USDA NRCS
United States Department of Agriculture
Natural Resources Conservation Service

McMILLEN, LLC

Draft Environmental Assessment for Structure Repairs on the Weber River

Weber County, Utah

Sponsoring Local Organization:
Weber County, Utah

Prepared by:
McMillen, LLC

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 Weber River splits into three separate channels on the Ogden Bay Waterfowl Management Area (WMA) operated by the Utah Division of Wildlife Resources: 1) North Run, 2) Middle Run, and 3) South Run. The outlet of each of these three channels is controlled by water control structures consisting of radial gates, stop log structures, and overflow weirs that control releases into the WMA for irrigation and waterfowl during periods of normal flow. During periods of normal flow, these structures are used to back up water in the Weber River for diversion into waterfowl habitat areas. Flood flows in the Weber River on the Ogden Bay WMA become constricted at these three water control structures when they are completely opened and back water up in the river which resulting in flooded resources upstream. During the 2011 flood event in the Weber River, portions of the dike system on the Ogden Bay WMA were mechanically breached to bypass the Middle Run and South Run water control structures to in an effort to reduce flood impacts to upstream property along the river. The NRCS and Weber County are analyzing alternatives to potentially reduce future flood damage which includes repair/modifications to the existing three structures, the creation of levees/dikes along the Weber River, acquiring 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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INTRODUCTION

1.1 Introduction

The Natural Resources Conservation Service (NRCS) is proposing to partially fund the Ogden Bay Wildlife Management Area (WMA) Structure Repairs project located on the lower Weber River in Weber County, Utah (Appendix B-Figure 1). The Ogden Bay WMA is owned and operated by the State of Utah Department of Natural Resources (UDNR) Division of Wildlife Resources (UDWR) and uses a levee system and three regulating structures consisting of radial gates and overflow weirs to create wetlands for waterfowl habitat and convey water for irrigation purposes. During the spring 2011flood event, these structures constricted flow of the Weber River and increased water surface elevations upstream. In an attempt to reduce the water levels, levees were breached in two locations. This increased the discharge through the WMA which damaged the three channel structures: 1) North Run, 2) Middle Run, and 3) South Run as well as infrastructure in a waterfowl habitat pond named Unit 1. Deficiencies regarding the ability of the structures to pass flood flows have also been identified by NRCS and Weber County as a result of the flood event.

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 repairs needed for the Ogden Bay WMA water control structures do 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 Structure Repairs on the Weber River. 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 75% of the construction cost to repair structures damaged by the 2011 flood event.

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, the water control structures on the Ogden Bay WMA are eligible for repair funding due to damage incurred during the spring 2011 flood event.

The purpose of the Project is to repair the water control structures to conditions prior to the 2011 flood event and add a second regulating structure at the South Run site. This additional structure is intended to help reduce the water levels at the existing South Run structure during flood events allowing larger volumes of water to pass through to the Great Salt Lake. In addition to repairing damage, the EWPP

requires that structures 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 provide additional conveyance capacity through the structures, thus reducing water surface levels in the Weber River upstream, reducing flood damage to the Ogden Bay WMA, eliminating the need to breach WMA levees in the future, and reduce potential damage to roads, properties, structures, infrastructure, and life.

1.4 Scope of Draft EA

This section defines and explains the scope (boundaries/limits) of the Weber River Structure Repairs 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 repairing and modifying structures located on the lower Weber River that were damaged during the 2011 flood event and installing new river gages to assess flow conditions in the river 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, damages and deficiencies were identified on water control structures located on the Ogden Bay WMA by Weber County and UDWR. Weber County

requested financial assistance to repair and modify these structures 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 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 Weber River Structure Repairs 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

The Ogden Bay WMA is owned and operated by UDWR in western Weber County. Its primary purpose is to manage and protect migratory bird habitat during nesting and foraging periods. Within the WMA, the Weber River splits into three channels; 1) North Run, 2) Middle Run, and 3) South Run. Each of these channels contains a water control structure that has the capability to impede flow to the Great Salt Lake. These structures contain gates and weirs that can impede water manually but also can result in the back up of water in the channel upstream during high flow events due to a lack of capacity to pass water. Some of the water in the three channels can be diverted to supply water to wetlands and ponds. The UDWR has permission for use of this water as described in Chapter 2.0 of this document.

Weber County and UDWR have coordinated with NRCS to identify conceptual design alternatives that may reduce water surface levels upstream of the structures and fix damage incurred during 2011. Repairing and upgrading the structures will allow UDWR to manage water flows within the Ogden Bay WMA more efficiently during flood events and potentially reduce flood impacts to resources and property upstream. The conceptual design has been prepared to help reduce water surface elevations during flood events and not eliminate flooding adjacent to the lower Weber River.

1.6 Existing Water Control Structure Conditions

The Weber River watershed includes approximately 2,110 square miles above the South Run Structure (Appendix B-Figure 2). The Weber River splits into three channels and flows through three water control structures on the Ogden Bay WMA: 1) North Run, 2) Middle Run, and 3) South Run. Each of these channels has a water control structure that regulates all of the water draining from 2,110 square miles.

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 Little Weber River Cutoff Channel (approximately ten miles upstream of the Ogden Bay WMA). It is estimated that about 2,700 cfs was being discharged through the South Run structure and about 2,300 cfs was flowing over and through the North Run structure (Bowen Collins and Associates [BCA] 2013). The levee near the Middle Run structure was observed to have about six inches of freeboard before it would have overtopped. 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 (BCA 2013). 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 2013). The approximated FEMA extents of the 2011 flood event are depicted in Appendix B-Figure 3.

1.6.1 North Run Structure

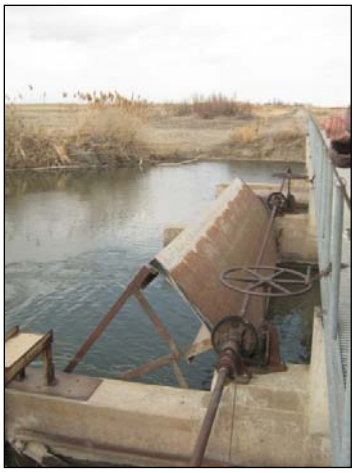
The North Run Structure is located on the northern side of the Ogden Bay WMA and regulates water in this channel during normal flows for habitat purposes on the WMA. Water can either flow through this structure into the Great Salt Lake via a channel on the northern side of Unit 1 or be diverted through a channel leading south to the Middle Run Structure. The majority of the water in the Lower Weber River flows south throughout the year to the Middle Run Structure. This structure consists of a combination of

three radial gates and four stop-log weirs bays. The North Run channel past the structure has not been actively used in the past 50 years to flush out sediment and vegetation, and as a result, sediment and common reed grass (*Phragmites australis*) have accumulated in the channel constricting the flow capacity of the channel.

Components of this structure were damaged during the 2011 flood event. Damage to the structure includes erosion around the foundation of the structure and the wingwalls, the radial gates do not seal properly, and the gate support arms are bent making it difficult to operate.

