flood events similar to 2011. Modifying the channel restrictions will allow up to 1,000 cfs to be transported out of the river during flood events, reduce inundation times, and potentially reducing flood impacts to resources and property both upstream and downstream. The conceptual design has been prepared to help reduce water surface elevations in the river, and inundation depths and time during flood events in the adjacent floodplain. It has not been prepared to eliminate flooding adjacent to the lower Weber River or the Cutoff Channel.

1.6 Existing Cutoff Channel Conditions

The Weber River watershed area upstream of the Cutoff Channel includes approximately 2,069 square miles above the Cutoff Channel inlet (Appendix B-Figure 2). Once flood water enters the Cutoff Channel, it travels approximately nine miles until it reaches the Great Salt Lake. Due to the restrictions located throughout the alignment, flows above 100 cfs are not attainable and require mechanical breaching during flood events to better convey flood flows and decrease the water inundation depth and time in the adjacent floodplain.

An analysis of flows during the 2011 flood event at the United States Geological Survey (USGS) Plain City river gage identified that the peak discharge of the 2011 flood event was about 5,000 cubic feet per second (cfs) before the embankment failed at the existing Cutoff Channel inlet. The flood frequency analysis that was performed for the current-effective Federal Emergency Management Agency (FEMA) Flood Insurance Study indicates that the magnitudes of the 1- and 2-percent annual chance floods (100- and 50-year floods) are 6,200 cfs and 4,600 cfs, respectively at the USGS river gage at Plain City (Bowen Collins and Associates [BCA] 2013a). This means that the 2011 flood has about a 1.6 percent chance of occurring in any given year (a recurrence interval of about 63-years) (BCA 2013a). The approximated FEMA extents of the 2011 flood event are depicted in Appendix B-Figure 3.

1.6.1 Inlet

The inlet to the Cutoff Channel is located on the western side of the river (river right looking downstream) as shown in Appendix B-Figure 3. The inlet currently has a large earthen dike with a steel sheetpile core at the embankment where Weber County placed fill after the flood waters in the river had receded as shown in Picture 1-1. Prior to the 2011 flood, this earthen embankment was similar to the embankments upstream and downstream which was created from dirt pushed into a pile from the adjacent agricultural field over the past 100 years.

Picture 1-1. Existing Earthen Dike at Cutoff Channel Inlet

The embankment broke on June 9, 2011 sending flood water into the surrounding agricultural fields. Attempts to repair the embankment were unsuccessful and water was allowed to flow down the historic Cutoff Channel in an excavated ditch to 5500 W as it historically did in the 1952 and 1983 floods. A picture of the failed embankment is shown in Picture 1-2.

Picture 1-2. Embankment Failure at Cutoff Channel Inlet during 2011 Flood

1.6.2 Cutoff Channel from Inlet to Warren Canal

The channel from the inlet to 5500 W is approximately 80 feet wide and 2,000 feet long as depicted in Picture 1-3. There are several private road crossings through this channel with culverts to convey water flow.

Picture 1-3. Existing 80-Foot Wide Ditch Looking East from 5500 W

A 36-inch diameter culvert is located underneath 5500 W (Picture 1-4) which carries water to a smaller ditch in a grass field. This road crossing was mechanically breached by Weber County during the flood event to allow increased flood water conveyance in the ditch.

Picture 1-4. 5500 W Road Crossing Looking North

Once water passes 5500 W, it flows into smaller channel which is approximately 20 feet wide by 1,600 feet long in a grass field as depicted in Picture 1-5. Once water flows out of this ditch is disperses into the grass field before it reaches 5900 W.

Picture 1-5. Existing 20-Foot Wide Channel Looking West from 5500 W

At the time of the 2011 flood event, there was only one concrete box culvert (3 feet by 4 feet) in place to convey flood water across 5900 W. The capacity of that culvert was deemed inadequate during the flood event and the road was mechanically breached by Weber County to allow additional flood flows past the road as depicted in Picture 1-6. Since the flood event, Weber County has installed additional culverts where the road was breached for increased flow capacity during future flood events as depicted in Picture 1-7.

Picture 1-6. Mechanical Breach at 5900 W During 2011 Flood Looking South

Picture 1-7. New Culverts Installed at 5900 W Looking North

Picture 1-8 depicts the Cutoff Channel from the inlet to 5900 W during the 2011 flood event.

Picture 1-8. Cutoff Channel Looking West from Inlet During 2011 Flood

1.6.3 700 N and 6700 W Road Crossings

Once flood water in the Cutoff Channel passes through 5900 W, it flows through an existing open channel conveyance system to culverts that convey water under the Warren Canal and then to culverts that cross under 700 N. The culverts under the Warren Canal were determined to be a flow restriction in the Cutoff Channel during the 2011 flood event. Therefore, two additional culverts (8-foot diameter) were installed after the 2011 flood to supplement the three culverts that were in place prior to the flood event. The culvert underneath 700 N has a diameter of 42 inches and does not have capacity to pass flood flows down the Cutoff Channel as depicted in Picture 1-9. This road crossing was mechanically breached by Weber County to allow flood flows to pass downstream.

Picture 1-9. 700 N Road Crossing Looking North

Once the Cutoff Channel crosses 700 N, it splits into two separate channels and flows under 6700 W at two separate locations. The northern road crossing is depicted in Picture 1-10. Both of these road crossings on 6700 W were mechanically breached by Weber County to convey flood flows downstream.

Picture 1-10. 6700 W Road Crossing Looking East

1.6.4 Restrictions on Private Ground

There are four restrictions in the Cutoff Channel that have been identified on private ground to the west of 6700 W. These restrictions include a culvert in a private road (Picture 1-11), and small berms in the channel (Pictures 1-12 and 1-13). These restrictions were not mechanically breached during the 2011 flood event.

Picture 1-11. Culvert under Private Road in Cutoff Channel

Picture 1-12. Small Berm in Cutoff Channel

Picture 1-13. Small Berm in Cutoff Channel

1.6.5 Rainbow Pond Dike

Rainbow Pond Dike is located on the Harold S. Crane WMA owned by the UDWR. This dike impounds water for waterfowl habitat during the spring and summer months. The pond currently has two 24-inch culverts, one 48-inch culvert, and one 3-foot by 6-foot concrete box culvert to convey water through the dike as depicted in Pictures 1-14 and 1-15. These culverts have stoplog weirs to raise or lower the level of the pond as desired. The existing culverts did not have enough capacity to safely convey water during the 2011 flood event and the dike was mechanically breached by UDWR (Picture 1-16) so that the dike did not fail.

Picture 1-14. Existing 24-Inch Culvert on Rainbow Pond Dike, Typical

Picture 1-15. Existing 3-Foot by 6-Foot Culvert on Rainbow Pond Dike

Picture 1-16. Rainbow Pond Dike Mechanical Breach Location

1.6.6 Railroad Crossing

The Cutoff Channel crosses underneath the GSL railroad crossing via five, 36-inch culverts. These culverts have become partially buried over time from sediment accumulation as depicted in Pictures 1-17 and 1-18. A large breach was created in this railroad line prior to the 2011 flood event. This breach allows impounded water that is not able to flow through the culverts to pass into a large open flat on the Harold S. Crane WMA.

Picture 1-17. Culvert under Railroad Track

Picture 1-18. Partially Buried Culvert under Railroad Track

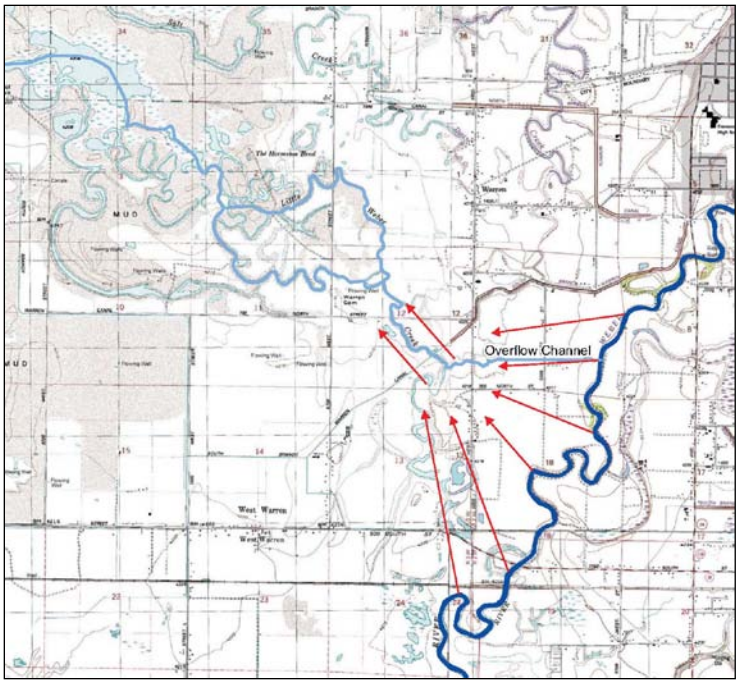
1.6.7 GSL Road Crossing

The last restriction in the flowpath of the Cutoff Channel before it flows to the Great Salt Lake is located underneath a private road crossing used by the GSL. This culvert is approximately 20 inches and is depicted in Picture 1-19.

Picture 1-19. Culvert under GSL Road Crossing

1.7 Lower Weber River Floodplain Existing Conditions

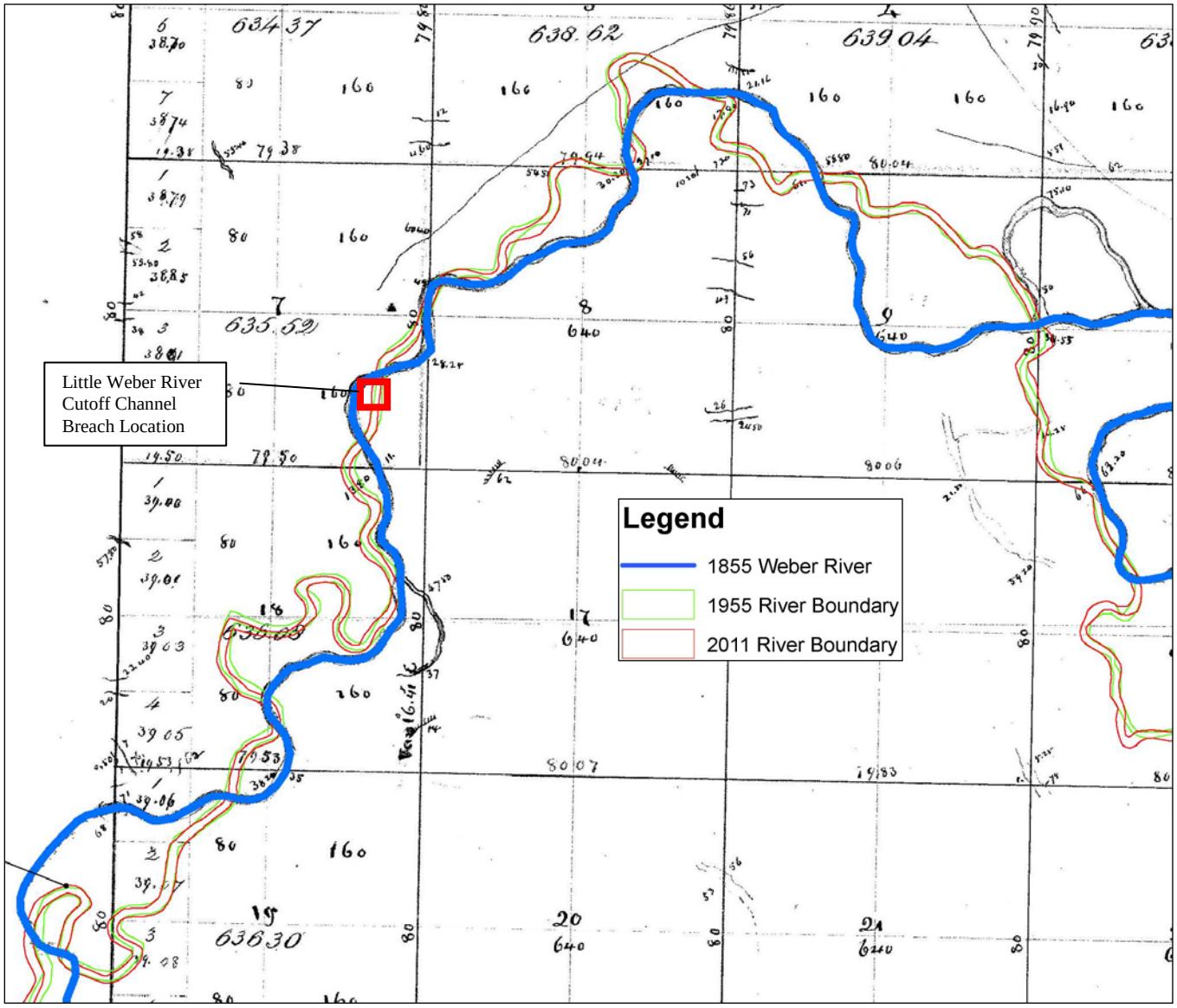
Flood events greater than 3,500 cfs typically rise above the natural banks of the lower Weber River. The construction of intermittent embankments along the river has artificially raised the river banks allowing them to currently handle up to about 5,000 cfs. Once flows exceed 5,000 cfs, flood waters overtop the embankments and spill into the adjacent floodplain (BCA 2013a). The surrounding land near the Cutoff Channel typically consists of agricultural fields and undeveloped land. During the past 100 years, small embankments have been constructed along the banks of the Weber River by farmers, but flood flows similar to the 2011 event (1952 and 1983) typically overtop these embankments and spill into the adjacent land. The natural topography of the surrounding land slopes to the northwest and any flows that overtop the embankments typically flow out from the Cutoff Channel to the Great Salt Lake (BCA 2013b) and not back to the main stem of the lower Weber River. The following picture depicts the typical overland drainage direction in the Cutoff Channel floodplain (BCA 2013b).



Picture 1-20. Floodplain Drainage Surrounding the Cutoff Channel

1.8 Historical Aerial Photographs

The following historical aerial photographs (Pictures 1-21 through 1-23) show the channel and alignment changes in the lower Weber River and Cutoff Channel starting in 1855 to 2011.



Picture 1-21. 1855, 1955 and 2011 River Channel Boundaries

Picture 1-22. 1937 Aerial Photograph

Picture 1-23. 2011 (Post-Flood) Aerial Photograph

CHAPTER 2.0
AFFECTED ENVIRONMENT

This chapter describes the affected environment in regards to the relevant resource issues if one of the project alternatives was implemented.