Picture 1-1. North Run Structure (Downstream End) with Water Flowing over Weir

Picture 1-2. North Run Structure Wingwall Erosion



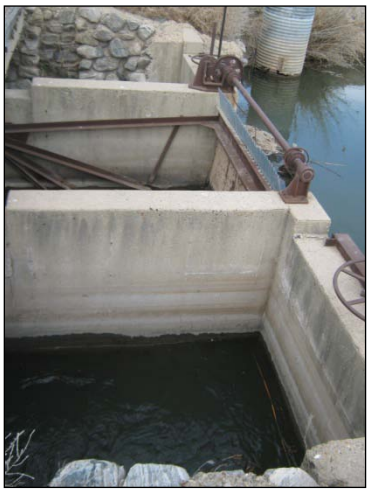
Picture 1-3. North Run Structure Damaged Radial Gate

1.6.2 Middle Run Structure

The Middle Run Structure is located in the north center of the Ogden Bay WMA and contains one radial gate and two slide gates to regulate water flowing into Unit 1; a marsh area managed for nesting and foraging habitat for migratory birds which has no direct outlet to the Great Salt Lake. There are numerous small water turnout structures within Unit 1 that regulate small ponds for habitat as discussed in Chapter 1.6.4. These structures are aged and are only capable of withholding or passing small volumes of water (10 to 20 cfs). The radial gate was damaged during the 2011 flood event when the gate was mechanically opened by Ogden Bay WMA staff.

In a typical year, the gates on the South Run Structure are closed between June and January to create backwater so that water can be diverted through the open gates at the Middle Run Structure for Unit 1 irrigation and habitat. Between January and June, the Middle Run gates are closed and most of the water in the lower Weber River flows through the South Run structure. Components of this structure were damaged during the 2011 flood event. Damage to the structure includes erosion around the wingwalls, blockage of the gates, a non-functioning radial gate operator, and punctures through the steep plate of the existing radial gate. The structure also has inefficient devices for raising and lowering the two slide gates creating delays and safety concerns in regards to accessing the gate operators during flood events. A bridge is located on top of the structure to facilitate vehicle and equipment transport.

Picture 1-4. Middle Run Structure (Upstream End Looking Southwest)



Picture 1-5. Middle Run Structure

Picture 1-6. Middle Run Structure Leaking Radial Gate

1.6.3 South Run Structure

The South Run Structure is located on the southern side of the Ogden Bay WMA. It was constructed on the channel that has historically served as the primary channel to convey Weber River water to the Great Salt Lake. In a typical year, the gates on the South Run Structure are closed between June and January to create backwater so that water can be diverted through the Middle Run Structure for Unit 1 irrigation and habitat and into Unit 3 inlet channel which is located south of the South Run Structure. Between January and June, the Middle Run gates are closed and most of the water in the lower Weber River flows through the South Run structure before discharging into the Great Salt Lake. There are three radial gates associated with this structure and there is typically a four- to five-foot difference in water surface elevation between upstream and downstream during normal operation and flows.

During flood events, the gates on this structure a fully opened and a little more than half of the flood water would be conveyed through the structure. When the gates are raised to the highest level during a flood event, there is generally a significant difference in water surface elevation between the upstream and downstream side of the structure. An 18-inch water surface elevation difference was observed during the 2011 flood event at peak discharge. A wooden deck bridge is located on top of the structure to

facilitate vehicle and equipment transport, but does not have sufficient load capacity to allow heavy construction equipment travel. This limits the ability of Ogden Bay WMA staff to maintain the refuge and respond to emergency situations during flood events since they have to use smaller construction equipment.

Picture 1-7. South Run Structure (Upstream End Looking North Toward Middle Run)

Picture 1-8. South Run Structure (Downstream End Looking South)

Picture 1-9. South Run Structure Radial Gate

Picture 1-10. South Run Structure Bridge

1.6.4 Unit 1 Structures

The Middle Run Structure radial gate was mechanically opened during the 2011 flood event to help reduce flood levels in the lower Weber River. This gate is not typically operated by the Ogden Bay WMA staff since they use the two existing slide gates to divert water. As a result of opening this gate, a large surge of water flowed into Unit 1 damaging some of the water turnout structures that regulate flow for waterfowl habitat. The radial gate was also damaged when it was opened. Unit 1 does not have an outlet to the Great Salt Lake so the levees downstream of the Middle Run Structure and downstream of the South Run Structure were breached to alleviate the added water pressure stress as described in Chapter 1.7. Before the water pressure was relieved in Unit 1, damage occurred to the unit's turnout structures and levees.

Picture 1-11. Unit 1 Typical Metal Water Turnout Structure

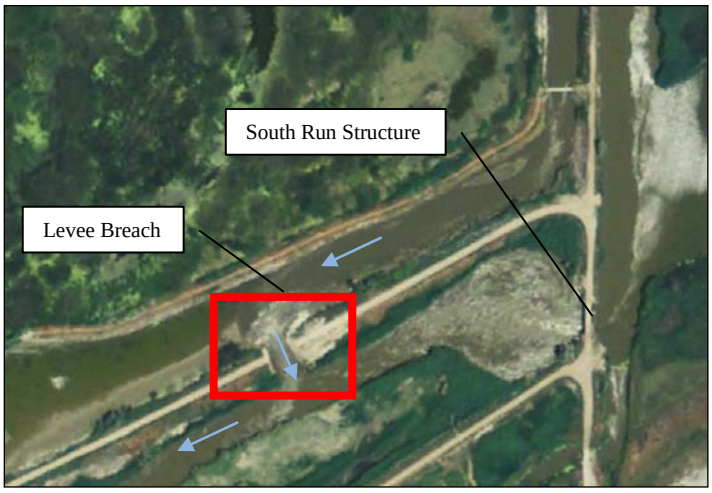
Picture 1-12. Unit 1 Typical Concrete Water Turnout Structure

Picture 1-13. Unit 1 Typical Low Spot in Levee

1.7 2011 Levee Breach

During the 2011 flood event in the Weber River, portions of the dike system in the Ogden Bay WMA were mechanically breached to bypass the Middle Run and South Run water control structures. The desired outcome was to reduce upstream water surface elevations (Appendix B-Figure 3). Flood waters were allowed to flow unobstructed down a channel in Unit 1. After the flood waters receded, the breaches in the levee were restored back to pre-flood conditions by UDWR.

Picture 1-14. Middle Run Structure 2011 Levee Breach



Picture 1-15. South Run Structure 2011 Levee Breach

1.8 Lower Weber River Floodplain Existing Conditions

Once water passes the 1100 S Bridge in the lower Weber River, it travels downstream and splits into the North Run and South Run channels upstream of the Ogden Bay WMA (Appendix B-Figure 3). Within the WMA, the North Run splits into a North Run and Middle Run of the Weber River. Flow events greater than 3,500 cfs typically overtop the banks of the river and spill into the adjacent floodplain (BCA 2013). The surrounding land downstream of the 1100 S Bridge 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, but flood flows similar to the 2011 (1952 and 1983) event typically overtop

these embankments and spill into the adjacent land. The following photographs depict the typical land conditions in the floodplain adjacent to the Lower Weber River.