2.1 Climate

Although scientific evidence predicts that continued increases in greenhouse gas emissions will lead to climate change, uncertainties remain regarding the timing, extent, and magnitude of climate change impacts. A number of reports (State of Utah 2007) have concluded that climate is already changing; that the change will accelerate, and that human greenhouse gas (GHG) emissions, primarily carbon dioxide emissions, are the main source of accelerated climate change. Projected climate change impacts include air temperature increases; sea level rise; changes in the timing, location, and quantity of precipitation; and increased frequency of extreme weather events. These changes will vary regionally and affect renewable resources, aquatic and terrestrial ecosystems, and agriculture.

In Utah, climate change is predicted to result in warmer, drier climates (State of Utah 2007).

> "Utah is projected to warm more than the average for the entire globe and more than coastal regions of the contiguous United States. The expected consequences of this warming are fewer frost days, longer growing seasons, and more heat waves. Studies of precipitation and runoff over the past several centuries and climate model projections for the next century indicate that ongoing greenhouse gas emissions at or above current levels will likely result in a decline in Utah's mountain snowpack and the threat of severe and prolonged episodic drought in Utah is real."

Throughout the 20th Century Western United States has experienced an increase of ambient air temperature (approximately 2 degrees Fahrenheit [°F]). Current projections have estimated that much of the Western United States will experience further increases ranging from 5-7°F. Warmer air temperatures will produce milder winters with more spring and fall rains, resulting in lower water levels from the reduced snowpack.

2.1.1 Weber River Watershed Local Climate

The Cutoff Channel is located about 8 miles west from Ogden, Utah and is situated at the downstream end of an approximately 2,069 square mile watershed. The elevation of the Cutoff Channel inlet is approximately 4,230 ft above mean sea level (AMSL). Ogden is located in the lower end of the watershed and is generally warm during the summer with average temperatures between 70°F and 80°F and cold during the winter with average temperatures around 30°F. The warmest month of the year is July with an average maximum temperature of 78°F, while the coldest month of the year is January with an average minimum temperature of 29°F. Temperature variations between night and day tend to be moderate during summer with a difference that can reach 27°F, and fairly limited during winter with an average difference of 17°F. The annual average precipitation in Ogden is 21.98 inches. Rainfall in Ogden is fairly evenly distributed throughout the year with highest precipitation in May, averaging 2.58 inches. (Western Regional Climate Center 2013)

2.2 Cultural/Historic

Section 106 of the National Historic Preservation Act of 1966 (36 CFR Part 800) requires Federal agencies to take into account the effects of historic properties and provide the Advisory Council of

Historic Preservation a reasonable opportunity to comment. A literature review of cultural resources was conducted to determine if any important cultural/historic resources could potentially be affected by the project. This literature review consisted of requesting records from the Utah State Historic Preservation Office (SHPO) and it identified 74 sites that have been previously recorded within a half-mile radius of the project area. After the literature review was completed, a pedestrian survey was conducted in May and June 2012 and April 2013 to examine the project area. The pedestrian survey discovered four archeological sites and 13 isolated finds within the project area. None of these sites are recommended to be eligible for listing on the National Register of Historic Places. NRCS is currently consulting with Utah SHPO and detailed documentation of this consultation is presented in Chapter 5.0.

2.3 Endangered and Threatened Species

A review of the United States Fish and Wildlife Service (USFWS) Endangered Species Act (ESA) list for Weber County (USFWS 2013) was performed within the vicinity of the Cutoff Channel. This review identified species that historically or currently use habitat or could potentially migrate into the area in Weber County. Table 2-1 identifies the ESA listed species in Weber County.

Table 2-1. Federally Listed Species and Critical Habitat within Weber County, Utah

Common Name	Scientific Name	Federal Status	Designated Critical Habitat within the Project Area?
Fish			
June Sucker	*Chasmistes liorus*	Endangered	No
Least Chub	*Iotichthys phlegethontis*	Candidate	No
Wildlife			
Canada Lynx	*Lynx Canadensis*	Threatened	No
Greater Sage-Grouse	*Centrocercus urophasianus*	Candidate	No
Western Yellow-Billed Cuckoo	*Coccyzus americanus occidentalis*	Candidate	No

2.3.1 June Sucker

The June sucker is listed as Endangered by the USFWS (51 FR 10851-10857) and is primarily found in Utah Lake and the Provo River approximately 62 miles southeast of the project area. Due to its rarity, little is known of the June sucker life history. There have been no recorded observations of the June sucker in the Weber River and they are not expected to be present within the project area. They typically reside in larger streams with slower water velocities. Critical habitat for the June sucker has only been designated in the Provo River which is a tributary to Utah Lake, approximately 62 miles outside of the project area (51 FR 10851-10857).

2.3.2 Least Chub

The Least chub is listed as Candidate by the USFWS (76 FR 66370-66439) and typically inhabits slow moving stream segments and spring seep pools with dense vegetation. Only five wild populations are known to currently exist; three in the Snake Valley and two near the Wasatch Front. They are not expected to be present within the project area. There are no documented occurrences of the Least chub in Weber River, and the river does not contain suitable habitat. There is no critical habitat designated for the Least chub since they are listed as Candidate.

2.3.3 Canada Lynx

The Canada lynx is listed as Threatened by the USFWS (65 FR 16052-16086) and typically resides in montane coniferous forest at high elevations. The Canada lynx is nocturnal and its major food source is the snowshoe hare. The area surrounding the river does not contain a montane coniferous forest. There is no documentation of the Canada lynx within the project area and they are not expected to be present within the project vicinity. Critical habitat has been designated for the Canada lynx (74 FR 8616-8702); however, the project is not located within designated critical habitat.

2.3.4 Greater Sage-Grouse

The greater sage-grouse is listed as Candidate by the USFWS (77 FR 69993-70060) and inhabits large sagebrush communities as it is highly reliant on the shrub for cover and food. Males require open or barren spaces to display and attract females during the breeding season. Outside of breeding season the greater sage-grouse stay predominately under cover within the sagebrush stands. There are no sagebrush stands within the project area and there is no documentation of the greater sage-grouse within the project area; thus, they are not expected to inhabit this area. There is no critical habitat designated for the greater sage-grouse as they are listed as candidate. The project is not located in greater sage-grouse Priority Areas for Conservation (PACs).

2.3.5 Yellow-Billed Cuckoo

The yellow-billed cuckoo is listed as Candidate by the USFWS (77 FR 69993 70060) and typically inhabits lowland large space riparian areas (~25+ acres) with dense cottonwood trees, willows and other riparian shrubs providing a dense canopy cover of at least 50 percent (NatureServe 2013). They prey upon large insects from tree and shrub foliage. The project area is located in upland and wetland areas that do not contain large unfragmented tracts of riparian habitat suitable for the yellow-billed cuckoo and they are not expected to inhabit this area. There is no critical habitat designated for the yellow-billed cuckoo since they are listed as Candidate.

2.4 Fish and Wildlife

2.4.1 Fish

UDWR completed fish surveys from the 4700 W Bridge down to the 1100 S Bridge in the Weber River in 2012 (UDWR 2012a). Fish observed during these surveys in this reach of the river included Utah sucker (*Catostomus ardens*), Bonneville cutthroat trout (*Oncorhynchus clarki utah*) during previous surveys, mountain suckers (*Catostomus platyrhynchus*), brown trout (*Salmo trutta*), common carp (*Cyprinus carpio*), yellow perch (*Perca flavescens*), black bullhead (*Ameiurus melas*), speckled dace (*Rhinichthys osculus*), gizzard shad (*Dorosoma cepedianum*), fathead minnow (*Pimephales promelas*), green sunfish (*Lepomis cyanellus*), largemouth bass (*Micropterus salmoides*), and smallmouth bass (*Micropterus dolomieu*). The bluehead sucker (*Catostomus discobolus*) was not observed during the fish surveys but has been historically observed in the lower Weber River. Due to difficult sampling conditions and the sparse population believed to inhabit the area, presence of the bluehead sucker in the project area is presumed even though it has not been confirmed or denied. The Utah sucker was observed in this reach of the lower Weber River and is used as a detection and management surrogate for the bluehead sucker which indicated that there is suitable habitat for both sucker species.

2.4.1.1 Fish Habitat

The lower Weber River within the project area has been altered from historical activities which include grazing, diking, dredging, road construction and filling (Webber *et al*. 2012 and United States Environmental Protection Agency [EPA] 2010). The physical characteristics of the river have changed from meandering channels with slow-velocity and backwater environments to straightened, channelized and diked sections of river for better flow control (Webber *et al*. 2012). Annual flow variations are regulated by numerous large irrigation or flood control reservoirs which dampen flushing flows and reduce seasonal river volumes. Typical annual high flows occur during early April to late June with low base flow periods occurring July to March (Webber et al 2012). These physical alterations combined with increased urbanization, intensive agricultural use and stormwater runoff have led to current fish habitats in the lower river dominated by fine silty sediments, turbid water, warm summer temperatures with limited instream cover. Thompson (2013) noted much of the river course in the project area has old cottonwoods lining the steep banks that provide a good overhead canopy as well as instream cover where they have fallen into the river. The river reach near Interstate-15 has more gravel and cobble substrate with more of a pool riffle sequence when compared to the lower sections closer to the Cutoff Channel inlet that has lower velocities, less gradient and less quality fish habitat (Thompson 2013).

During the spring runoff, flows in the Weber River are elevated and volumes are increased. There are numerous reservoirs in the upper Weber River watershed that regulate river flows and may delay fish migration downstream. Juvenile fish that have just spawned in the spring are typically washed downstream and may end up in the project area in the lower Weber River. Larger adult fish species may also be washed downstream into the project area during heavy flood events. Depending on the fish size and swimming capabilities, it is expected that varying life stages of fish will be present throughout the entire river water column during flood events.

2.4.1.2 Special Status Fish Species

The information documented in this section is compiled from existing data collected by UDWR and lists within Weber County. No formal studies were conducted for the preparation of this Draft EA. Table 2-2 identifies the fish species on the UDWR Utah Conservation Data Center (2011 and 2012b) for sensitive species occurring in Weber County.

Table 2-2. Special Status Fish Species

Common Name	Scientific Name	State Status[1]	Suitable Habitat Present
Bluehead Sucker	*Catostomus discobolus*	CAS	Yes
Bonneville Cutthroat Trout	*Oncorhynchus clarkii utah*	CAS	Yes

Notes: [1] (CAS) Conservation Agreement Species

2.4.1.3 Fish Stocking

There is annual fish stocking by the UDWR (2013) in the Weber River. Stocking occurs in the Weber drainage mainly in the upstream reaches and no stocking data exists indicating any fish have been stocked in the Weber River west of Interstate 15. The Weber River was stocked 18 times in 2012, 17 times with rainbow trout averaging 9.96 inches with an average plant of 384 fish. Weber River was also stocked on a single occasion in 2012 with brown trout with an average length of 4.26 inches and a plant of 13,728 fish. These fish could migrate downstream into the project area but are not expected to become full time residents of this area due to the lack of suitable habitat and poor water quality conditions.

2.4.2 Wildlife

2.4.2.1 Wildlife Habitat

Wildlife habitats within the project area are a function of the dominant vegetation cover types. These vegetation types are dictated by the local climate, local topography, and proximity to soil types and riparian areas. Although there is a wide range of plants and microhabitats found throughout the plant communities in the Cutoff Channel, theses habitats do not tend to support a high wildlife species richness, with the exception of birds (Milchunas 2006; Paul and Manning 2008). Migratory bird species are discussed in Chapter 2.7.

Native ungulates are not common inhabitants of this area with the exception of mule deer (*Odocoileus hemionus*). Potential habitat does exist for pronghorn (*Antilocapra americana*) and Rocky Mountain elk (*Cervus canadensis*) (UDWR 2005). No specific data exists on specific rodent or furbearer populations in the immediate project area. However, it is likely that numerous rodents species inhabit the grass habitats and riparian wet meadow areas along with furbearers including muskrat (*Ondatra zibethicus*), mink (*Mustela vison*), badger (*Taxidea taxus*), red fox (*Vulpes vulpes*), coyote (*Canis latrans*), and bobcat (*Lynx rufus*) (UDWR 2005).

2.4.2.2 Special Status Wildlife Species

The information documented in this section is compiled from existing data and lists within Weber County. No formal studies were conducted for the preparation of this Draft EA. Table 2-3 identifies the wildlife species on the UDWR Utah Conservation Data Center (2011 and 2012b) for sensitive species occurring in Weber County.

Table 2-3. Special Status Wildlife Species

Common Name	Scientific Name	State Status[1]	Suitable Habitat Present
American White Pelican	*Pelecanus erythrorhynchos*	SoC	Yes
Bald Eagle	*Haliaeetus leucocephalus*	SoC	Yes
Bobolink	*Dolichonyx oryzivorus*	SoC	No
Burrowing Owl	*Athene cunicularia*	SoC	Yes
Columbia Spotted Frog	*Rana luteiventris*	CAS	Yes
Desert Mountain Snail	*Oreohelix peripherica*	SoC	No
Ferruginous Hawk	*Buteo Regalis*	SoC	No
Grasshopper Sparrow	*Ammodramus savannarus*	SoC	No
Kit Fox	*Vulpes macrotis*	SoC	No
Lewis's Woodpecker	*Melanerpes lewis*	SoC	No
Long-billed Curlew	*Numenius americanus*	SoC	Yes
Lyrate Mountainsnail	*Oreohelix haydeni*	SoC	No
Mountain Plover	*Charadruis mantanus*	SoC	No
Northern Goshawk	*Accipiter gentilis*	CAS	No
Sharp-tailed Grouse	*Tympanuchus phasianellus*	SoC	No
Short-eared owl	*Asio flammeus*	SoC	Yes
Smooth Greensnake	*Opheodrys vernalis*	SoC	No
Townsend's Big-eared Bat	*Corynohunis townsendii*	SoC	No

Notes: [1] (CAS) Conservation Agreement Species, (SoC) Wildlife Species of Concern

2.5 Floodplain Management

The lower Weber River floodplain has experienced changed and development over the past 100 years primarily for agricultural activities. Embankments have been created along the banks of the river to contain flood flows from flooding adjacent fields. These embankments consist of soil and debris that has been pushed into mounds and not compacted or stabilized. In some areas, residential houses have been built behind these embankments in the floodplain of the Weber River.

During flood events above 3,500 cfs, the lower Weber River rises above tops of the natural banks of the river onto the embankments or into the natural floodplain (BCA 2013a). The embankments provide the river with up to an additional 1,500 cfs of river conveyance capacity (totaling 5,000 cfs) before the embankments begin overtopping (BCA 2013a). In 2011, the west embankment failed at the location of the Cutoff Channel inlet spilling flood water onto the adjacent agricultural fields and residences. There were several other minor failures in the embankment on the lower Weber River that were repaired by Weber County. Floodplain management in the project area is typically reactive and consists of responding to flood situations that may impact structures, roads, homes, infrastructure and life with emergency services. There has been minimal proactive floodplain management in the past which would have limited development within the floodplain. Weber County is now proactively regulating the level of development within the floodplain of the lower Weber River.