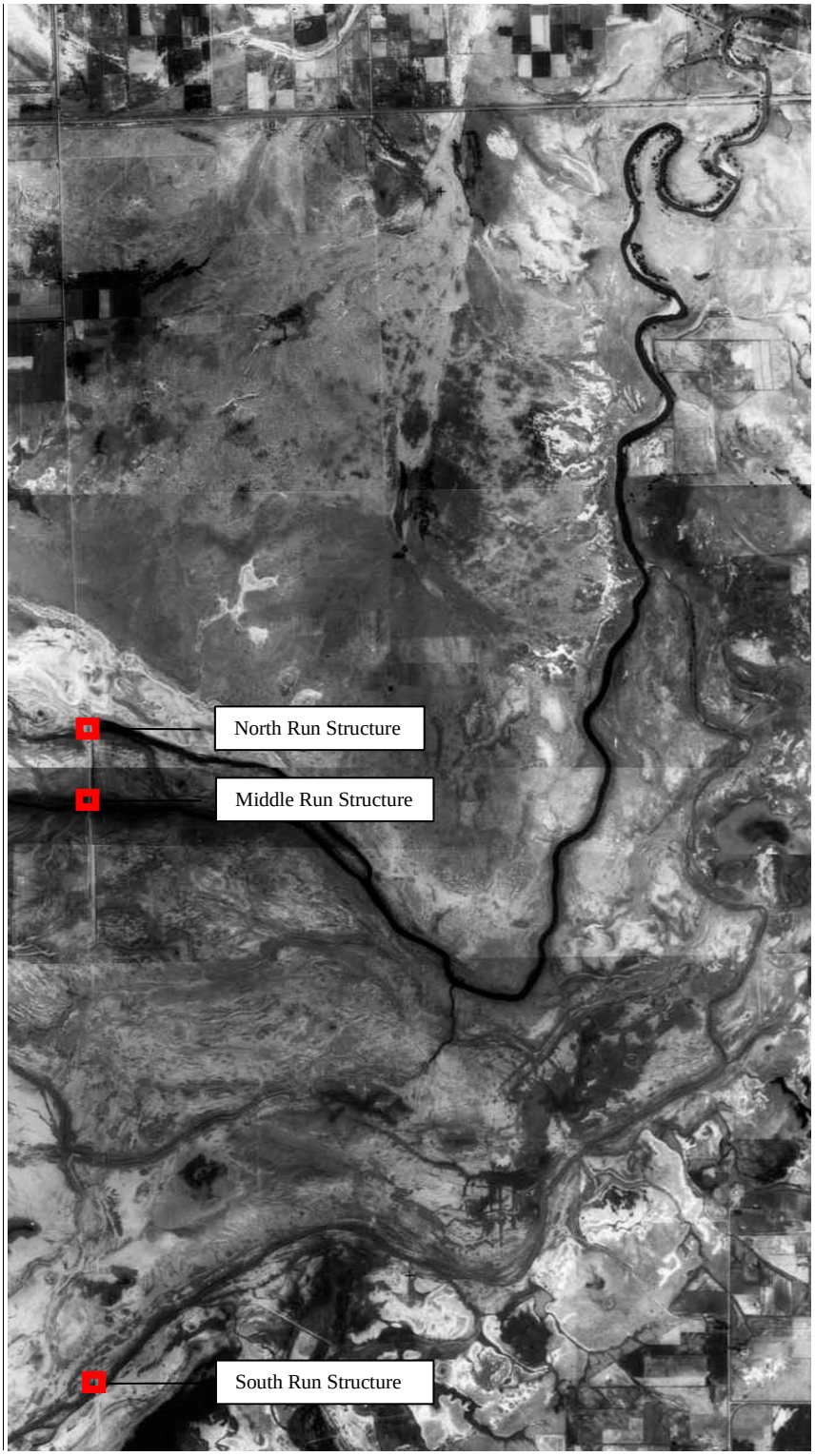
Picture 1-16. Lower Weber River Channel and Banks Looking Downstream on Private Land

Picture 1-17. Lower Weber River Bank Adjacent to Agricultural Field

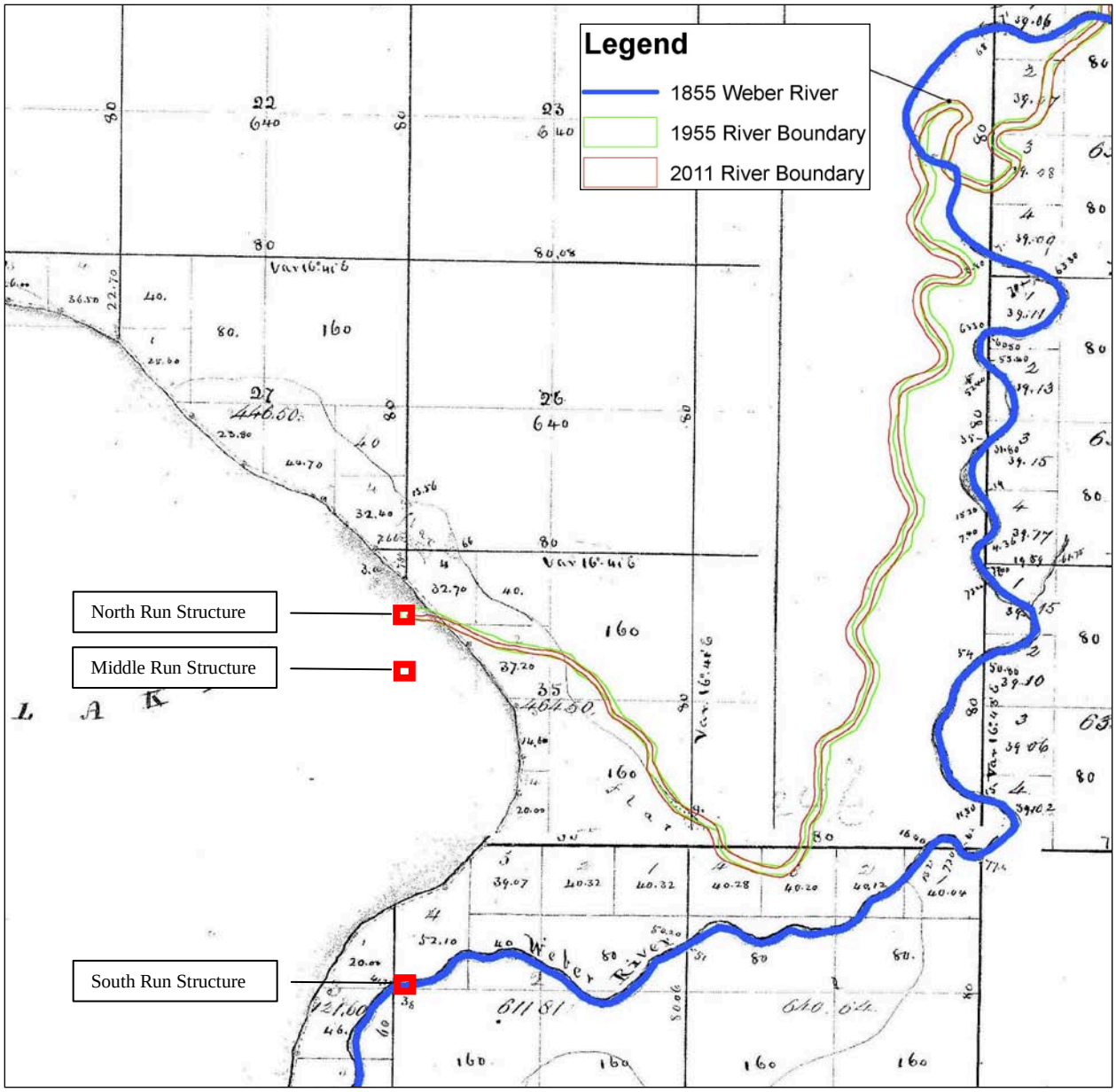
Picture 1-18. Lower Weber River Channel and Banks on Ogden Bay WMA

1.9 Historical Aerial Photographs

The following historical aerial photographs (Pictures 1-19 through 1-21) show the changes in the lower Weber River channel alignment starting in 1855 to 2011.