2.6 Land Use

Land uses in western Weber County predominantly include low density, agricultural areas with single-family residences located on large agricultural parcels. Table 2-4 shows the various land uses within West Central Weber County and the approximate number of acres allocated to each (Weber County 2013). In the case of the mixed residential/agricultural land, only a one-acre site is attributed to a residence. The remaining parcel is considered as agricultural.

Table 2-4. West Central Weber County Land Use

Land Use	Acres	Percentage
Residential	2,839	3%
Commercial	3	0%
Manufacturing	20,225	20%
Institutional	40	0%
Parks and Recreation	6	0%
Agricultural	28,116	29%
Public Lands	44,682	45%
Public Utilities	14	0%
Other	2,886	3%
Total	**98,811**	**100%**

Existing lands adjacent to the project area consist mostly of privately owned agricultural lands, with single family homes located along existing roads. The downstream project area is located within the Harold S. Crane WMA which consists of State owned lands used for waterfowl habitat and the GSL which uses the land for agricultural mining of minerals.

2.7 Migratory Birds

The fresh-water and brackish marshes support a wide variety of migratory birds including waterfowl, shorebirds and neotropical songbirds who nest and forage (UDWR 2005). According to the UDWR (2005) there are approximately 247 species of birds that potentially would utilize habitats found in the project area. The WMAs in the vicinity of the Cutoff Channel are several of the Great Salt Lake marshes which serve as a major stopover point for migrating waterfowl and shorebirds in the Pacific Flyway. Migrant populations in these marshes in the fall regularly approach 1,000,000 ducks, 40,000 tundra swan, 25,000 geese, 1,500,000 eared grebes, 500,000 Wilson's phalaropes, 280,000 red-necked phalaropes, 250,000 American avocets, 65,000 black-necked stilts, 30,000 marbled godwits and numerous other species of waterbirds (UDWR 2005). The project area also includes known habitat for raptors, shorebirds, waterfowl and songbirds. This large collection of avian species may utilize the proposed project areas for feeding, nesting, rearing, migrating and resting during various times of the year (UDWR 2005).

2.8 Public Health and Safety

The 2011 flood event resulted in a health and safety risk to the general public of western Weber County. During the flood event, roads were breached to convey flood flows through the Cutoff Channel and general traffic was blocked in the areas of 5500 W, 5900 W, 700 N, and 6700 W Streets. Detours were set up to redirect traffic around the flooded areas to decrease the risks to the general public. These detours also created a delay for emergency response equipment and personnel to access the area for flood prevention measures as well as any emergency medical assistance that may have been required in the area.

Some of the residents living in the flooded area were asked to evacuate their homes to reduce health and safety hazards associated with the loss of power, water, and sewer.

2.9 Recreation

The Cutoff Channel is located on both private and public property as presented in Appendix B-Figure 16. The lands adjacent to the lower Weber River include mostly agricultural use, roads, embankments, and residential development. There is minimal recreational use for the public on private ground in the agricultural areas. Private landowners may use the area for recreational hunting during certain times of the year, primarily in the fall.

The Harold S. Crane WMA is located on State property and is open to the public. The WMA consists of nearly 11,000 acres of emergent bulrush marshes, mud flats, open water ponds and upland game nesting habitat of tall grasslands, saltbush and greasewood. Hunting and bird watching are popular in certain areas of the WMA. However, access to the portion of the WMA in the project area is limited to the general public due to the property surrounding the WMA is privately owned.

In addition to the Harold S. Crane WMA, there are three additional WMAs are in the area that the public uses for recreation purposes: Howard Slough WMA, Ogden Bay WMA, and Willard Bay Upland Game WMA. These other WMA are located within 20 miles of the project area.

2.10 Soil

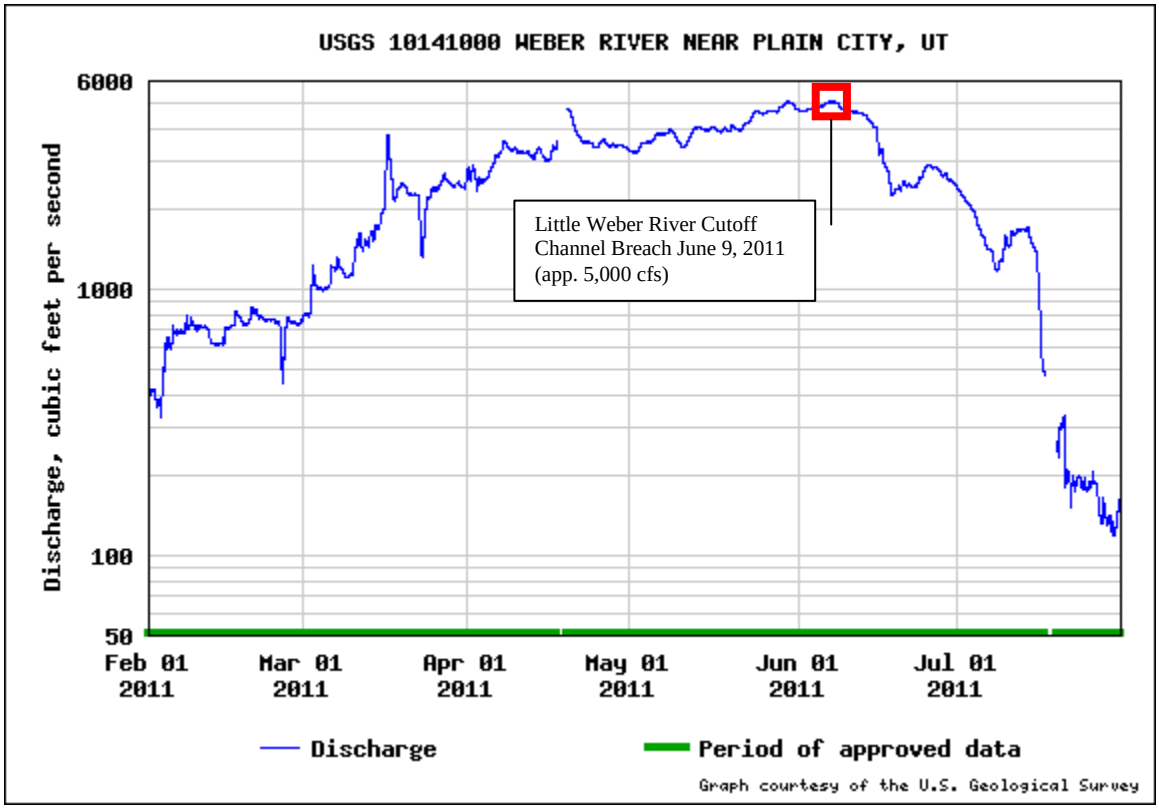
Soil information for the project area was obtained from the NRCS Web Soil Survey program (NRCS 2013b) for western Weber County, Utah and is presented in Appendix B-Figure 13. The project area encompasses a wide variety of soil types including silt, clay, loam and sand. The banks of the lower

Weber River are classified as loam and silt loam while the Cutoff Channel is classified as a silt loam and loamy sand. Since the lower Weber River area is largely composed of fine silt loamy soil which is highly erodible, the probability of erosion is high. However, the slope of the land is less than 1 percent in the project area resulting in a reduction of erosion potential from the lack of steep gradient. The primary concern for erosion would be on the banks and within channel during elevated flows in the river that may cause scouring and erosion and ultimately bank failure.

2.11 Water Resources

The Weber River originates in the northwest Uinta Mountains and meanders 125 miles across northern Utah eventually emptying into the Great Salt Lake. Within the Uinta Mountains, the Weber River receives a number of significant tributaries including Silver Creek, Chalk Creek, and East Canyon Creek. The Weber River exits the Wasatch Mountains through Weber Canyon and travels northwest past Ogden, Utah where it receives water from the Ogden River. The Weber River abruptly changes course at the western edge of the Marriott-Slaterville boundary line and meanders in a southwesterly direction toward the Cutoff Channel Inlet.

The Weber River watershed is part of the Lower Weber Hydrologic Unit 16020102. The estimated watershed area at the Cutoff Channel inlet is 2,069 square miles as depicted on Appendix B-Figure 2. Based on measurements taken at the USGS Plain City Gage (10141000) on the Weber River, the Weber River was observed to be above the full bank capacity (3,500 cfs) from early April 2011 through mid June 2011 as depicted in Picture 2-1.



Picture 2-1. 2011 Discharges at Weber River USGS Stream Gage (10141000)

Flows in the lower Weber River have been estimated at the following flow events as presented in the preliminary design report (BCA 2013a).

- 50-year reoccurrence interval: 4,600 cfs
- 63-year reoccurrence interval: 5,000 cfs (2011 flood event)
- 100-year reoccurrence interval: 6,200 cfs

The conveyance capacity of the lower Weber River has been estimated through hydraulic modeling to have the capacity to transport about 3,500 cfs prior to overtopping (BCA 2013a). Once the flows increase above 3,500 cfs, the original channel is not able to convey the water downstream and any additional flows are contained within the constructed embankments. Once the river reaches 5,000 cfs, the embankments overtop and flood flows spill into the adjacent floodplain. Once water jumps out of the channel into the floodplain on the western side of the lower Weber River near the Cutoff Channel, it naturally flows to the west through the existing channel alignment. It was estimated by NRCS (Smart 2013) that approximately 1,000 cfs was flowing through the Cutoff Channel after the roads and restrictions were mechanically breached during the 2011 flood event.

The 2011 Cutoff Channel alignment has been historically active during previous flood events in 1952 and 1983. During these flood events, it was noted that there was significant standing water in the adjacent agricultural fields and flood protection measures were also employed to reduce damages.

2.11.1 Water Quality

Based on the 2010 Utah Department of Environmental Quality (UDEQ) Integrated Report for Weber River from the Great Salt Lake to the Slaterville Diversion (last 6.15 miles of the Weber River) the overall status of this segment is "impaired". The cause of impairment is due to benthic macroinvertebrates bioassessments under the "non-game fish and other aquatic life" designated use. Under Agricultural and Wildlife Habitat designations the status is "good" (UDEQ 2010).

2.11.2 Water Rights

The Utah Division of Water Rights (UDWRi) lists four surface water rights out of the Cutoff Channel North Diversion alignment. These water rights are listed in Table 2-5 and the flows are used for irrigation and wildlife habitat.

Table 2-5. Cutoff Channel-North Diversion Surface Water Rights

Water Right No.	Owner	Flow	Source	Structure ID
35-1332	Orvel J. Hansen	1.81 cfs	Surface Drain – 5500 W	West of 3
35-8083	Western Basin Land and Livestock, LLC	4.0 cfs and 300 ac-ft	Little Weber River – 1.5 miles west of 6700 W southern channel (channel storage)	8
35-10772	Marsh Holders Inc	3.0 cfs or 2,000 ac-ft	Little Weber Slough – 0.8 miles east of Rainbow Pond Dike	East of 9
29-1584	UDWR	10.0 cfs or 7,227 ac-ft	Third Salt Creek – Harold S. Crane WMA (waterfowl habitat)	Near 13

The UDWRi lists five surface water rights out of the Cutoff Channel South Diversion alignment. These water rights are listed in Table 2-6 and the flows are used for irrigation and wildlife habitat.

Table 2-6. Cutoff Channel-North Diversion Surface Water Rights

Water Right No.	Owner	Flow	Source	Structure ID
35-1610	Knight Irrigation Co	2.0 cfs	Knight Slough – 0.3 miles north of 1100 S	3
35-8073	Edward C. and Joann E. England	0.5 cfs	Slough – 0.8 miles north of 1100 S	3
35-8083	Western Basin Land and Livestock, LLC	4.0 cfs and 300 ac-ft	Little Weber River – 1.5 miles west of 6700 W southern channel (channel storage)	8
35-10772	Marsh Holders Inc	3.0 cfs or 2,000 ac-ft	Little Weber Slough – 0.8 miles east of Rainbow Pond Dike	East of 9
29-1584	UDWR	10.0 cfs or 7,227 ac-ft	Third Salt Creek – Harold S. Crane WMA (waterfowl habitat)	Near 13

2.12 Waters of the United States

Waters of the United States pertaining to this proposed project consist of streams and wetlands within the project area. The National Wetlands Inventory (NWI) maps from the USFWS (1983), as depicted on Appendix C-Figure 15, identify general wetland and stream types as freshwater wetlands, freshwater pond, lake, and riverine throughout the project area. There was no formal wetland and stream delineation completed for the proposed project.

2.13 Vegetation

2.13.1 Dominant Vegetation Communities

Five general dominant habitat/vegetation types are found within the project area as depicted on Appendix C-Figure 14 and include the following:

- Agriculture (Altered Lands): This habitat type has been altered by human efforts and includes roadsides, levees and water control structures. These highly disturbed areas are dominated by grasses and weedy species, including Kentucky bluegrass (*Poa pratensis*) as well as cheatgrass (*Bromus tectorum*), Canada thistle (*Cirsium arvense*), and teasel (*Dipsacus sylvestris*). According to Findlay (2007) both nonnative and native species of vegetation are found within the project area in these altered habitats. Most of the uplands are dominated by grasses such as wheat grasses and salt grasses, with iodinebush and greasewood scattered across the landscape (Findlay 2007, Godfrey *et al.* 2005).
- Riparian Woodland: This habitat type is common primarily along the banks of the lower Weber River. Narrowleaf cottonwood (*Populus angustifolia*), coyote willow (*Salix exigua*), red-osier dogwood (*Cornus stolonifera*) and tamarisk (*Tamarix sp.*) are the dominant tall woody vegetation (Findlay 2007). Big sagebrush (*Artemisia tridentate*), smooth brome (*Bromus inermus*), timothy (*Phleum pratense*), Canada thistle (*Cirsium arvense*) as well as several other introduced and native grass species are common along the tops of the river banks.
- Riparian Shrubland: The majority of this habitat is found near and on the Harold S. Crane WMA and consists of emergent bulrush marshes, mud flats, open water ponds and upland game nesting habitat of tall grasslands, saltbush and greasewood. The current wet meadow areas commonly have numerous willows (*Salix spp*), red-osier dogwood (*Cornus stolonifera*), and other woody species along stream banks and riparian areas with better drained soils. Grasses and grass-like plants like tule (*Scirpus spp*), bluejoint reedgrass (*Calamagrostis canadensis*), mannagrasses

(*Glyceria spp*), Nebraska sedge (*Carex nebrascensis*), and beaked sedge (*Carex spp*) are important riparian and wet meadow plants (Banner 1992, USU 2103). Salt cedar (Tamarix spp) and common reed grass has invaded many riparian areas.