Picture 1-19. 1937 Aerial Photograph



Picture 1-20. 1855, 1955 and 2011 River Channel Boundaries

Picture 1-21. 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 Ogden Bay WMA is located about 10 miles west from Ogden, Utah and is situated at the downstream end of an approximately 2,110 square mile watershed. The elevation of the three water control structures is approximately 4,210 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). However, these searches did not identify any previously recorded cultural sites within 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 no cultural/historic sites within the project footprint. NRCS is currently consulting with Utah SHPO and detailed documentation 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 Ogden Bay WMA. This review identified species that historically or currently use habitat or could potentially migrate into the area in Weber County. Table 3-6 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 Weber River Structure is located in a wetland that does not contain large woody trees or riparian shrubs. The project area does not contain a large unfragmented tract 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.

No fish surveys have been conducted downstream of the 1100 S Bridge but the species observed above the bridge are presumed to present in the lower Weber River on the Ogden Bay WMA also.

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 several 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, intense agricultural use and stormwater runoff have led to current fish habitats in the lower river to be 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 Ogden Bay WMA that has lower velocities and less gradient (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 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. No known population of any of the listed fish is known to exist in the project area.

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.

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 at the Ogden Bay WMA, theses habitats do not tend to support high wildlife species richness, with the exception of birds (Milchunas 2006; Paul and Manning 2008). Migratory bird species are discussed in Chapter 2.7.

The UDWR indicates that the Ogden Bay WMA contains potential habitat for approximately 58 species of mammals. These range from large ungulates to small rodents. Native ungulates are not common inhabitants of this area. Potential habitat does exist for pronghorn (*Antilocapra americana*), Rocky Mountain elk (*Cervus canadensis*), and mule deer (*Odocoileus hemionus*) (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 been developed 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 the top of the natural banks of the river onto the embankments or into the natural floodplain (BCA 2013). The embankments provide the river with up to an additional 1,500 cfs of river conveyance capacity (totaling about 5,000 cfs) before the embankments begin overtopping (BCA 2013). In 2011, the west embankment failed at the location of the Little Weber River Cutoff Channel spilling flood water onto the adjacent agricultural fields and residences. Minor embankment failures also occurred on the river but did not result in complete embankment failure. The gates at the Ogden Bay WMA North, Middle and South water control structures were opened to maximum capacity by UDWR staff to pass the flood flows prior to the embankment failure. The floodplain upstream of the structures is generally open up to the West 1100 North Bridge and there are minimal embankments on the eastern side of the river adjacent to residential areas. There is generally no floodplain management in this area 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%

The project area is located within the Ogden Bay WMA which consists of nearly 20,000 acres of State owned lands used for waterfowl habitat. Existing lands adjacent to the project area consist mostly of privately owned agricultural lands, with single family homes located along existing roads.

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 Ogden Bay WMA is one of the several 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 in various locations in the county. 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 proposed project is located within the boundary of the Ogden Bay WMA and along the lower Weber River upstream to the West 1100 North Street Bridge. The lands adjacent to the lower Weber River include mostly agricultural activities, roads, embankments, and residential development. There are numerous recreational opportunities for the public throughout the year which include hiking, biking, fishing, hunting, trapping, dog training, wildlife viewing, kayaking, and canoeing. The WMA consists of nearly 20,000 acres of emergent bulrush marshes, mud flats, open water ponds and bird nesting habitat of tall grasslands, saltbush and greasewood. It is the largest such management unit under the UDWR's stewardship. The levee system that connects the North, Middle and South Run structures is used for access around the WMA by UDWR staff and the general public.

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

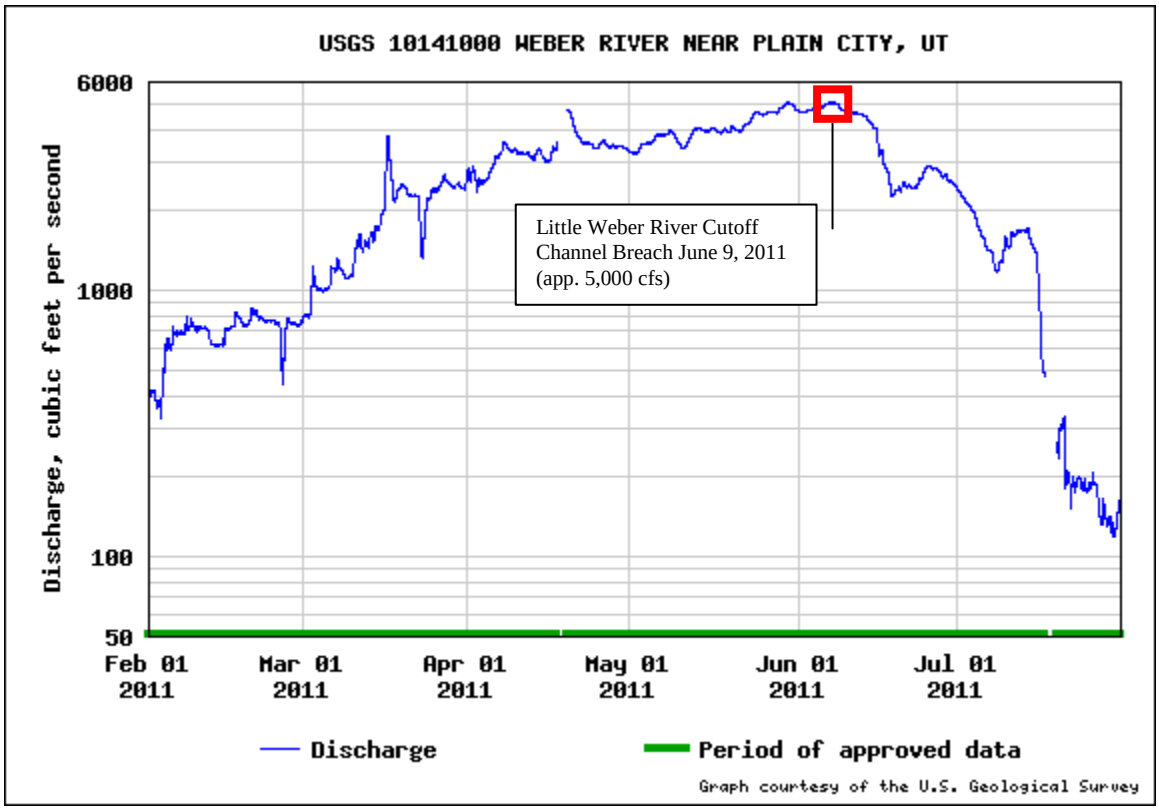
2.10 Soil

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 C-Figure 15. The majority of the Ogden Bay WMA is classified as silt clay loam or water. The banks of the lower Weber River are classified as loam and silt loam. Since the lower Weber River area is largely composed of fine silt loam 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 South Run structure is 2,110 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 bankfull 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 2013).

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

The conveyance capacity of the lower Weber River has been estimated through hydraulic modeling downstream of the West 1100 North Street Bridge. The existing river channel has the capacity to

transport 3,500 cfs prior to overtopping (BCA 2013). Once the flows increase above 3,500 cfs, the channel is not able to convey the water to the three Ogden Bay WMA structures and any additional flows are dispersed into the adjacent floodplain resulting in flooding of upland property downstream of West 1100 North Street Bridge. The floodplain is a wide, flat area and the majority of the water drains toward the Ogden Bay water control structures.

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 60.15 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 three surface water rights out of the Weber River near the North, Middle and South water control structures on the Ogden Bay WMA. These water rights are listed in Table 2-5 and are used for wildlife and waterfowl habitat by the UDWR.