- Emergent Marsh: The salt marsh area is found in the western portion of the project area. This marsh area and related mudflats are dominated by vegetation associated with salt marsh communities include Olney's threesquare (*Scirpus americanus*), hardstem bulrush (*Scirpus acutus*), cattail, lady's thumb (*Polygonum persicaria*), salt grass (*Distichlis spicata*), tamarisk and common reed (Findlay 2007). The salt marsh and associated mudflats are poorly drained soils with slow to moderate permeability. Saline soils are common in these salt marshes with mainly grasses growing in them including salt grass, wire grass (*Juncus articus*), Kentucky bluegrass (*Poa pratensis*), redtop (*Agrostis stolonifera*) and other shallow rooted plants which frequent harsh soil conditions (Banner 1992, USU 2013). Mudflats have little or no vegetation growing on them.
- Open Water: These areas generally lack vegetation or have sparse submerged vegetation. They occur within the Cutoff Channel and ponds.

2.13.2 Special Status Plant Species

The information documented in this section is compiled from existing data and lists within Weber County. No formal studies were conducted for the preparation of this Draft EA. There were no special status plant species identified on the UDWR Utah Conservation Data Center (2011 and 2012b) for sensitive species occurring in Weber County.

2.13.3 Noxious Weed and Invasive Plant Species

Noxious weeds are non-native plants introduced into an area. They spread quickly and can be difficult to control. They invade croplands, rangeland, forests, prairies, rivers, lakes and wetlands causing both ecological and economical damage. Utah has developed a list of noxious weeds that occur in the entire state (Utah Department of Agriculture 2010). Table 2-7 tabulates the species that have been documented in Weber County (NRCS 2013a).

Noxious weeds are classified into three classes A, B and C.

- Class A: Consists of weeds that are non-native to the state and pose a serious threat to native species. Weeds in this classification require an Early Detection Rapid Response action, and are considered very high priority.
- Class B: Consist of non-native species that pose a threat to the state and control is focused on controlling an invasion rather than rapid response. Weeds in Class B are considered high priority.
- Class C: Consist of non-native species that are already abundant in the state but may pose a threat to agricultural lands and industry. The focus for Class C weeds is containing and stopping the invasion.

Table 2-7. Weber County Noxious Weed Species

Common Name	Scientific Name	Class[1]
Bermuda Grass	*Cynodon dactylon*	B
Black Henbane	*Hyoscyamus niger*	A
Canada Thistle	*Cirsium arvense*	C
Diffuse Knapweed	*Centaurea diffusa*	A
Dyer's Woad	*Isatis tinctoria*	B
Field Bindweed	*Convolvulus arvensis*	C
Johnsongrass	*Sorghum halepense*	A
Leafy Spurge	*Euphorbia esula*	A
Medusahead	*Taeniatherum caput-medusae*	A
Musk Thistle	*Carduus nutans*	B
Perennial Pepperweed	*Lepidium latifolium*	B
Purple Loosetrife	*Lythrum salicaria*	A
Quack Grass	*Elytrigia repens*	C
Russian Knapweed	*Centaurea repens*	B
Scotch Thistle	*Onopordum acanthium*	B
Spotted Knapweed	*Centaurea maculosa*	A
Squarose Knapweed	*Centraurea virgata*	B
Yellow Starthistle	*Centaurea solstitialis*	A

Noxious weed species are common in the project area due to the presence of agricultural activity that can spread seed. Weeds have been mostly observed along the edges of roads and heavily disturbed areas. Invasive species including common reed grass and salt cedar that are not listed on the Utah State list are dominant in the landscape of the Cutoff Channel alignment. The Harold S. Crane WMA participates in the Invasive and Noxious Weed Control Project managed by UDWR. This enhanced control measure targets Utah's WMAs to restore and control the spreading of invasive and noxious weeds in wetlands and associated uplands.

CHAPTER 3.0
ALTERNATIVES

3.1 Project Scoping

Scoping questions, comments and concerns were requested from the public and government agencies during the preliminary scoping period through a scoping notice and at public meetings both orally and via written submittal of comments. The primary purpose of the scoping process was to gather input and feedback on the projects' purpose and need statement, potential alternatives for consideration, environmental issues to be addressed in the Draft EA, methodologies to be used to evaluate impacts, and the overall public participation process. A detailed description of the public scoping process is located in Chapter 5.0 and a copy of the Scoping Report is presented in Appendix A.

3.2 Formulation Process

The formulation process of alternatives to reduce the damage caused by flood events in 2011 on the Lower Weber River followed procedures outlined in the NRCS EWP Manual (NRCS 2012) and the NRCS EWP Programmatic Environmental Impact Statement (NRCS 2004). Numerous alternatives were evaluated by the project team based on the ability to address the purpose and need of the project. The scoping comments received during the scoping period were analyzed and viable comments were incorporated into the formulation process for the initial alternatives. Some of these initial alternatives were eliminated from further analysis due to high cost or other critical factors that made the alternative unfeasible. Four Action alternatives and one No Action alternative were selected by NRCS and the project team to be analyzed in this Draft EA.

3.3 Alternatives Considered but Eliminated from Detailed Study

There were six alternatives considered for the project but were eliminated from further analysis in this Draft EA. A list of these alternatives is presented below followed by a brief summary of these alternatives and the reason(s) for elimination.

- Storage Reservoirs
- River Dredging
- Willard Bay Canal
- Upstream Reservoirs Management
- Irrigation Ditches
- Other Flood Cutoff Channels

3.3.1 Storage Reservoirs

The implementation of off channel flood storage reservoirs along the Lower Weber River would provide the ability to transfer water out of the river/floodplain into these reservoirs and reduce the overall amount of water volume in the river. These reservoirs would be constructed in the adjacent floodplain or upland on private and/or public property. The bottom of the reservoirs would be created at existing or below ground level and dikes/levees would be constructed around the perimeter to contain the water. Water from the river/floodplain would be mechanically pumped or allowed to gravity flow into the reservoirs via conveyance pipes/channels and would be stored during flood events. Once the flood waters receded, the reservoirs would be gradually drained back into the Lower Weber River until they were completely empty.

This alternative was considered due to the potential to remove river water from the floodplain and store it in a safe location that would potentially reduce flood damage to surrounding properties. However, the size of the reservoirs would be very large and numerous reservoirs would be required up and down the Lower Weber River to achieve the reduction in flood flows desired for the project. For example, the removal of 8,000 acre/feet of water from the river would help reduce overall flows and potentially lower water levels. However, in order to store this volume of water the dike/levee would be a minimum of 8 feet tall on 1,000 acres plus the extent of the dike/levee footprint.

The reservoirs would be constructed mostly in private agricultural fields adjacent to the river and would require either the purchase or an easement on property to allow for flood water to be stored. This would also require farmers to potentially miss one or more years of crop rotation in these areas when water would be actively stored in these reservoirs. This alternative was eliminated from detailed study due to the lack of available suitable land required to significantly reduce flood levels in the river, the high cost to purchase property and/or obtain easements, the high cost to construct the dikes/levees, and the high cost to purchase, install, operate and maintain the pumps.

3.3.2 River Dredging

Dredging the lower Weber River in the vicinity of the Cutoff Channel would remove sediment that was deposited in the river over the past 50+ years that has filled in the bottom of the river. This sediment deposition is assumed to have reduced the capacity of the river channel to convey flood flows safely downstream to the Great Salt Lake without overtopping the banks and flowing into the adjacent floodplain. The lower Weber River would be dredged for approximately six miles starting at the 1100 S bridge and heading upstream to a depth below the existing river bed that would increase the capacity of the river to transport flood flows.

This alternative was considered to increase the flood capacity of the river to reduce impacts when flows overtop the banks as compared to the 2011 flood event. However, dredging sediment that was deposited in the river prior to the 2011 flood event is not authorized under the EWP program, Title 390, Part 511.4.A(8) (NRCS 2012). Sediment movement and deposition in the lower Weber River is expected to remain similar in magnitude during future flood events and this reach of the river is expected to have more sediment accumulation in the future. Dredging of the river is considered a temporary solution to restore the flood capacity and the river bed is expected to fill in with sediment again during future flood events. In addition, dredging the river channel may create banks along the river that are unstable and eventually slough into the river filling in the area previously dredged. This alternative was eliminated from detailed study since dredging of historical deposition is not approved under the EWP program and it is considered a temporary fix to a long-term problem.

3.3.3 Willard Bay Canal

The Willard Bay Canal conveys water from the Weber River into the Willard Bay Reservoir on the eastern edge of the Great Salt Lake. Willard Bay Reservoir is primarily used for irrigation water storage and also has some recreation benefits. Water is conveyed into the reservoir during the spring to fill it up and it can then flow back into the Weber River through the canal and a couple of pump stations during the summer and fall months to supplement water in the river for irrigation purposes. The canal was originally designed to convey approximately 1,000 cfs to Willard Bay Reservoir. Water from the Weber River was intermittently diverted into this at a rate of approximately 1,000 cfs during the 2011 flood. The diversion was intermittent because the canal intake trash rack kept plugging. In order to unplug the trashrack, the flow in the canal was allowed to backflow into the river. Trash rack modifications are discussed in Chapter 3.6.3 – Reasonably Foreseeable Actions. The canal channel could be upgraded to allow the

conveyance of up to 2,000 cfs into Willard Bay Reservoir during flood events to reduce the peak flood discharges in the Weber River below the diversion and to lessen the impacts that high flows in the river have on the river banks downstream that are prone to overtopping and failure and result in flooding.

This alternative was considered to convey up to 2,000 cfs out of the river potentially reducing impacts on the river system downstream. The open canal channel could be upgraded and reshaped to convey up to 2,000 cfs. However, there are several constriction points where the canal crosses underneath roads (I-84, Highway 126, 400 N St.) and infrastructure (railroads, pump stations) that have a maximum flow capacity of 1,000 cfs. Doubling the size of these constriction points would be more expensive (~$10,000,000) than the funds that were obligated to Weber County through the EWP program to repair flood damage from the 2011 flood event. Therefore, this alternative was eliminated from detailed study due to high cost and limited funding for the project.

3.3.4 Upstream Reservoirs Management

The Weber River watershed contains several reservoirs upstream of the Ogden Bay WMA that manage flows for irrigation storage. These reservoirs include the following:

- Pineview Reservoir on the Ogden River,
- Causey Reservoir on the South Fork Ogden River,
- Lost Creek Reservoir on Lost Creek,
- East Canyon Reservoir on East Canyon Creek,
- Echo Reservoir on the Upper Weber River,
- Rockport Reservoir on the Upper Weber River,

The reservoirs water levels fluctuate on a seasonal basis which includes high levels in the spring and low levels in the fall once water has been drained over the summer months for irrigation. The Weber Basin Water Conservancy District operates each dam and reservoir for optimal storage of water for irrigation purposes. Weber County can coordinate with Weber Basin Water Conservancy District in an effort to manage reservoir storage for optimal flood storage during years where snowmelt runoff is anticipated to be higher than normal. This would reduce the amount of water flowing downstream into the main stem of the Weber River. Each reservoir could be lowered prior to each flood season so that the maximum volume of water possible can be retained while still maintaining the Weber Basin Water Conservancy District responsibilities for operating the reservoirs.

This alternative was considered to identify the possibility of using the upstream reservoirs as a way to control the peak flow being conveyed downstream to the Lower Weber River. The primary purpose of the reservoirs is to store water for irrigation purposes. However, they also provide an additional benefit of water storage during flood events. The watermasters operate each reservoir to ensure that the reservoir is full of water starting the irrigation season so that the water rights holders downstream are allocated their water right. During the 2011 flood event, Weber County coordinated very closely with the Weber Basin Water Conservancy District in regards to peak releases into the Weber River system to keep river discharges at a level that could be confined within the channel banks through developed areas. Weber County will continue to coordinate with the Weber Basin Water Conservancy District during flood events in the future for maximum flood storage possible before releasing water downstream. This alternative was eliminated from detailed study since Weber County is already coordinating with the reservoir's watermasters during flood events. A detailed management plan between Weber County and the Weber Basin Water Conservancy District will be developed so that there are standard operating procedures in place for future flood events outside of this project.

3.3.5 Irrigation Ditches

The Lower Weber River area has multiple irrigation ditches (Wilson, Warren, Layton, and Hooper) that traverse agricultural fields providing irrigation water to farmers. Some of these irrigation ditches have the capacity to convey several hundred cfs throughout the area. Diverting flood flow into these ditches during flood events to convey additional water out of the river could reduce the overall volume of water flowing downstream. These ditches would be opened up to maximum capacity or modified to convey larger volumes of water.

This alternative was considered to identify the possibility of using these ditches as a way to reduce flood volumes and possibly reduce overtopping the river banks downstream. These irrigation ditches were primarily constructed to convey slower velocity flows to irrigation pumps and lateral ditches. The ditches gradually become smaller along their length since during the normal irrigation operating season water is taken out of the canal for irrigation purposes and the flow volume is gradually reduced. The outlet of these ditches is typically much smaller than the inlet reducing their hydraulic capacity that could result in failure of the ditch banks. This option would also only convey several hundred cfs out of the river which would not make a significant impact on water levels within the river and floodplain to be a cost effective alternative. This alternative was eliminated from detailed study due to the lack of available water conveyance capacity in the ditches and the extensive modifications that would be required to upgrade the ditches to convey a significant amount of water out of the river.

3.3.6 Other Flood Cutoff Channels

There are several remnant other flood cutoff that could convey flood flows out of the Weber River toward the Great Salt Lake and reduce flood volumes. These other cutoff channels would include the same style and method of conveying water out of the river channel as stated in the Cutoff Channel alternative that is considered for detailed study.

This alternative was considered to increase the amount of water that could be conveyed out of the river system during flood events. However, these channels, not associated with the Cutoff Channel, are not as large and would not convey enough water to see a significant reduction in flood volumes. These channels are also hydraulically disconnected by the construction of roads, irrigation ditches and agricultural fields that would require extensive modifications to create an unobstructed flow path. These modifications would be expensive and not yield a substantial benefit to the surrounding community during flood events. This alternative was eliminated from detailed study based on the small size of the channels and low cost-benefit for the overall project.

3.4 Alternatives Considered for Detailed Study

There was one No Action alternative and four Action alternatives considered for the project that were carried forward to detailed analysis in this Draft EA. A list of these alternatives is presented below followed by a summary of these alternatives.

- No Action
- Little Weber River Cutoff Channel – North Diversion
- Little Weber River Cutoff Channel – South Diversion
- Levees
- Floodplain Easements

3.4.1 No Action

The No Action alternative consists of not using any federal money under the EWPP to repair damage and modify the existing Cutoff Channel. Any modifications would be funded by Weber County and/or local property owners to modify structures and roads, and mechanically breach roads to allow for increased flows through obstructions or constrictions during flood events. Under this No Action alternative, the residents in the surrounding agricultural community would most likely continue to be flooded during elevated flows in the Weber River and the water level would continue to back up behind constriction points and potentially flood homes and crops. The rise in the Weber River flow volumes would increase the risk of failure to embankments adjacent to the river that are currently protecting adjacent resources. The worst-case-scenario under the No Action is the failure of the embankments upstream and downstream of the Cutoff Channel breach location resulting in potentially flooded homes, land and loss-of-crop similar to the 2011 damage level or greater.

3.4.2 Little Weber River Cutoff Channel – North Diversion

The Cutoff Channel was activated during the 2011 flood event as shown in Appendix B-Figure 3. It was activated at a historical breach point on the river dating back to before 1952. The northern diversion point alternative (Appendix B-Figure 4 and Figures 6 through 8) has been activated during most flood events in the lower Weber River including the floods of 1952, 1983, and 2011. The embankment on the right bank of the river (looking downstream) was breached by the river and water traveled down an existing ditch, previously created for this type of event, to the west. Four roads and one dike on the Harold S Crane Waterfowl Management Area were mechanically breached to allow the conveyance of water through the Cutoff Channel system and help reduce flood levels in the area. It was estimated that up to 1,000 cfs flowed through the Cutoff Channel during the flood event (Smart 2013). Once water overtops the banks it drains to the Cutoff Channel and not back to the Weber River (BCA 2013b). Flood water pooled in the adjacent agricultural fields prior to the breaching of roads. Once the roads and dike were breached, the fields were still inundated with water but the water level dropped approximately several feet and was able to flow freely out of the area once the flood waters in the river started to recede.

This alternative was considered for detailed study because it is the natural flow path for flood water to flow out of the surrounding floodplain following existing topography to the Great Salt Lake. The channel would be sized to pass up to 1,000 cfs during flood events and the intake structure would control the amount of water flowing through the channel. The channel could be activated when flood flows in the river reach approximately 3,500 cfs. All structures would be modified using current engineering technology and standards as specified under the EWPP, Title 390, Part 511.4.A(12) (NRCS 2012) and would be designed to withstand up to a 100-year flood event. Under this north diversion alternative, the following components would be included in the project:

1. Install a new inlet structure on the right bank of the Weber River at the inlet to the Cutoff Channel where the river breached in 2011 to pass up to 1,000 cfs.
2. Install a 40 feet wide by six feet deep concrete lined channel from the inlet off the Weber River to the Warren Canal. This channel would cross 5500 W and 5900 W and would be approximately 6,000 feet long.
    a. The new channel would flow through the four existing culverts underneath 5900 W that is already sized to pass up to 1,000 cfs.
3. Install a 40-foot wide bridge at 5500 W to pass up to 1,000 cfs.
4. Install five new culverts underneath 700 N to pass up to 1,000 cfs.
5. Install six new culverts (three per crossing) underneath 6700 W to collectively pass up to 1,000 cfs.
6. Install four new culverts at the private road crossing to the west of 6700 W to pass up to 520 cfs.

7. Remove berms in the Cutoff Channel on private property that are restricting flow capacities. Install water regulating structures to allow the landowner to retain water according to water rights.
8. Remove berms in the Cutoff Channel on private property that are restricting flow capacities. Install water regulating structures to allow the landowner to retain water according to water rights.
9. Install four new culverts and regulating structures on Rainbow Pond Dike to pass up to 1,000 cfs.
10. Install ten new culverts underneath the railroad to pass up to 1,000 cfs.
11. Enclose the existing open canal on GSL Minerals property for 150 feet to pass up to 900 cfs.
12. Install seven new culverts at the GSL road crossing to pass up to 1,000 cfs.
13. Enclose the open canal for 30 feet to allow excess water to flow across the canal into the Great Salt Lake.

The Cutoff Channel would require maintenance and inspection on a yearly basis that would be the responsibility of Weber County for vegetation clearing, invasive species removal, repair, etc. An Operations and Maintenance Plan would be developed describing how to operate the Cutoff Channel mechanical components and perform maintenance in the channel itself so that it does not become overgrown with vegetation or invasive species.

The implementation of these Cutoff Channel modifications is not expected to eliminate flooding or damage to property adjacent to the lower Weber River. These components will help reduce the flood effects via a reduction in the inundation depth and time on the land by creating a stabilized conveyance channel to move water away from the area.

3.4.3 Little Weber River Cutoff Channel – South Diversion

The Little Weber River Cutoff Channel – North Diversion was activated during the 2011 flood event as shown on Figure 3. The northern diversion point alternative has been activated during most flood events in the lower Weber River including the floods of 1952, 1983, and 2011. There is another historical inlet location that confluences with the Cutoff Channel near the intersection of 1100 S and 5900 W (Appendix B-Figure 5 and Figures 6 through 8). This inlet location does not currently connect directly to the Cutoff Channel due to the construction of roads and agricultural activities. Historical photographs show that this channel has been disconnected since prior to 1937. As an alternative to the North Diversion location, this South Diversion could be reconnected to the mainstem of the Little Weber Cutoff Channel through the existing drainages and meet the channel alignment approximately 1,100 feet west of 5900 W. The water course would then follow the path described in the North Diversion alternative.

This alternative was considered for detailed study because it was once connected to the current mainstem of the Cutoff Channel and would also provide a path for flood water to flow out of the surrounding floodplain following the topography to the Great Salt Lake. The channel would be sized to pass up to 1,000 cfs during flood events and the intake structure would control the amount of water flowing through the channel. The channel would be activated when flood flows in the river reach approximately 3,500 cfs. All structures would be modified using current engineering technology and standards as specified under the EWPP, Title 390, Part 511.4.A(12) (NRCS 2012) and would be designed to withstand up to a 100-year flood event. Under this South Diversion alternative, the following components would be included in the project:

1. Install a new inlet structure on the right bank of the Weber River near the intersection of 1100 S and 5900 W to pass up to 1,000 cfs.
2. Install a 40 feet wide by six feet deep concrete lined channel for 900 feet from the inlet off the Weber River to 5900 W and install new culverts underneath 5900 W to pass up to 1,000 cfs.

3. Install seven new culverts in the channel alignment to pass up to 1,000 cfs.
4. Install five new culverts underneath 700 N to pass up to 1,000 cfs.
5. Install six new culverts (three per crossing) underneath 6700 W to collectively pass up to 1,000 cfs.
6. Install four new culverts at the private road crossing to the west of 6700 W to pass up to 520 cfs.
7. Remove berms in the Cutoff Channel on private property that are restricting flow capacities. Install water regulating structures to allow the landowner to retain water according to water rights.
8. Remove berms in the Cutoff Channel on private property that are restricting flow capacities. Install water regulating structures to allow the landowner to retain water according to water rights.
9. Install four new culverts and regulating structures on Rainbow Pond Dike to pass up to 1,000 cfs.
10. Install ten new culverts underneath the railroad to pass up to 1,000 cfs.
11. Enclose the existing open canal on GSL Minerals property for 150 feet to pass up to 900 cfs.
12. Install seven new culverts at the GSL road crossing to pass up to 1,000 cfs.
13. Enclose the open canal for 30 feet to allow excess water to flow across the canal into the Great Salt Lake.

The Cutoff Channel would require maintenance and inspection on a yearly basis that would be the responsibility of Weber County for vegetation clearing, invasive species removal, repair, etc. An Operations and Maintenance Plan would be developed describing how to operate the Cutoff Channel mechanical components and perform maintenance in the channel itself so that it does not become overgrown with vegetation or invasive species.

The implementation of these Cutoff Channel modifications is not expected to eliminate flooding or damage to property adjacent to the lower Weber River. These components will help reduce the flood effects via a reduction in the inundation depth and time on the land by creating a stabilized conveyance channel to move water away from the area.

3.4.4 Levees

The installation of levees would be constructed on both sides of the river starting at the 1100 S Bridge and heading upstream for six miles (Appendix B-Figures 9 and 10) to contain flood flows up to a reoccurrence event similar to the 2011 event (~63 year event). These levees would be constructed approximately 50 to 200 feet from the bank of the river primarily on private property. Construction of the levees would require up to a 100-foot right-of-way area for the installation of the levee and access. The levee would be designed and constructed with a minimum of three feet of freeboard during flood events. All areas encompassed in the right-of-way would not be used for agricultural purposes and would also be cleared and maintained free of woody vegetation. If portions of the levee were to be located in areas within the vegetated riparian corridor, all existing trees and shrubs would be cleared in the right-of-way as part of the project.

In order for the levees to be constructed on private property, the landowner will have to voluntarily agree to sell their land or enter into an easement for the levee system. The entire length of the levee system would require agreement from all landowners so that there are no missing portions of the levee where flood flows could inundate the adjacent agricultural fields located in the floodplain. Flood water may become trapped on the outer side of the levee causing prolonged inundation in agricultural fields. Culverts with flap gates would be installed in various locations throughout the levee system to allow one-way flow of water back into the river.

The levees would require maintenance and inspection on a yearly basis that would be the responsibility of Weber County for vegetation clearing, invasive species removal, repair, maintenance, etc. An Operations and Maintenance Plan would be developed describing the responsibilities and requirements for maintaining the levee.

The installation of levees on each side of the Weber River would create a protective measure above and beyond what existed prior to the 2011 flood event. According to the EWPP, Title 390, Part 511.4.A(5) (NRCS 2012), solving watershed or natural problems that existed prior to a natural disaster are not approved. However, a waiver may be submitted to the Deputy Chief for Easements and Landscape Planning to grant an unusual situation or circumstance where it is in the best interest of the Government to implement the EWP project.

3.4.5 Floodplain Easements

A floodplain easement authorized under the EWPP provides an alternate measure to traditional recovery work where sites are eligible for the program but it is determined that acquiring an easement in lieu of recovery is the more economical and prudent approach to reducing a threat to life or property according to EWPP, Title 390, Part 514.0.A (NRCS 2012). The purchase of floodplain easements is on a voluntary basis only with landowners who were impacted during the 2011 flood event. These easements are held by the United States Secretary of Agriculture, administered by the NRCS and are perpetual in duration. The landowner still owns the land and utilizes the land under conditions that exist currently.

The floodplain easements would be created adjacent to the lower Weber River (Appendix B-Figure 11) and would allow both public and private land to be flooded naturally without protection. The locations of easements on Figure 11 are meant for illustrative purposes only and further coordination and analysis of the easement boundary would be performed if this alternative is selected for the project. The landowner would possibly lose use of the land during the flood year and/or experience damage to land and structures within the easement. Land that is entered into the program may be left as-is or restored/enhanced to create floodplain/wetland areas.

The land and associated use would be valued for the floodplain easement program and the property owner would be offered a value for the easement. The responsibilities and requirements of the floodplain easement would be outlined in an agreement between the landowner and NRCS. Table 3-1 lists the ownership, use and area within the floodplain easement areas.

Table 3-1. Floodplain Easement Area Descriptions

Ownership	Current Use	Area (acres)
Private	Agriculture	~1,350
Private	Bare Land	~260

3.4.6 River Gages

A new river gage is proposed for installation at the 4700 W Bridge (Appendix B-Figure 12) in an effort to more accurately track flood events in the lower Weber River. This new gage is applicable to all four Action alternatives considered for detailed study. The information obtained from this gage will allow Weber County to respond to future flood events via the operation of any mechanical structures or the initiation of flood response procedures.

One additional river gage would be installed to track flood events at the 1100 S Bridge downstream. This river gage is not associated with this project and is discussed in Chapter 3.6.3 – Reasonably Foreseeable Actions.

3.5 Summary and Comparison of Alternative Plans

Table 3-2. Summary and Comparison of Alternatives

Effects	No Action	Cutoff Channel – North Diversion (Proposed Alt)	Cutoff Channel – South Diversion	Levees	Floodplain Easements
Climate	Minor Beneficial Impact	**Moderate Beneficial Impact**	**Moderate Beneficial Impact**	**Moderate Beneficial Impact**	Minor Beneficial Impact
Cultural/Historic	**No Adverse Effect**	**No Adverse Effect**	**No Adverse Effect**	**No Adverse Effect**	**No Adverse Effect**
Endangered and Threatened Species	**No Effect**	**No Effect**	**No Effect**	**No Effect**	**No Effect**
Fish and Wildlife	**Negligible Negative Impact to Fish; Moderate Negative Impact to Wildlife Habitat**	Moderate Negative Impact to Fish; Minor Negative Impacts to Wildlife	Moderate Negative Impact to Fish; Minor Negative Impacts to Wildlife	**Negligible Negative Impact to Fish; Moderate Negative Impacts to Wildlife**	**Negligible Negative Impact to Fish; Moderate Negative Impact to Wildlife Habitat**
Floodplain Management	Moderate Negative Impact from Lack of Federal Funding	**Major Beneficial Impacts**	**Major Beneficial Impacts**	**Major Beneficial Impacts**	Minor Negative Impact
Land Use	No Effect	**Minor Negative and Beneficial Impacts**	Minor Negative Impacts	**Minor Negative and Beneficial Impacts**	Moderate Negative Impact
Migratory Birds	Moderate Negative Impact to Bird Habitat	**Minor Negative Impacts**	**Minor Negative Impacts**	Moderate Negative Impact	Moderate Negative Impact to Bird Habitat
Public Health and Safety	Major Negative Impact	**Major Beneficial Impacts**	**Major Beneficial Impacts**	**Major Beneficial Impacts**	Major Negative Impact
Recreation	No Effect	Minor Negative Impact	Minor Negative Impact	**Minor Beneficial Impact**	No Effect
Soils	Minor Negative Impact	Negligible Beneficial Impact	Negligible Beneficial Impact	Negligible Negative Impact	Minor Negative Impact
Water Resources	No Effect	**Moderate Beneficial Impact**	**Moderate Beneficial Impact**	Minor Negative Impact	No Effect
Waters of the United States	**Negligible Negative Impact**	Moderate Negative Impact	Moderate Negative Impact	Moderate Negative Impact	**Negligible Negative Impact**
Vegetation	Moderate Negative Impact	**Minor Negative Impact**	**Minor Negative Impact**	Moderate Negative Impact	Moderate Negative Impact
Cost	**Low**	Moderate	Moderate	High	High

Note: **Bold** indicates the least negative impact or most beneficial impact to the environment.

3.6 Past, Present and Reasonably Foreseeable Actions

3.6.1 Past Actions

Weber County has dredged the bottom of the lower Weber River at bends where significant deposits of sand have accumulated over at least the past 50 years. This dredging has helped increase the capacity of the channel at bends and reduced the possibility for flow impediment during flood events.

3.6.2 Present Actions

Present actions occurring on the lower Weber River includes the removal of debris and repair of damaged banks from the 2011 flood event under the EWPP. The removal of debris includes removing large woody debris and miscellaneous trash (i.e. cars, concrete rubble) from the banks and within the channel that may be restricting flow capacities. Removal of debris consists of removing trees that fell into the channel and trash that was dislodged from the bank during the flood event. The repair of the banks consists of

restoring the banks to pre-flood conditions and armoring them with riprap to prevent erosion and scour during future flood events.