Table 2-5. Weber River Surface Water Rights

Water Right No.	Owner	Flow	Source
35-128	Bureau of Reclamation	50.0 cfs	Weber River – Middle Run
35-1526	Bureau of Reclamation	100.0 cfs	Weber River – North Run
35-1651	Bureau of Reclamation	6.0 cfs	Weber River – North Hooper Slough (South Run)
35-826	Bureau of Reclamation	34.7 cfs	Weber River – North Hooper Slough (South Run)
35-9880	UDWR	10.0 cfs	Surface Run-off entering the North Run side channel

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 17, identifies general wetland and stream types as freshwater wetlands, freshwater pond, lake, and riverine throughout the Ogden Bay WMA and lower Weber River. 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 and include the following:

- 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 and salt grasses, with iodinebush and greasewood scattered across the landscape (Findlay 2007, Godfrey *et al.* 2005).

- Cottonwood//Willow Riparian Lands: 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, smooth brome (*Bromus inermus*), timothy (*Phleum pratense*), Canada thistle as well as several other introduced and native grass species are common along the tops of the river banks.
- Wet Meadows Lands: The majority of these two related habitats are found within and adjacent to the Ogden Bay WMA totaling approximately 20,000 acres 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.
- Salt Marsh: The salt marsh area is found in the extreme western edge 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 Habitat: These areas generally lack vegetation or have sparse submerged vegetation. They occur within the Weber River, ponds, and the Ogden Bay WMA reservoir areas.

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 2-6 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: Weeds 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 2-6. Weber County Noxious Weed Species

Common Name	Scientific Name	Class
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 not common in the Ogden Bay WMA primarily due to the lack of development in the area. Weeds have been mostly observed along the edges of roads and heavily disturbed areas. However, 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 WMA. The Ogden Bay 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. Three 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 nine 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
- Flood Bypass Channels
- South Run By-Pass Channel
- North Run Channel Dredging
- Unit 1 Levee Mechanical Breach

3.3.1 Storage Reservoirs

The implementation of 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, primarily on public property but also on private 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 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 reservoir 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 on public land within the boundary of the Ogden Bay WMA adjacent to the river and would require either the purchase or an easement on property to allow for flood water to be stored. The location of these reservoirs would almost completely be constructed in areas identified as wetlands by the USFWS National Wetlands Inventory as shown on Appendix C-Figure 17 which would be considered a permanent impact. This alternative was eliminated from detailed study do to the lack of available suitable space 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 Ogden Bay Waterfowl Management Area 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 in conjunction with a very low channel gradient 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 eight miles starting at the South Run Structure upstream to the W 1100 S bridge 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 of 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. This canal was intermittently flowing at a rate of approximately 1,000 cfs during the 2011 flood event. The diversion was intermittent because the canal intake trash rack kept plugging with debris and almost all water was blocked from entering the canal. 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 for optimal flood storage during flood events that 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 dam.

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 flood water capacity conveyance 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 Flood Bypass Channels

There are several remnant flood bypass that could convey flood flows out of the Weber River toward the Great Salt Lake and reduce flood volumes. A separate project under the EWPP is being proposed by NRCS (Little Weber River Cutoff Channel) to alleviate flood impacts within the Weber River. This project consists of constructing a flood cutoff channel to convey a portion of the flood flows out of the Weber River to reduce flooding downstream and is discussed in Chapter 3.6.3 – Reasonably Foreseeable Actions. Similar to the Little Weber River Cutoff Channel, there are other remnant channels within the Weber River area that could convey water out of the river during flood events. These cutoff channels would include the same style and method of conveying water out of the river channel as stated in the Little Weber River Cutoff Channel NEPA EA.

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 Little Weber River 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.

3.3.7 South Run Bypass Channel

As the Weber River enters the northeast corner of the Ogden Bay WMA, the main river channel changes flow direction from south to northwest and heads toward the North Run and Middle Run Structures.

However, most of the water in the Lower Weber River bypasses these structures and is conveyed to the South Run Structure which eventually flows into the Great Salt Lake. The installation of a bypass channel starting at the sharp bend in the Lower Weber River directly to the South Run Structure would allow water to bypass the North Run and Middle Run Structures as well as any channel constrictions in this area. Conveying flood flows straight to the South Run Structure may potentially lower the water level in the river and adjacent floodplain.

This alternative was considered to create additional flow capacity during flood events in the Lower Weber River and aid in conveying water through the Ogden Bay WMA with reduced constrictions. The area where the proposed bypass channel would be constructed in is primarily wetland (Appendix C-Figure 17) and would involve a significant amount of permanent impact to jurisdictional waters of the United States. The channel would be partially lined with riprap for stability and would be approximately 9,000 feet long by 50 feet wide resulting in an estimated 10 acres of wetland impact. This area is also located within the boundary of the Ogden Bay WMA and is important wildlife habitat to migratory birds and waterfowl. The construction of the bypass channel is not authorized under the EWPP, Title 390, Part 511.4.A(8) (NRCS 2012) since it would involve the removal of material in wetland areas that was not directly deposited by the 2011 flood event. This alternative was eliminated from detailed study since removal of the wetland material is not approved under the EWP program and the high impacts to wetland and wildlife habitat.

3.3.8 North Run Channel Dredging

The North Run channel downstream of the North Run Structure has reportedly filled in with sediment and invasive species over the past 50+ years, reducing the channel capacity to pass flood flows. During the 2011 flood event, flood water ran through this channel and adjacent floodplain and eventually flowed into the Great Salt Lake. However, a large percentage of this flow was conveyed overland instead of in the channel due to the reduced capacity. Dredging the North Run channel would remove sediment and vegetation allowing higher volumes of water to flow through channel during flood events. This channel would be dredged for approximately four miles starting at the North Run Structure and heading west to the Great Salt Lake 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 allow higher flood discharges to pass through this channel. However, dredging sediment that was deposited in the river prior to the 2011 flood event is not authorized under the EWPP, 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 channel 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 channel bed is expected to fill in with sediment again during future flood events. This alternative was eliminated from detailed study since dredging of historical deposition is not approved under the EWPP and it is considered a temporary fix to a long-term problem.

3.3.9 Ogden Bay WMA Levee Mechanical Breach

The existing levee on the eastern and southern side of Unit 1 on the Ogden Bay WMA was mechanically breached during the 2011 flood event in an effort to reduce flooding along the Lower Weber River. Some of the public and agency personnel believed that the levee and Ogden Bay WMA water control structures were significantly restricting flow into the Great Salt Lake and was creating backwater effects that extended for miles upstream. The upstream breach was approximately 600 feet south of the Middle Run Structure and downstream breach was approximately 700 feet southwest of the South Run Structure. The breaches were created by Ogden Bay Waterfowl Management Area staff via an excavator at the request of

Weber County officials. The levee breach and the opening of the radial gate on the Middle Run Structure resulted in more water being directed into the Unit 1 canal system than it had capacity to convey through its system of turnouts and distribution ditches and canals. This reportedly resulted in about $160,000 of flood damage to Unit 1 facilities. Once the flood waters receded in the river, the breaches in the levee were filled and the levee was restored to pre-flood conditions.

This alternative was considered to identify an inexpensive way to bypass water around assumed constriction points on the Ogden Bay WMA such as the Middle Run and South Run Structures. Breaching the levees via mechanical equipment during a flood event is not a safe method to bypass water or a viable long-term solution. The breaches are not stabilized when they are created providing the opportunity for extensive levee erosion and/or failure, or the possibility of damage to equipment or harm to staff. If the levee is mechanically breached during future flood events then Unit 1 infrastructure should also be upgraded to handle the additional volumes of water. This alternative was eliminated from detailed study due to the instability of the breaches and safety hazards.

3.4 Alternatives Considered for Detailed Study

There was one No Action alternative and three 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
- Structure Repairs
- Levees
- Floodplain Easements

3.4.1 No Action

The No Action alternative consists of leaving the structures on the Ogden Bay WMA "As-Is" and providing no Federal money through the EWPP to Weber County. Under this No Action alternative, the residents in the surrounding agricultural community and Ogden Bay WMA facilities would continue to be flooded during elevated flows in the Lower Weber River and the elevated water level would continue to potentially flood homes, property, farmland, and infrastructure along the lower Weber River as well as property in the Ogden Bay WMA. The worst-case-scenario under No Action is the failure of the embankments upstream of Ogden Bay WMA resulting in potentially flooded homes, land, loss-of-crop, and damage to infrastructure similar to the 2011 damage level or greater.

3.4.2 Structure Repairs

The North Run, Middle Run and South Run Structures experienced damage during the 2011 flood event. That damage has affected the ability of those structures to function properly. The South Run Structure was also identified to be a flow constriction point that backs water upstream during elevated flows in the river. This alternative was considered for detailed study because these structures are located at the very end of the Weber River and repairing them and increasing the capacity of the South Run structure will lower the water surface immediately upstream of the structure and increase conveyance capacity. A description of the repair and modifications to all three of these structures is presented in the following sections as summarized from the *Weber County Emergency Watershed Protection – Ogden Bay Wildlife Management Area Structures Repair Project, Draft Preliminary Design Report* (BCA 2013). The Draft Preliminary Design Report is located in Appendix A.

All structures would be repaired or 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. The structures would require maintenance and inspection on a yearly basis that would be the responsibility of the Ogden Bay WMA for vegetation clearing, invasive species removal, repair, etc. An Operations and Maintenance Plan would be developed describing how to operate the structures mechanical components and perform maintenance so that the structures operate as designed.

The repair and modifications to these structures is not expected to significantly reduce flooding or damage to land upstream. The actions will help reduce the flood effects via a reduction in the depth and time of inundation on the land by creating additional flow capacity at the South Run Structure. The actions will not eliminate flooding upstream of the structures and adjacent properties may still be inundated with water from the Weber River during future flood events.

3.4.2.1 North Run Water Control Structure

The North Run Structure would be repaired and modified using current engineering technology and standards as specified under the EWPP, Title 390, Part 511.4.A(12) (NRCS 2012) and depicted in Appendix B-Figure 4. The existing radial gates would be replaced with new radial gates that will allow the same water flow as pre-flood conditions through the structure into the North Run channel. The foundation of the structure would be protected from further erosion through the installation of riprap. The repairs and modifications to the North Run Structure would specifically consist of the following elements:

- Remove and replace the existing radial gates with automated radial gates.
    - Each gate would have a supervisory controls and data acquisition (SCADA) system to monitor the structure.
- Install riprap around the foundation of the structure on the banks to prevent further erosion.
- Install a new river gage to track the volume of water flowing through the structure.

3.4.2.2 Middle Run Water Control Structure

The Middle Run Structure would be repaired and modified using current engineering technology and standards as specified under the EWPP, Title 390, Part 511.4.A(12) (NRCS 2012) and depicted in Appendix B-Figure 5. The existing slide gates would be replaced with new gates and automated controls that would allow the same water flow as pre-flood conditions through the structure into Unit 1 that is used for waterfowl habitat. The existing radial gate would be replaced for use only during flood events since the two slide gates will be used for the diversion of water under normal flows. The repairs and modifications to the Middle Run Structure would specifically consist of the following elements:

- Remove the three existing water control structure gates.
- Install two new automated water control structure slide gates and one new radial gate.
    - Each gate would have a SCADA system to monitor the structure.
- Install a new river gage to track the volume of water flowing through the structure.

3.4.2.3 South Run Water Control Structure

The existing South Run Structure will be modified using current engineering technology and engineering standards as specified under the EWPP, Title 390, Part 511.4.A(12) (NRCS 2012) and depicted in Appendix B-Figures 6 through 8. A new parallel low-level outlet structure would also be installed

directly to the north of the existing structure. The bottom of the structure would be two feet lower than the existing structure to increase conveyance capacity and help facilitate the conveyance of more sediment through the lower Weber River. During the flood of 2011, the South Run structure restricted flows in the Weber River. There was an approximate 18-inch drop in the water surface between the upstream and downstream faces of the structure. By repairing the existing gates and adding the additional gates, the head differential is expected to be reduced over half during periods of high discharge, and as a result the discharge capacity would be increased to allow for more sediment transport through the lower Weber River. The modifications to the South Run Structure would specifically consist of the following major elements:

- Repair/modify the existing water control structure.
    - Replace the wooden deck bridge across the existing structure with a reinforced concrete deck to provide access across the structure for heavy construction equipment.
    - Install a new river gage on the existing structure to track the volume of water flowing through the structure.
- Install a new parallel low-level outlet water control structure with the outlet two feet lower than the existing structure.
    - Install two radial gates (25 feet wide x 10 feet tall and 15 feet wide x 10 feet tall).
    - Install a reinforced concrete deck for heavy construction equipment access.
    - Install a river gage to track the volume of water flowing through the structure.
- Riprap
    - Fill and armor the existing 19-foot deep scour hole that exists in the channel immediately downstream of the proposed structure with riprap.
    - Armor the banks with riprap approximately 500 feet downstream of the structure.

The installation of the new parallel outlet structure is not intended to eliminate flooding upstream of the structure. It is intended to allow more water to flow past the structure and reduce water surface elevations. It also intended to flush more sediment through the lower Weber River system by increasing natural erosion during periods of lower flows, naturally increase the sediment discharge through the system, and reduce the need for future dredging after flood events.

3.4.2.4 Unit 1 Structures

Unit 1 on the Ogden Bay WMA is located behind the Middle Run Structure and consists of approximately 3,100 acres of waterfowl habitat. This unit does not have an outlet to the Great Salt Lake and all water is retained in the unit. The replacement of the existing radial gate on the Middle Run Structure would allow flood water to enter into Unit 1 during elevated flows in the lower Weber River, at the discretion of Ogden Bay WMA staff. Water would travel south along the western side of the existing levee and flow toward the South Run Structure. A new radial gate structure would be installed to discharge this flood water back into the lower Weber River and ultimately bypass the South Run Structure. However, the added surge of water flowing through the Middle Run Structure would put stress on the existing water turnout structures inside of Unit 1 that regulate pond flows. Modifications to the water turnout structures are required to maintain operation of Unit 1 in association with the flood management and are depicted in Appendix B-Figures 9 and 10. These modifications specifically include the following:

- Replace eight water turnout structures.
- Repair approximately 2,200 feet of low spots in the levee.

- Install a new radial gate approximately 700 feet downstream of the South Run Structure to discharge flood flows out of Unit 1 into the lower Weber River. This location is the same as the 2011 mechanical levee breach location.

3.4.3 Levees

The installation of levees would be constructed on both sides of the river starting at the South Run Structure and heading upstream for eight miles to the West 1100 South bridge (Appendix B-Figures 11 and 12) 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 on both public and private land. 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. Over half of the levee alignment would be constructed in areas identified as wetlands by the USFWS National Wetlands Inventory as shown in Appendix C-Figure 17 which would be considered a permanent impact.

In order for the levees to be constructed on both public and private ground, 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.