3.6.3 Reasonably Foreseeable Actions

Willard Bay Canal Intake

The Willard Bay Canal Intake currently does not have a system that allows the intake trashrack to be cleaned during flood events without shutting down the canal. Modifications to the intake trashrack may include realigning the trashrack system to bypass large debris and installing a system so that an excavator or an automated mechanical trash rack cleaner may clean debris off of the rack system while the canal is operating. By installing this new trashrack system, the canal will be able to flow up to 1,000 cfs to the Willard Bay Reservoir during flood events. NRCS is proposing to fund this project under the EWPP. The implementation of this project would reduce flood flows downstream of the canal intake by up to 1,000 cfs during flood events.

Weber River Structure Repairs

The Weber River Structure Repairs project consists of repairing structures on the Ogden Bay WMA that were damaged during the 2011 flood event. The Weber River splits into three separate channels on the WMA: 1) North Run, 2) Middle Run, and 3) South Run. A water regulating structure has been constructed on each of these channels to regulate and control releases into the WMA for irrigation and waterfowl during periods of normal flow. During periods of normal flow in the Weber River, these structures at the Ogden Bay WMA are used to back water up in the river so that water can be diverted into WMA wetlands and nesting areas. During periods of elevated flows, the gates on these structures are opened to minimize any structure-related flow restrictions and impacts to flooding upstream. During the 2011 flood event on the Weber River, portions of the dike system on the Ogden Bay WMA were mechanically breached to bypass the Middle Run water control structure in an effort to reduce flood impacts to upstream property along the river. NRCS is proposing to fund the repair of the structures and modify the existing WMA infrastructure to pass flood flows more efficiently under the EWPP and is preparing an EA for this project also. This project is not intended to eliminate flooding upstream but to reduce the flood water depths and inundation time on the ground.

3.6.3.1 Cumulative Impact Area

Based on the Reasonably Foreseeable Actions on the lower Weber River, cumulative impacts are expected to the human environment as a result of the proposed project. The cumulative impact area assessed in this report is the reach of the lower Weber River from the Willard Bay Canal Intake down to the 1100 S Bridge within the floodplain that was activated during the 2011 flood event.

3.7 Proposed Alternative

The Proposed Alternative for the project is the Little Weber River Cutoff Channel – North Diversion Alternative based on the ability to meet the purpose and need for the project. Through the analysis of environmental and social resources in the Environmental Consequences Chapter (4.0), it was determined that the Little Weber River Cutoff Channel – North Diversion alternative would also provide the least negative and most beneficial effects for the project out of all the alternatives considered. This alternative was also chosen because the river has historically breached at this location during the 1952 and 1983 flood events also. The stabilization of the channel and increased flow capacity up to 1,000 cfs would not eliminate flooding upstream, downstream and adjacent to the lower Weber River but would reduce the flood water depth and inundation time on the ground.

3.7.1 Mitigation

Cultural/Historical Resources: There are no cultural/historical resources present at the proposed structure and culvert modification areas. If encountered during excavation activities, construction would stop and the appropriate agencies would be notified.

Fish: Fish may be entrained in the Cutoff Channel during flood events. There is no suitable fish habitat in the Cutoff Channel or the Great Salt Lake so any fish that enter into the channel are anticipated to die. Mitigation efforts to reduce fish entrainment include the preparation of an Operation and Maintenance Plan that would specify under which flow conditions the Cutoff Channel would be activated. These flow conditions would be coordinated with UDWR to identify when fish would be expected to be present in the inlet area and at what times the channel should or shouldn't be activated to help reduce fish entrainment.

Migratory Birds: Migratory birds will experience temporary impacts during construction activities from general construction noise and dewatering of wetland areas to install water control structures and culverts. Mitigation efforts include using machinery equipped with noise reducing features, minimizing work time, and reducing the construction schedule to the greatest extent practicable.

Soils: Erosion may occur on disturbed and cleared areas within the project boundary during precipitation events. Proper Best Management Practices (BMP) would be installed to prevent and control soil erosion.

Streams and Wetlands: Modifications to the Cutoff Channel would impact the Weber River, Little Weber River and surrounding wetlands. Coordination with the USACE would be performed to determine if compensatory mitigation would be required for impacts to jurisdictional waters of the U.S.

Vegetation: All disturbed areas not associated with direct structure and culvert modifications would be revegetated with native plant species. Special precautions will be taken to not spread common reed grass on or off site during construction.

3.7.2 Operation and Maintenance

Operation of the structures includes the administration, management, and performance of non-maintenance actions needed to keep the structures safe and functioning as designed. Maintenance includes performance of work, measuring the recording instrumentation data, preventing deterioration of structures, and repairing damage or replacement of the structure as-needed to prevent failure. Damages to completed structures caused by normal deterioration, droughts, flooding, or vandalism are considered maintenance. Maintenance includes both routine and as-needed measures which include:

- Annual control of woody species on or near the structures.
- Operating structure gates on a monthly basis to ensure proper performance of the gate.
- Other specific items that will be identified during final design.

Inspection of the structures is necessary to verify that the structures are safe and functioning properly. Inspection reports will be supplied to the NRCS following each inspection. Inspections and the associated reports will assess the following items:

- The adequacy of O&M activities,
- Identify needed O&M work,
- Specify ways of relieving unsafe work or performing other needed work, and

- Set action dates for performing corrective actions.

Weber County will be responsible for the operation, maintenance, and future modifications to the structures on private property. UDWR will be responsible for the operation, maintenance, and future modifications to the structures on State property. A specific O&M Plan will be prepared by the NRCS, Weber County, and UDWR that will govern the use of the structures and determine when the Cutoff Channel will be activated. This plan and agreement will be entered into prior to the start of construction activities.

CHAPTER 4.0
ENVIRONMENTAL CONSEQUENCES

The NRCS has the responsibility under NEPA to identify and address effects on the human environment that may occur as a result of the alternatives. This chapter describes the potential effects of the alternatives within each resource category as described in Chapter 2.0. The following defines the type of effects and impacts analysis used in this chapter (NRCS 2011):

- Direct Effect: Impacts caused by a proposed action and occurring at the same time and place.
- Indirect Effect: Impacts caused by an action that are later in time or farther removed in distance, but are still reasonably foreseeable.
- Temporary Impact: This type of impact is usually associated with construction activities and is short-term in duration.
- Permanent Impact: This type of impact is long-term in duration and is usually associated with impacts after construction is complete and the project is operational.

4.1 No Action Alternative

4.1.1 Climate

The effects of climate change on the lower Weber River if No Action is performed would not increase the risk of flooding and damage to property, structures and roads. Climate change in Utah is resulting in declining snowpacks and an increase in droughts. Direct effects from the reduction in precipitation in the watershed would result in a lower risk for high volumes of water to flow through the river. There are no indirect effects anticipated from climate change.

4.1.2 Cultural/Historic

There are several known cultural/historical resources located in the project area. There would be no direct or indirect effects to cultural/historical resources if no modifications are made to the lower Weber River through the EWPP.

4.1.3 Endangered and Threatened Species

There are no ESA listed species, suitable habitat, or designated critical habitat within the project area. Continued flooding of the lower Weber River will have No Effect on the June sucker, least chub, Canada lynx, greater sage-grouse, and the western yellow-billed cuckoo or designated critical habitat.

4.1.4 Fish and Wildlife

Leaving the river in its current condition would result in no direct or indirect effects to fish species. The Bonneville cutthroat trout and bluehead sucker have been observed in the lower Weber River; however, there would be no effect to these special status fishes.

Leaving the channel in the current restrictive condition could lead to the increased probability for bank and/or embankment failure during future flood events. If the embankments fail, existing wildlife habitat on the banks (trees and shrubs) may become directly impacted from excessive flooding and scouring. As a result, wildlife would be indirectly impacted due to the lack suitable habitat for nesting, foraging and cover during certain times of the year causing them to displace to other suitable habitat locations.

4.1.5 Floodplain Management

Under current floodplain management prescriptions, future floods in the Weber River would result in similar flooding to adjacent property, structures, and roads as was experienced during the 2011 flood event. Weber County would be responsible to make the decision to provide flood protection measures to the residences in western Weber County and no federal money from the NRCS EWPP would be used to repair damages from future flood events.

4.1.6 Land Use

Current land use in the area would not be directly or indirectly altered from existing conditions if no federal money from the EWPP is used for the project.

4.1.7 Migratory Birds

Leaving the channel in the current restrictive condition would lead to the increased probability for bank and/or embankment failure during future flood events. If the embankments fail, existing migratory bird habitat on the banks (trees and shrubs) may become directly impacted from excessive flooding and scouring. As a result, birds would become indirectly impacted due to the loss of suitable habitat for nesting and foraging during certain times of the year and would be displaced to other suitable habitat locations.

4.1.8 Public Health and Safety

Public health and safety is put at risk during flood events that spill into the adjacent floodplain where the general public resides. Leaving the river channel, banks, and embankments in their current condition allows flood water to spill into residential areas where there are utilities including roads, electricity, water, and sewer. Public health and safety is directly and indirectly negatively impacted during flood events from the inundation of water in populated areas that could damage roads, property, infrastructure, structures, and life.

4.1.9 Recreation

Recreation resources would not be directly or indirectly affected from not funding the project under the EWPP.

4.1.10 Soil

Soil and erosion along the lower Weber River would remain the same as existing conditions during future flood events. Direct effects would include the continued erosion of soil along the banks and deposition downstream in the river and the floodplain. Continued erosion of the banks may indirectly result in the loss of land and vegetation as the banks slough into the channel over time.

4.1.11 Water Resources

Water quality, stream flows, and water rights would directly and indirectly remain the same as existing conditions during future flood events. Stream flows would remain elevated potentially resulting in flooding, scouring of banks, and damage to structures, property and roads.

4.1.12 Waters of the United States

Streams and wetlands along the edge of the lower Weber River would remain the same during future flood events and would not experience any direct effects. Continued erosion of the banks upstream of the project area may indirectly result in the filling of wetlands adjacent to the channel.

4.1.13 Vegetation

Vegetation along the lower Weber River would remain the same as existing conditions during future flood events. Direct effects would include the continued inundation and scouring of vegetation along the banks and in the floodplain resulting in potential mortality. Continued erosion of the banks may indirectly result in a vegetation shift and/or the loss of vegetation as the banks slough into the channel over time. There are no special status plant species within the lower Weber River area and there would be no effect to special status plants.

4.2 Little Weber River Cutoff Channel – North Diversion Alternative

4.2.1 Climate

Modifications to the Cutoff Channel would provide a beneficial direct and indirect effect related from climate change since the diversion of up to 1,000 cfs out of the river channel would allow the river to pass higher volumes of water downstream. Since climate change in Utah is expected to result in declining snowpack and increased droughts, water flows in the Weber River will be lower than normal during flood events and as a result the Cutoff Channel would help reduce flood inundation time and depth in the floodplain.

4.2.2 Cultural/Historic

There are no known cultural/historical resources that would be impacted from the modifications to the Cutoff Channel and the installation of the river gages. The Cutoff Channel modifications are expected to have no direct or indirect adverse effects on historical structures, places or sites or potentially eligible archeological sites. Utah SHPO consultation is being performed to obtain concurrence that there would be no effect to resources. In the event that cultural/archeological resources are found during construction activities, construction would stop and the appropriate agencies would be notified.

4.2.3 Endangered and Threatened Species

There are no ESA listed species, suitable habitat, or designated critical habitat within the project area. Modifications to the Cutoff Channel would have No Effect on the June sucker, least chub, Canada lynx, greater sage-grouse, and the western yellow-billed cuckoo or designated critical habitat within the project Action Area. The Action Area defined for this alternative is a 0.5-mile radius around the project site which signifies the extent that general construction noise can travel until it typically reaches background levels.

4.2.4 Fish and Wildlife

Modifications to the Cutoff Channel would result in direct and indirect negative effects to fish species from the potential entrainment in the channel when it is actively flowing during flood events. Various life stages of game and sensitive fish species can be expected to be migrating downstream during spring runoff events in the area of the Cutoff Channel inlet. Flood flows in the river will be diverted from the top of the water column during flood events as specified in the Operations and Maintenance Plan that will

be developed between NRCS, Weber County, and UDWR. Fish species are expected to be diverted into the Cutoff Channel and become entrained resulting in mortality. There are negligible temporary effects anticipated to fish during construction as the majority of the work will be completed outside of the river channel.

There will be temporary direct construction effects to wildlife species (including special status wildlife) during the modifications to channel from construction activity and noise. However, this disturbance will be temporary and is not expected to have an adverse effect on wildlife species in the area as they would be able to migrate to other suitable habitat near the project area. There are no indirect impacts anticipated to wildlife species.

4.2.5 Floodplain Management

The installation of the Cutoff Channel and river gages would allow Weber County to more accurately track flood flows in the river and respond to flood emergencies appropriately which would result in direct and indirect beneficial effects. An Operations and Maintenance Plan would be created that describes flood protection measures and how to operate the new structures in the Cutoff Channel for optimal flood water conveyance out of the Weber River to the Great Salt Lake.

4.2.6 Land Use

Cutoff Channel modifications at the North Diversion would directly alter land use from the inlet to 5900 W. The channel would be replaced with a concrete lined channel approximately 40 feet wide. The property owner from the inlet to 5500 W would gain approximately 40 feet of land that was previously used for the channel resulting in a beneficial impact. The property owner from 5500 W to 5900 W would lose 20 feet of land used for agricultural purposes resulting in a negative impact. There are no indirect impacts anticipated from the alteration of land use.

4.2.7 Migratory Birds

There will be temporary direct construction effects to migratory bird species during the modifications to channel from construction activity and noise. However, this disturbance will be temporary and birds can migrate to suitable habitat in the near area. There are no indirect impacts anticipated to migratory birds.

4.2.8 Public Health and Safety

Modifications to the Cutoff Channel would divert up to 1,000 cfs out of the river channel and convey it to the Great Salt Lake. Flood inundation depths and time would be reduced resulting in a direct and indirect beneficial effect from the decreased risk to public health and safety during and after flood events.

4.2.9 Recreation

Modifications to the Cutoff Channel would temporarily close roads within the project area during construction. This will result in a direct effect to recreation as the general public will not be allowed to access or travel through these areas at times. Construction at the Harold S. Crane WMA would directly impact access to hunting property as well as potentially deter birds from inhabiting the area. Construction would be timed so that impacts to recreation use (hunting, fishing) would be minimized to the public. There are no indirect effects anticipated to recreation resources. The modifications to the culvert crossings would eliminate the need to breach roads during future flood events resulting in a beneficial indirect impact to recreation.

4.2.10 Soil

Cutoff Channel modifications would directly disturb the surrounding soil temporarily for the installation of the new structures and culverts. The decreased flows downstream of the Cutoff Channel would help reduce the scour velocity resulting in a beneficial indirect effect to soils. The reduction of flood flows in the floodplain would reduce the potential for future erosion of soil.