3.4.4 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 13) and would allow both public and private land to be flooded naturally without protection. The locations of easements on Figure 13 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)
State of Utah	Waterfowl Habitat	~1,390
Private	Bare Land	~3,060

3.4.5 River Gages

New river gages would be installed on the Ogden Bay WMA at the North Run, Middle Run and South Run Structures (Appendix B-Figure 14) in an effort to more accurately track flood events in the Lower Weber River. Two additional river gages would be installed to track flood events at: 1) 1100 S Bridge, and 2) 4700 W Bridge. The river gage at 4700 W Bridge is not associated with this project and is discussed in Chapter 3.6.3 – Reasonably Foreseeable Actions. These new gages would be applicable to all three Action alternatives considered for detailed study. The information obtained from these gages will allow Weber County to respond to flood events via the operation of any mechanical structures or the initiation of flood response procedures.

3.5 Summary and Comparison of Alternative Plans

Table 3-2. Summary and Comparison of Alternatives

Effects	No Action	Structure Repairs (Proposed Alt)	Levees	Floodplain Easements
Climate	Minor 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**
Endangered and Threatened Species	**No Effect**	**No Effect**	**No Effect**	**No Effect**
Fish and Wildlife	**No Effect to Fish;** Moderate Negative Impact to Wildlife Habitat	**Negligible Negative Impact to Fish; Minor Negative Impacts to Wildlife Habitat**	**Negligible Negative Impact to Fish;** Moderate Negative Impact to Wildlife Habitat	**No Effect to Fish;** Moderate Negative Impact to Wildlife Habitat
Floodplain Management	Moderate Negative Impact from Lack of Federal Funding	**Major Beneficial Impacts**	**Major Beneficial Impacts**	Minor Negative Impact
Land Use	**No Effect**	Negligible Negative Impact	Minor Negative Impacts	**No Effect**
Migratory Birds	Moderate Negative Impact to Bird Habitat	**Minor Beneficial Impacts**	Moderate Negative Impact	Moderate Negative Impact to Bird Habitat
Public Health and Safety	Major Negative Impact	**Major Beneficial Impacts**	**Major Beneficial Impacts**	Major Negative Impact

Effects	No Action	Structure Repairs (Proposed Alt)	Levees	Floodplain Easements
Recreation	Minor Negative Impact	Minor Negative Impact	**Minor Beneficial Impact**	Minor Negative Impact
Soils	Minor Negative Impact	**Negligible Beneficial Impact**	Negligible Negative Impact	Minor Negative Impact
Water Resources	No Effect	**Moderate Beneficial Impact**	Minor Negative Impact	No Effect
Waters of the United States	**Negligible Negative Impact**	Minor Negative Impact	Moderate Negative Impact	**Negligible Negative Impact**
Vegetation	Moderate Negative Impact	**Minor Negative Impact**	Moderate Negative Impact	Moderate Negative Impact
Cost	**Low**	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 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. The trees fell into the channel and trash was dislodged from the bank into the channel 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

<u>Willard Bay Canal Intake</u>
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.

<u>Little Weber River Cutoff Channel</u>
The Little Weber River Cutoff Channel is a historic drainage channel that conveys water out of the mainstem of the Weber River to the Great Salt Lake in between West 300 North and West 900 North Streets. Over the past 100 years, this channel has been restricted through the construction of roads, dikes and agricultural practices. Four road crossings and one dike were mechanically breached during the 2011 flood event to convey water through this channel after the Weber River embankment failed. Modifications to the channel would be performed so that it may convey up to 1,000 cfs out of the Weber River during flood events. This project is not intended to eliminate flooding in the surrounding area but

to reduce the flood water depths and inundation time on the ground. NRCS is proposing to fund this project under the EWPP and is preparing an EA for this project also. The implementation of this project would reduce flood flows downstream of the Little Weber River Cutoff Channel by up to 1,000 cfs during flood events and help protect existing embankments along the river downstream of 4700 W.

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 three structures on the Ogden Bay WMA within the floodplain that was activated during the 2011 flood event.

3.7 Proposed Alternative

The Proposed Alternative for the project is the Structure Repairs 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 Structure Repairs alternative would also provide the least negative and most beneficial effects for the project out of all the alternatives considered. The repairs and modifications to the structures would not eliminate flooding upstream of the Ogden Bay WMA 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 known at the project area. If encountered during excavation activities, construction would stop and the appropriate agencies would be notified.

Fish: There is no mitigation proposed for impacts to fish species.

Recreation: Certain parking areas and trails on the Ogden Bay WMA would be used for staging areas during construction and would be completely closed to public use. Notification will be posted at the WMA to notify the public of the areas that will remain open during construction.

Streams and Wetlands: Structure Repairs would impact the 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.

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.

Vegetation: All disturbed areas not associated with direct structure repair would be revegetated with approved UDWR 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.

UDWR will be responsible for the operation, maintenance, and future modifications to the structures. 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 they 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 no 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 structures on the Ogden Bay WMA 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 structures in their 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 structures in the current condition would lead to the increased probability for failure during future flood events. If the structures fail, existing wildlife habitat on the WMA (specifically Unit 1) may become directly impacted from excessive flooding and scouring. As a result, wildlife habitat (primarily

waterfowl) would become indirectly impacted because it would temporarily no longer be suitable for nesting and foraging during certain times of the year.

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, indirectly, or cumulatively 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 may become directly impacted from excessive flooding and scouring. As a result, birds would become indirectly impacted because it would temporarily no longer be suitable for nesting and foraging during certain times of the year.

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 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 be directly affected from the closure of the Ogden Bay WMA during flood events that could compromise the water control structures and/or the levees. Access through the WMA may also be limited to the public during repairs. Public interested in using the Ogden Bay WMA could be redirected to temporarily use one of the other three WMA in the area while it is temporarily closed and repairs are being performed. Recreation at the Ogden Bay WMA would not be indirectly effected.

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 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.

4.1.11 Water Resources

Water quality, stream flows, and water rights would directly and indirectly remain the same during future flood events. Stream flows would remain elevated potentially resulting in flooding 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 structures 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. 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 Structure Repairs Alternative

4.2.1 Climate

Repairs to the structures at the Ogden Bay WMA provide a beneficial direct and indirect effect related to climate change since the structures would be capable of passing higher volumes of water. 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 structures would help reduce flood inundation time and depth in the floodplain. Repairing the structures would allow the Ogden Bay WMA to operate their water control system more efficiently and gage the amount of water flowing in the Weber River.

4.2.2 Cultural/Historic

There are no known cultural/historical resources that would be impacted from the repair of the structures and the installation of the river gages. Structure repairs are expected to have no direct or indirect 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. Repair to structures on the Ogden Bay WMA 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

Repair of the structures would result in direct negative effects to fish species during temporary construction activities to repair the structures. There are no permanent or indirect impacts anticipated to fish species.

Repairing the structures would allow the UDWR to more effectively deliver water to the various waterfowl management units in the Ogden Bay WMA (specifically Unit 1). There will be temporary direct construction effects to wildlife species (including special status wildlife) during the repair of the structures from construction activity and noise. However, this disturbance will be temporary is not expected to have an adverse effect on wildlife species in the area.

The UDWR will be able to more effectively manage water distribution through the WMA which would indirectly result in beneficial effects from the creation of more suitable habitat for wildlife species.

4.2.5 Floodplain Management

The installation of the structure repairs and river gages would allow the Ogden Bay WMA and Weber County to more accurately track flood flows in the river and respond to flood emergencies appropriately. An Operations and Maintenance Plan would be created that describes flood protection measures and how to operate the new structures on the Ogden Bay WMA for optimal flood water conveyance to the Great Salt Lake.

4.2.6 Land Use

The repair of the structures on the Ogden Bay WMA would not directly or indirectly alter land use from existing conditions.

4.2.7 Migratory Birds

There will be temporary direct construction effects to migratory bird species during the repairs to the structures from construction activity and noise. However, this disturbance will be temporary. There are beneficial indirect impacts anticipated to migratory birds from the upgraded water management system.