4.2.11 Water Resources

Modifications to the Cutoff Channel would divert up to 1,000 cfs out of the Weber River during flood events and eventually into the Great Salt Lake. Stream flows in the lower Weber River would be reduced downstream of the Cutoff Channel inlet resulting in a direct beneficial impact to stream flows. Flooding is still expected to occur in the adjacent floodplain during flood events greater than 5,000 cfs but the new Cutoff Channel is expected to reduce the inundation depth and time of floodwater on the surrounding property. There would be no direct or indirect effects to water quality and water rights during future flood events.

4.2.12 Waters of the United States

Cutoff Channel modifications at the North Diversion would directly impact streams and wetlands at each structure and culvert replacement location. The majority of the modifications would be located within the existing footprint and impacts are considered to be minor. Wetlands adjacent to the channel downstream would experience a beneficial indirect effect from the potential decrease in sediment flowing downstream and potentially filling wetland resources.

4.2.13 Vegetation

Modifications to the Cutoff Channel would directly negatively impact vegetation in the immediate vicinity of the structures and culverts modifications. Vegetation along the lower Weber River would be expected to remain the same as existing conditions during future flood events and there are no indirect effects anticipated. There are no special status plant species within the lower Weber River area and there would be no effect to special status plants.

4.3 Little Weber River Cutoff Channel – South Diversion Alternative

4.3.1 Climate

Modifications to the Cutoff Channel would provide a beneficial direct and indirect effect related from climate change since the diversion of up to 1,000 cfs out of the river channel would allow the river to pass higher volumes of water downstream. Since climate change in Utah is expected to result in declining snowpack and increased droughts, water flows in the Weber River will be lower than normal during flood events and as a result the Cutoff Channel would help reduce flood inundation time and depth in the floodplain.

4.3.2 Cultural/Historic

There are no known cultural/historical resources that would be impacted from the modifications to the Cutoff Channel and the installation of the river gages. The Cutoff Channel modifications are expected to have no direct or indirect adverse effects on historical structures, places or sites or potentially eligible archeological sites. Utah SHPO consultation is being performed to obtain concurrence that there would

be no effect to resources. In the event that cultural/archeological resources are found during construction activities, construction would stop and the appropriate agencies would be notified.

4.3.3 Endangered and Threatened Species

There are no ESA listed species, suitable habitat, or designated critical habitat within the project area. Modifications to the Cutoff Channel would have No Effect on the June sucker, least chub, Canada lynx, greater sage-grouse, and the western yellow-billed cuckoo or designated critical habitat within the project Action Area. The Action Area defined for this alternative is a 0.5-mile radius around the project site which signifies the extent that general construction noise can travel until it typically reaches background levels.

4.3.4 Fish and Wildlife

Modifications to the Cutoff Channel would result in direct and indirect negative effects to fish species from the potential entrainment in the channel when it is actively flowing during flood events. Various life stages of game and sensitive fish species can be expected to be migrating downstream during spring runoff events in the area of the Cutoff Channel inlet. Flood flows in the river will be diverted from the top of the water column during flood events as specified in the Operations and Maintenance Plan that will be developed between NRCS, Weber County, and UDWR. Fish species are expected to be diverted into the Cutoff Channel and become entrained resulting in mortality. There are negligible temporary effects anticipated to fish during construction as the majority of the work will be completed outside of the river channel.

There will be temporary direct construction effects to wildlife species (including special status wildlife) during the modifications to channel from construction activity and noise. However, this disturbance will be temporary and is not expected to have an adverse effect on wildlife species in the area as they would be able to migrate to other suitable habitat near the project area. There are no indirect impacts anticipated to wildlife species.

4.3.5 Floodplain Management

The installation of the Cutoff Channel and river gages would allow Weber County to more accurately track flood flows in the river and respond to flood emergencies appropriately which would result in direct and indirect beneficial effects. An Operations and Maintenance Plan would be created that describes flood protection measures and how to operate the new structures in the Cutoff Channel for optimal flood water conveyance out of the Weber River to the Great Salt Lake.

4.3.6 Land Use

Cutoff Channel modifications at the South Diversion would directly alter land use from the inlet to the confluence with the Cutoff Channel – North Diversion alignment. Portions of the channel would be replaced with a concrete lined channel approximately 40 feet wide from the inlet to 5900 W resulting in a permanent direct loss of agricultural land. There are no indirect impacts anticipated from the alteration of land use.

4.3.7 Migratory Birds

There will be temporary direct construction effects to migratory bird species during the modifications to channel from construction activity and noise. However, this disturbance will be temporary and birds can migrate to suitable habitat in the near area. There are no indirect impacts anticipated to migratory birds.

4.3.8 Public Health and Safety

Modifications to the Cutoff Channel would divert up to 1,000 cfs out of the river channel and convey it to the Great Salt Lake. Flood inundation depths and time would be reduced resulting in a direct and indirect beneficial effect from the decreased risk to public health and safety during and after flood events.

4.3.9 Recreation

Modifications to the Cutoff Channel would temporarily close roads within the project area during construction. This will result in a direct effect to recreation as the general public will not be allowed to access or travel through these areas at times. Construction at the Harold S. Crane WMA would directly impact access to hunting property as well as potentially deter birds from inhabiting the area. Construction would be timed so that impacts to recreation use (hunting, fishing) would be minimized to the public. There are no indirect effects anticipated to recreation resources. The modifications to the culvert crossings would eliminate the need to breach roads during future flood events resulting in a beneficial indirect impact to recreation.

4.3.10 Soil

Cutoff Channel modifications would directly disturb the surrounding soil temporarily for the installation of the new structures and culverts. The decreased flows downstream of the Cutoff Channel would help reduce the scour velocity resulting in a beneficial indirect effect to soils. The reduction of flood flows in the floodplain would reduce the potential for future erosion of soil.

4.3.11 Water Resources

Modifications to the Cutoff Channel would divert up to 1,000 cfs out of the Weber River during flood events and eventually into the Great Salt Lake. Stream flows in the lower Weber River would be reduced downstream of the Cutoff Channel inlet resulting in a direct beneficial impact to stream flows. Flooding is still expected to occur in the adjacent floodplain during flood events greater than 5,000 cfs but the new Cutoff Channel is expected to reduce the inundation depth and time of floodwater on the surrounding property. There would be no direct or indirect effects to water quality and water rights during future flood events.

4.3.12 Waters of the United States

Cutoff Channel modifications at the South Diversion would directly impact streams and wetlands at each structure and culvert replacement location. Modifications made in the South Diversion alignment before it confluences with the historical channel alignment would require more fill to wetlands than the North Diversion since there are more restrictions in the channel. Wetlands adjacent to the channel downstream would experience a beneficial indirect effect from the potential decrease in sediment flowing downstream and potentially filling wetland resources.

4.3.13 Vegetation

Modifications to the Cutoff Channel would directly negatively impact vegetation in the immediate vicinity of the structures and culverts modifications. Vegetation along the lower Weber River would be expected to remain the same as existing conditions during future flood events and there are no indirect effects anticipated. There are no special status plant species within the lower Weber River area and there would be no effect to special status plants.

4.4 Levees Alternative

4.4.1 Climate

The construction of levees along the banks of the Weber River would contain flood flows within the leveed areas providing beneficial direct and indirect effects. Since climate change in Utah is expected to result in declining snowpack and increased droughts, water flows in the Weber River will be lower than normal during flood events and as a result the levees would help contain flood flows within the channel.

4.4.2 Cultural/Historic

A cultural survey was not completed in the entire proposed levee alignment area. Ground disturbing construction activities would be involved with this alternative and impacts may occur to cultural/historic resources in the levee alignment if present. If this levees alternative is selected, additional cultural surveys should be completed prior to construction. In the event that cultural/archeological resources are found during construction activities, construction would stop and the appropriate agencies would be notified.

4.4.3 Endangered and Threatened Species

There are no ESA listed species, suitable habitat, or designated critical habitat within the project area. The construction of levees along the lower Weber River would have No Effect on the June sucker, least chub, Canada lynx, greater sage-grouse, and the western yellow-billed cuckoo or designated critical habitat within the project Action Area. The Action Area defined for this alternative is a 0.5-mile radius around the levee alignment which signifies the extent that general construction noise can travel until it typically reaches background levels.

4.4.4 Fish and Wildlife

Constructing levees on both sides of the river would contain flood flows and result in no direct or indirect effects to fish species since the levees would be constructed outside of the river channel. The levees would also not create any standing pockets of water where fish could become entrained above and beyond existing conditions.

There are currently large segments of wildlife (specifically waterfowl and migratory bird) habitat within the lower Weber River floodplain. The construction of levees along both sides of the river would disconnect flood flows from the floodplain directly reducing the amount of available habitat in the project area. The construction of levees may also require the clearing of vegetated areas containing suitable wildlife habitat resulting in direct negative impacts. As a result of the disconnection and clearing, wildlife may not utilize this area for habitat resulting in an indirect negative effect in the future.

4.4.5 Floodplain Management

The installation of levees would contain flood flows in the river and they would not be allowed to spill into the adjacent floodplain. The containment of flood flows would allow Weber County to manage the floodplain more efficiently resulting in direct and indirect beneficial effects.

4.4.6 Land Use

The construction of the levees would require a portion of the land adjacent to the Weber River to be permanently designated as a levee structure. The majority of the land use is agriculture in the levee

alignment and the landowner would directly lose a portion of their agricultural field for the construction of the levees resulting in the direct loss of crop land. The landowner of the agricultural fields would indirectly receive beneficial effects during flood events due to the increased flood protection outside of the leveed area. Since flood water from the river would not be inundating the land, the ground could be planted earlier in the spring and planted crops would potentially not be lost due to flood water.

4.4.7 Migratory Birds

There are currently large segments of migratory bird habitat within the lower Weber River floodplain. The construction of levees along both sides of the river would disconnect flood flows from the floodplain indirectly reducing the amount of available habitat in the project area. Suitable habitat may also be cleared in the levee alignment resulting in a direct negative effect. As a result of the disconnection, migratory birds may not utilize this area for habitat resulting in an indirect adverse effect in the future.

4.4.8 Public Health and Safety

The construction of levees along the Weber River would contain flood flows and not allow water to spill into the adjacent floodplain. The levee installation would result in the direct and indirect beneficial impact to public health and safety during flood events.

4.4.9 Recreation

The installation of levees would eliminate the need to breach roads during future flood events resulting in a beneficial indirect impact to recreation. Recreation resources would not be directly affected from the installation of levees.

4.4.10 Soil

The construction of levees would contain flood flows in the channel possibly creating higher velocities that could erode soils along the banks and in the channel. Direct and indirect negative effects would include the continued erosion of soil along the banks and deposition downstream or in the floodplain.

4.4.11 Water Resources

The installation of levees along the lower Weber River would confine flood flows into a channel. Water quality and water rights would directly and indirectly remain the same during future flood events. Stream flows would be higher due to the loss of available floodplain and channelization.

4.4.12 Waters of the United States

The construction of levees would directly negatively impact any wetlands adjacent to the river channel. These impacts would include filling from levee construction material resulting in a permanent loss. However, the area surrounding the lower Weber River has been heavily disturbed from agricultural activities and there are few wetlands in the levee alignment. Compensatory mitigation may be required for impacts to these wetlands features. Streams and wetlands would not be indirectly altered from existing conditions inside of the levee floodplain.

4.4.13 Vegetation

The construction of levees would contain flood flows in the channel possibly reducing inundation in the floodplain on the outside of the levees. Direct effects would include the clearing of vegetation within the

levee alignment which may include the removal of mature cottonwood and willow trees. Vegetation may be indirectly negatively impacted from increased flood flow velocities inside of the levee floodplain.

4.5 Floodplain Easements Alternative

4.5.1 Climate

The establishment of floodplain easements would allow flows in the Weber River to disperse into the floodplain naturally. Since climate change in Utah is expected to result in declining snowpack and increased droughts, water flows in the Weber River will be lower than normal during flood events and as a result the floodplain would not become inundated for as long or as deep as during previous flood events resulting in direct and indirect beneficial effects.

4.5.2 Cultural/Historic

A cultural survey was not completed in the proposed floodplain easement area since there would be no ground disturbing activities associated with this alternative. There would be no direct or indirect effects to cultural/historical resources from the establishment of floodplain easements.

4.5.3 Endangered and Threatened Species

There are no ESA listed species, suitable habitat, or designated critical habitat within the floodplain easement area. Continued flooding of the lower Weber River will have No Effect on the June sucker, least chub, Canada lynx, greater sage-grouse, and the western yellow-billed cuckoo or designated critical habitat.

4.5.4 Fish and Wildlife

The establishment of floodplain easements along both sides of the river would result in no direct or indirect effects to fish species since this alternative would still allow water to flow into the floodplain uninhibited. Bonneville cutthroat trout and bluehead sucker have been observed in the lower Weber River; however, there would be no effect to these special status fishes.

Establishing floodplain easement would consist of leaving the channel in the current restrictive condition which could lead to the increased probability for bank and/or embankment failure during future flood events. If the embankments fail, existing wildlife habitat on the banks (trees and shrubs) may become directly impacted from excessive flooding and scouring. As a result, wildlife would be indirectly impacted due to the lack suitable habitat for nesting, foraging and cover during certain times of the year causing them to displace to other suitable habitat locations.

4.5.5 Floodplain Management

Under the floodplain easement alternative, the floodplain would be allowed to flood naturally and Weber County would not provide any flood protection assistance in these areas.

4.5.6 Land Use

The establishment of floodplain easements would require the land adjacent to the Weber River to be flooded naturally during flood events. The owner of the land would still be able to use the land as intended except during flood events when the field may be inundated with water. The loss of land use

during flooding would be a direct negative effect. Current land use in the area would not be indirectly altered from existing conditions.

4.5.7 Migratory Birds

Leaving the channel in the current restrictive condition and establishing floodplain easements would lead to the increased probability for bank and/or embankment failure during future flood events. If the embankments fail, existing migratory bird habitat on the banks (trees and shrubs) may become directly impacted from excessive flooding and scouring. As a result, birds would become indirectly impacted due to the loss of suitable habitat for nesting and foraging during certain times of the year and would be displaced to other suitable habitat locations.

4.5.8 Public Health and Safety

Public health and safety is put at risk during flood events that spill into the adjacent floodplain where the general public resides. Establishing floodplain easements would leave the river channel, banks, and embankments in their current condition and allow flood water to spill into residential areas where there are utilities including roads, electricity, water, and sewer. There would be no flood protection measures in these areas and public health and safety would be directly and indirectly impacted during flood events.

4.5.9 Recreation

Recreation resources would not be directly or indirectly affected from the establishment of floodplain easements.