4.2.8 Public Health and Safety

Repairs to the structure would allow additional flood flows to pass the Ogden Bay WMA on its way to the Great Salt Lake. Flood inundation depths and time upstream would be reduced directly and indirectly decreasing the risk to public health and safety during and after flood events.

4.2.9 Recreation

Structure repairs would temporarily close the Ogden Bay WMA at each water control structure location during construction. This will result in a direct negative effect to recreation as the general public will not be allowed to access or travel past these areas at times. Public interested in using the Ogden Bay WMA could temporarily be redirected to use one of the other three WMA in the near area while it is temporarily closed. Construction would be timed so that impacts to recreation use (hunting, fishing) would be minimized to the public.

4.2.10 Soil

Structure repairs would allow higher volumes of flood flows to pass through the structures reducing the inundation depth immediately upstream. Soils in the South Run structure repair area will be disturbed for the installation of the new structure and riprap to protect the banks from scouring. The increased flows through the structures would help reduce the inundation depths upstream 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

The structure repairs would be completed to increase the flow of water through the structures out into the Great Salt Lake. Stream flows in the lower Weber River would be reduced in the immediate vicinity of the South Run structure but due to channel capacity limitations upstream of the structure, the reduced flows would not extend very far upstream (approximately one mile). It is anticipated that over time the channel between Middle Run and South Run structured will scour itself to create more capacity in the channel naturally. Due to the construction of the channel of approximately 3,500 cfs before the river splits into the three channels on the Ogden Bay WMA, flooding is still expected to occur in the adjacent floodplain.

Water quality and water rights would directly and indirectly remain the same during future flood events. The structures would be operated to comply with the allocated water right used by the UDWR for waterfowl management on the WMA.

4.2.12 Waters of the United States

Repair of the structures would directly impact streams and wetlands in the immediate vicinity of the structures from the installation of the new South Run structure and riprap along the downstream banks. Continued erosion of the banks upstream of the structures may indirectly result in the filling of wetlands adjacent to the channel.

4.2.13 Vegetation

Repair of the structures would directly impact vegetation in the immediate vicinity of the structures. Vegetation along the lower Weber River would remain the same as existing conditions during future flood events. Direct effects would include the continued inundation of vegetation along the banks and in the floodplain. There are no special status plant species within the lower Weber River area and there would be no effect to special status plants. 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.

4.3 Levees Alternative

4.3.1 Climate

The construction of levees along the edge of the Weber River would contain flood flows within the new channel. 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.

4.3.2 Cultural/Historic

A cultural survey was not completed in the 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.

4.3.3 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.

4.3.4 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. As a result of the disconnection and clearing, wildlife may not utilize this area for habitat resulting in an indirect adverse effect in the future.

4.3.5 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/UDWR to manage the floodplain more efficiently resulting in direct and indirect beneficial effects.

4.3.6 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 owner of the land would directly lose the use of this land. The majority of the land use is bare land in the levee alignment. Closer to the West 1100 North Street Bridge the landowner would directly lose a portion of their agricultural field for the construction of the levees resulting in the loss of crop land. The landowner of the agricultural fields would indirectly receive beneficial effects during flood events due to the increased flood protection. 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.

4.3.7 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.

4.3.8 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.

4.3.9 Recreation

The construction of levees would contain the flood flows in a new channel and would not allow flows to enter into the surrounding floodplain. All of the water in the Weber River would be channeled to the three water control structures. The levee system would create new recreation opportunities in the form of trails on the Ogden Bay WMA resulting in a direct beneficial impact. Recreation at the Ogden Bay WMA would not be indirectly effected from the construction of levees.

4.3.10 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 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.

4.3.11 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 to the water control structures on the Ogden Bay WMA which could have a direct impact to the structures from added stress.

4.3.12 Waters of the United States

The construction of levees would directly impact any wetlands adjacent to the stream channel (approximately 15 to 20 acres). These impacts would include filling from levee construction material resulting in a permanent loss. Compensatory mitigation would be required for impacts to these wetland features. Streams and wetlands would not be indirectly altered from existing conditions inside of the levee floodplain.

4.3.13 Vegetation

The construction of levees would contain flood flows in the channel and possibly reducing the inundation in the floodplain on the outside of the levees. Direct effects would include the clearing of vegetation within the levee alignment. Vegetation would not be indirectly altered from existing conditions inside of the levee floodplain.

4.4 Floodplain Easements Alternative

4.4.1 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.

4.4.2 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.

4.4.3 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.

4.4.4 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.

4.4.5 Floodplain Management

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

4.4.6 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 effect. Current land use in the area would not be indirectly altered from existing conditions.

4.4.7 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.

4.4.8 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.

4.4.9 Recreation

Recreation resources would be directly affected from the establishment of floodplain easements due to the closure of the Ogden Bay WMA during flood events that could compromise the water control structures and/or the levees. Access through the WMA may be limited to the public during repairs. Public interested in using the Ogden Bay WMA could be redirected to temporarily use one of the other three WMA in the near area while it is temporarily closed. Recreation at the Ogden Bay WMA would not be indirectly effected.

4.4.10 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.

4.4.11 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.

4.4.12 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.

4.4.13 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.

4.5 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 three water control structures on the Ogden Bay WMA.

4.5.1 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.

4.5.2 Structure Repairs Alternative

The implementation of the Willard Bay Canal Trashrack and Little Weber River Cutoff Channel projects would have a beneficial cumulative effect to the proposed project area from the reduction of flood flows that could damage resources in the project area. Flows in the river channel would be reduced from current conditions by up to 2,000 cfs reducing the inundation depth, time and scour velocities in the adjacent floodplain. This flow reduction could lessen the impacts to fish and wildlife, floodplain management, land use, migratory birds, public health and safety, recreation, soil, water resources, waters of the U.S., and vegetation.

4.5.3 Levees Alternative

The implementation of the Willard Bay Canal Trashrack and Little Weber River Cutoff Channel projects 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 2,000 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.

4.5.4 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 structure repairs activities for 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 repair 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 Ogden Bay WMA 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/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 Weber River Structure Repairs 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

The UDWR maintains titled ownership of the property proposed for Structure Repairs. Construction activity associated with the proposed alternative would occur within the boundaries of the Ogden Bay Wildlife Management Area. A new river gage to measure flows in the Weber River would be installed on private property adjacent to the 12th St. 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

Name	Title (Years Experience)	Education	Other
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Debby Howe	NEPA Specialist (20+)	B.S. – Environmental Sciences and Planning	
Bowen Collins & Associates, Inc.			
Craig Bagley	Principal Engineer (20+)	B.S. – Civil and Environmental Engineering M.S. – Civil and Environmental Engineering	Utah PE

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
Draft EA	Draft Environmental Assessment
CFR	Code of Federal Regulations
cfs	cubic feet per second
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
FEMA	Federal Emergency Management Agency
FONSI	Finding of No Significant Impact
GHG	Green House Gases
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
SCADA	supervisory control and data acquisition
SHPO	State Historic Preservation Office
SWPPP	Storm Water Pollution Prevention Plan
UDEQ	Utah Department of Environmental Quality
UDNR	Utah Department of Natural Resources
UDWR	Utah Division of Wildlife Resources
UDWRi	Utah Division of Water Rights
UPDES	Utah Pollutant Discharge Elimination System
USACE	U.S. Army Corps of Engineers
USC	United States Code
USDA	U.S. Department of Agriculture
USFWS	U.S. Fish and Wildlife Service
USGS	United States Geological Survey
WMA	Waterfowl Management Area