4.5.10 Soil

Soil and erosion along the lower Weber River would remain the same as existing conditions during future flood events from the establishment of floodplain easements. Direct effects would include the continued erosion of soil along the banks and deposition downstream or in the floodplain. Continued erosion of the banks may indirectly result in the loss of land and vegetation as the banks slough into the channel over time.

4.5.11 Water Resources

Water quality, stream flows, and water rights would directly and indirectly remain the same during future flood events with the establishment of floodplain easements. Stream flows would remain elevated potentially resulting in flooding, scouring of banks, and damage to structures, property and roads.

4.5.12 Waters of the United States

Streams and wetlands along the edge of the lower Weber River would remain the same during future flood events and would not experience any direct effects from the establishment of floodplain easements. Continued erosion of the banks upstream of the structures may indirectly result in the filling of wetlands adjacent to the channel.

4.5.13 Vegetation

Vegetation along the lower Weber River would remain the same as existing conditions during future flood events from the establishment of floodplain easements. Direct effects would include the continued inundation and scouring of vegetation along the banks and in the floodplain resulting in potential

mortality. Continued erosion of the banks may indirectly result in a vegetation shift and/or the loss of vegetation as the banks slough into the channel over time. There are no special status plant species within the lower Weber River area and there would be no effect to special status plants.

4.6 Cumulative Effects

Cumulative Effects are impacts on the environment that results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertaking such other action. The cumulative impact area assessed in this report is the reach of the lower Weber River from the Willard Bay Canal Intake down to the 1100 S Bridge.

Cumulative impacts from the Weber River Structure Repairs project is not expected to have noticeable impacts within the project area.

4.6.1 No Action

No cumulative effects are expected to any of the resources identified for detailed study in this report from the implementation of the No Action Alternative as there would be no change to the existing environment.

4.6.2 Little Weber River Cutoff Channel – North Diversion Alternative

The implementation of the Willard Bay Canal Trashrack project would have a major beneficial cumulative effect to the proposed project area in conjunction with the modifications to the Cutoff Channel-North Diversion. Flows at the Cutoff Channel inlet would be reduced up to 1,000 cfs and flows downstream of the Cutoff Channel inlet would be reduced up to 2,000 cfs minimizing impacts from future flood events on fish and wildlife, floodplain management, land use, migratory birds, public health and safety, recreation, soil, water resources, waters of the U.S., and vegetation.

4.6.3 Little Weber River Cutoff Channel – South Diversion Alternative

The implementation of the Willard Bay Canal Trashrack project would have a major beneficial cumulative effect to the proposed project area in conjunction with the modifications to the Cutoff Channel-South Diversion. Flows at the Cutoff Channel inlet would be reduced up to 1,000 cfs and flows downstream of the Cutoff Channel inlet would be reduced up to 2,000 cfs minimizing impacts from future flood events on fish and wildlife, floodplain management, land use, migratory birds, public health and safety, recreation, soil, water resources, waters of the U.S., and vegetation.

4.6.4 Levees Alternative

The implementation of the Willard Bay Canal Trashrack project would have a major beneficial cumulative effect to the proposed project area in conjunction with the installation of levees. Flows in the leveed area would be reduced up to 1,000 cfs and would be contained minimizing impacts from future flood events on fish and wildlife, floodplain management, land use, migratory birds, public health and safety, recreation, soil, water resources, waters of the U.S., and vegetation.

4.6.5 Floodplain Easements Alternative

No cumulative effects are expected to any of the resources identified for detailed study in this report from the implementation of the Floodplain Easement Alternative as there would be no change to the existing flood regime.

CHAPTER 5.0
CONSULTATION, COORDINATION, AND PUBLIC PARTICIPATION

5.1 Consultation

The USFWS and UDWR were invited to comment on the project during the scoping period and no comments were received from either agency. Additional consultation will be performed with both agencies during the Draft EA review period and the results of this consultation will be documented in the Final EA.

NRCS has coordinated with Utah SHPO regarding the project under formal consultation (Utah State Antiquities Project Numbers: U-12-XN-0452p and U-13-XN-0245ps). The reports prepared for the project describing the results of the literature review and pedestrian survey concluded that there are no cultural or historical resources within the project area. Both reports were submitted to Utah SHPO for a concurrence of No Effect. The results of the consultation with Project Numbers: U-12-XN-0452p and U-13-XN-0245ps will be documented in the Final EA.

The Proposed Alternative would require work within jurisdictional waters of the U.S. A USACE Section 404 permit will be required to complete the construction activities associated with the project. Consultation with the USACE will be performed once the project design has advanced to identify dredge/fill impacts (area and volume) to jurisdictional waters. The preliminary assessment of impacts to jurisdictional waters of the U.S described in this document have identified that there will be impacts from each of the Action alternatives. Further coordination with the USACE will be performed as the project progresses during final design.

5.2 Coordination

Weber County requested financial assistance from the NRCS to mitigate flood damage incurred in 2011 through Standard Form 424 – Application for Federal Assistance in 2011. Initial coordination was conducted between the NRCS and Weber County regarding the project through the preparation of a DSR. The DSR documented the eligibility of the damaged structures for inclusion in the EWPP. NRCS, through the preparation of the DSR, concluded that the project was eligible for funding under EWPP but would require additional analysis under NEPA. Meetings were conducted with the NRCS, Weber County, and UDWR staff to discuss the project and identify potential concerns relating to the project. The results of these meetings and discussions have been incorporated into this Draft EA.

5.3 Public Participation

5.2.1 Scoping

Project scoping questions, comments and concerns were requested from the public and government agencies during the preliminary scoping period, both orally at public meetings and via written submittal of comments. The main goal of public participation during the scoping period was to involve a diverse group of public and government agency participants to solicit input and provide timely information regarding their concerns for the project and the proposed alternatives.

A scoping notice was prepared and sent to interested parties and regulatory agencies on August 27, 2012. The list of recipients, as presented in Chapter 8.0, was prepared by the NRCS, Weber County, and UDWR. The scoping notice gave a description of the project, location and overview, purpose and need, identified preliminary scoping issues, and requested public participation. The scoping notice also

identified the location of public meetings, contact information to submit written comments, and the scoping period closure date. Two public notices were posted in the Standard Examiner newspaper on August 30, and September 6, 2012 announcing the project and public meeting. The scoping notices were also posted to the NRCS website (http://www.ut.nrcs.usda.gov/programs/EWP/little_weber_river/index.html) to make it available for public review on the internet. One agency scoping meeting was conducted on September 12, 2012 and one public scoping meeting was conducted on September 13, 2012. There were two attendees at the agency meeting and 18 attendees at the public meeting.

The scoping period officially opened on August 30, 2012 and ended on September 28, 2012 for a total of 31 days. Written comments could have been submitted via mail, e-mail, facsimile, or comment card, and oral comments could have been submitted at the scoping meetings. There were seven written comments received for the Cutoff Channel project during the scoping period. The Scoping Report for the project is located in Appendix A. This Draft EA has taken into consideration the scoping comments received and incorporated the relevant ones into the project as best suited.

Official comments received during the Draft EA review period will be included in Appendix A in the Final EA.

5.4 Laws, Regulations, and Policies

Construction activity associated with the proposed alternative would occur on private property, within the boundaries of the Harold S. Crane WMA, and within Weber County right-of-ways. A new river gage to measure flows in the Weber River would be installed on private property adjacent to the 4700 W Bridge.

The following laws, regulations, and policies may apply to the Proposed Alternative and are in addition to the requirements of the EWPP:

- Federal
  - *USACE*
    - Section 404 of the Clean Water Act: The Sponsor will be required to obtain a permit from the USACE for discharge of dredged or fill materials in waters of the U.S. including wetlands.
  - *USFWS*
    - Bald and Golden Eagle Protection Act (16 UCS 668): The NRCS reviews compliance during the EA process. The Sponsor will monitor compliance during construction.
    - ESA (16 United States Code [USC] 1531): There are no endangered species documented to occur within the vicinity of the project area. NRCS consultation will be performed with USFWS during this NEPA EA review process and no further consultation will be required for the project unless there are unforeseen impacts expected to ESA listed species.
    - Fish and Wildlife Coordination Act (16 USC 661 and subsequent sections): The NRCS reviews compliance during the EA process. The Sponsor will monitor compliance during construction.
    - Migratory Bird Treaty Act (16 USC 703 and subsequent sections): The NRCS reviews compliance during the EA process. The Sponsor will monitor compliance during construction.
  - *NRCS:*
    - Executive Order 11990-Protection of Wetlands: The NRCS reviews compliance during the EA process.

- Executive Order 11988-Floodplain Management: The NRCS reviews compliance during the EA process.
- Executive Order 12898-Environmental Justice for Low-Income and Minority Populations: The NRCS reviews compliance during the EA process.
- Executive Order 13007-Indian Sacred Sites: The NRCS reviews compliance during the EA process.
- Executive Order 13112-Invasive Species: The NRCS reviews compliance during the EA process.
- Farmland Protection Policy Act (7 USC 4201) : The NRCS reviews compliance during the EA process.

- State
  - *Utah Division of Air Quality:*
    - Utah Air Conservation Act (Title 19, Chapter 2 of Utah Code): The NRCS reviews compliance during the EA process. The Sponsor will monitor compliance during construction.
  - *Utah Division of Drinking Water:*
    - Utah Safe Drinking Water Act (Title 19, Chapter 4 of Utah Code): The NRCS reviews compliance during the EA process. The Sponsor will monitor compliance during construction.
  - *Utah Division of Water Quality:*
    - Antidegradation of Water Quality: The NRCS reviews compliance during the EA process. The Sponsor will monitor compliance during construction.
    - Under Section 401 of the Clean Water Act (33 USC1251 and subsequent sections), an approval will be required so that the project does not violate state water quality standards. The Sponsor will obtain certification as part of the USACE Section 404 Permit review process.
    - Under Section 402 of the Clean Water Act, a Utah Pollutant Discharge Elimination System (UPDES) Storm Water General Permit for Construction Activities is required for construction activities that disturb more than one acre and discharge pollutants to surface waters. The Sponsor will prepare a Storm Water Pollution Prevention Plan (SWPPP), including submitting a Notice of Intent (NOI), to the Utah Division of Water Quality if more than one acre is disturbed.
  - *Utah Division of Water Rights:*
    - Consistency with Permitted Water Rights: The NRCS reviews compliance during the EA process.
    - Stream Alternation Permit: The Sponsor will be required to obtain a permit from the State for discharge of dredged or fill materials in streams.
  - *Utah SHPO:*
    - National Historic Preservation Act (16 USC 470): Consultation is currently being performed with SHPO during the EA process by NRCS. If during construction, previously unevaluated cultural resources are discovered, then the area of discovery would be avoided, the discovery given adequate protection, and NRCS and SHPO would be notified by the Sponsor. Procedures for discoveries outlined in the cultural resources NRCS State Level Agreement would be followed.
- Local: A building permit may be required from Weber County for the structure repairs and river gage. The Sponsor will be required to obtain the necessary permits.

CHAPTER 6.0
REFERENCES

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CHAPTER 7.0
LIST OF PREPARERS

7.1 Draft EA Preparers

The following people participated in the preparation of this Draft EA:

Table 7-1. List of Preparers

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CHAPTER 8.0
DISTRIBUTION LIST

A notice of availability for the Draft EA was distributed to the following government agencies/staff and organizations.

8.1 Federal Government

- Natural Resources Conservation Service
- U.S. Bureau of Land Management U.S.
- Bureau of Reclamation
- U.S. Fish and Wildlife Service
- U.S. Environmental Protection Agency
- U.S. Army Corps of Engineers

8.2 Tribal Government

- Northwestern Band of Shoshone
- Skull Valley Band Confederated Tribes
- Ute Indian Tribe

8.3 State Government

- Bureau of Environmental Health Services
- Public Land & Policy Coordination Office
- School and Institutional Trust Lands Administration
- State of Utah - Office of the Governor
- Utah Congress
- Utah Department of Agriculture
- Utah Department of Community and Culture
- Utah Department of Environmental Quality
- Utah Department of Natural Resources
- Utah Department of Transportation
- Utah Division of Wildlife Resources
- Utah Department of Public Safety
- Utah Division of Drinking Water
- Utah Division of Environmental Health
- Utah Division of Forestry, Fire & State Lands
- Utah Division State Land and Forest
- Utah Division of Water Quality
- Utah Division of Water Resources
- Utah Division of Water Rights
- Utah Environmental Congress
- Utah Natural Heritage Program
- Utah Reclamation Mitigation and Conservation Commission
- Utah Senate

8.4 Local Government

- Hooper City
- Mariott-Slaterville City
- Ogden City
- Plain City
- Weber County

8.5 Organizations

- Central Weber Sewer Improvement District
- Ducks Unlimited
- North Fork Special Service District
- PacifiCorp Lead Env Analyst
- Public Lands Equal Access Alliance
- Salt Lake County Council
- Sierra Club
- Sportsman For Habitat, Inc.
- Trout Unlimited
- Uintah Irrigation Company
- Utah National Parks Council
- Utah Snowmobile Association
- Utah Wildlife Federation
- Weber Basin Water Conservancy District
- Weber County Farm Bureau
- Western Land Exchange Project
- Wild Utah Project

8.6 Private Parties

The names and addresses of private parties who received notice of the Draft EA are not listed in this chapter for privacy.

CHAPTER 9.0
ACRONYMS, ABBREVIATIONS AND SHORT FORMS

9.1 Acronyms, Abbreviations and Short Forms

°F	degrees Fahrenheit
ac-ft	acre-feet
AMSL	Above Mean Sea Level
BCA	Bowen Collins and Associates, Inc.
BMP	Best Management Practices
CFR	Code of Federal Regulations
cfs	cubic feet per second
Cutoff Channel	Little Weber River Cutoff Channel
Draft EA	Draft Environmental Assessment
DSR	Damage Survey Report
EA	Environmental Assessment
EIS	Environmental Impact Statement
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
EWPP	Emergency Watershed Protection Program
FONSI	Finding of No Significant Impact
GHG	Green House Gases
GSL	Great Salt Lake Minerals Company
PEIS	Programmatic Environmental Impact Statement
NEPA	National Environmental Policy Act
NOI	Notice of Intent
NRCS	Natural Resources Conservation Service
NWI	National Wetlands Inventory
O&M	Operations and Maintenance
PACs	Priority Areas for Conservation
ROD	Record of Decision
SHPO	State Historic Preservation Office
SWPPP	Storm Water Pollution Prevention Plan
UDEQ	Utah Department of Environmental Quality
UDNR	Utah Department of Natural Resources
UDWRi	Utah Division of Water Rights
UDWR	Utah Division of Wildlife Resources
UPDES	Utah Pollutant Discharge Elimination System
USACE	U.S. Army Corps of Engineers
USDA	U.S. Department of Agriculture
USFWS	U.S. Fish and Wildlife Service
USGS	United States Geological Survey
WMA	Waterfowl Management Area