U.S. Department of Homeland Security
FEMA Region VIII
Denver Federal Center
Building 710, Box 25267
Denver, CO 80225-0267

FEDERAL EMERGENCY MANAGEMENT AGENCY (FEMA)

FINAL FINDING OF NO SIGNIFICANT IMPACT (FONSI)

FINAL PROGRAMMATIC ENVIRONMENTAL ASSESSMENT WATERSHED RESILIENCY PROJECTS IN THE STATE OF UTAH

BACKGROUND

In September 2015, the deadliest single flash flood in Utah's history occurred on the Utah-Arizona border. The flash flood carried large volumes of debris that caused several fatalities, damaged a municipal water pipeline, and washed out several roads and bridges (NRCS, 2015). As a result of the recent flooding and other initiatives, watershed organizations consisting of Federal, State, and local government representatives have coordinated development of watershed improvement and resiliency projects. This PEA is intended to assist all future watershed resiliency projects of all types, including projects proposed by these watershed organizations, until superseded

This PEA evaluates typical actions undertaken by Federal agencies, or any entity responsible for Federal level environmental compliance, to provide financial support or technical assistance to any watershed resiliency project covered by the scope of this document in Utah. This includes future major disaster events such as flooding, fires, avalanches, and tornados which result in similar impacts to watershed environments, as well as watershed resiliency funding interests. This PEA also provides the public and decision-makers with the information required to understand and evaluate the potential environmental consequences of these actions and to consider these impacts in decision making. The Programmatic Environmental Assessment (PEA) assesses environmental compliance for watershed hydraulic capacity and floodplain resiliency projects through:

- Floodplain and channel naturalization through biologically inspired resiliency measures, such as bank stabilization and hardening using natural materials and re-vegetation, referred to as bioengineering.

- Multi-objective project design of hydraulic control elements such as fish-passage friendly drop structures, energy dissipating fish ladders, or the creation of recreational open space to preserve watershed functions.

- Watershed restoration and mitigation including channel shaping or re-profiling, floodplain construction, overflow channel construction, riparian re-vegetation, in-stream habitat improvement, and erosion and sediment control including slope stabilization and sediment detention.

- Upland forest health including fuels mitigation, wildfire suppression, and upland plantings directly tied to watershed and floodplain resiliency.

In accordance with the National Environmental Policy Act of 1969 (NEPA; 42 U.S. Code [U.S.C.] 55 parts 4321 et seq., 2000), the Council on Environmental Quality (CEQ) implementing regulations (40 Code of Federal Regulations [CFR] 30 parts 1500 et seq., 2004), FEMA Directive 108-1 and in the spirit of the Unified Review as outlined in Section 6 of the Sandy Recovery Improvement Act (SRIA) of 2013, FEMA prepared a PEA to evaluate the potential environmental impacts resulting from watershed resiliency projects.

The PEA evaluated two alternatives: (1) No Action and (2) Watershed Resiliency Activities. A given alternative may not be available in all locations. Therefore, specific project sties may have different preferred alternatives.

The notice of availability of the PEA was published in the *Salt Lake Tribune* on April 25, 2017, and in *The Spectrum* in St. George, Utah, on April 26, 2017 to start the 30-day public comment period. No comments were received.

CONDITIONS

Actions under this PEA and FONSI must meet the following conditions and all conditions noted in the PEA. Failure to comply with these conditions will make the FONSI determination inapplicable for the project and could jeopardize the receipt of funding.

1. In accordance with applicable local, State, and Federal regulations, the applicant will be responsible for acquiring any necessary permits prior to commencing construction at the propose project site.
2. The applicant will follow the best management practices and requirements under applicable stormwater pollution requirements for the placement of fill and construction activities.
3. Contractor and/or Subcontractors will properly handle, package, transport, and dispose of hazardous materials and/or waste in accordance with all local, State, and Federal regulations, laws, and ordinances. If hazardous substances are released to the project area during construction, these Federal, State, and local requirements must be followed in response and cleanup.
4. If during the course of work, unmarked graves, burials, human remains, or archaeological artifacts (prehistoric or historic) are discovered, the applicant shall stop work in the vicinity of the discovery, secure the site, and take all reasonable measures to avoid or minimize harm to the finds. All archaeological findings will be secured and access to the sensitive area restricted. The applicant shall inform their Federal grant program contacts, who will in tum consult with Historic Preservation (HP) staff. The applicant will not proceed with work until HP staff completes consultation with the State Historic Preservation Office (SHPO), or Tribal Historic Preservation Office (THPO), to ensure that the project is in compliance with the National Historic Preservation Act (NHPA).
5. The applicant will follow applicable mitigation measures as identified in Section 5 of the PEA to the maximum extent possible.
6. The applicant must meet any project-specific conditions developed and agreed upon between the Federal grant program and environmental planning or historic preservation resource or regulatory agencies during consultation or coordination.
7. Construction traffic should be closely monitored and controlled as appropriate. All construction activities will be conducted in a safe manner in accordance with OSHA requirements. To alert motorists and pedestrians of project activities, appropriate signage and barriers will be on site prior to and during construction activities. During

construction activities, the construction site(s) will be fenced off to discourage trespassers.

8. The applicant will submit any changes to the scope of work that was originally submitted as part of the application for the Federal grant program determination of whether the PEA is still valid or whether any supplementation or re-evaluation is needed.

FINDINGS

Based on the information contained in the PEA, the potential impacts resulting from the two alternatives in the PEA, and in accordance with FEMA Directive 108-1 and Executive Orders 11988 (Floodplain Management), 11990 (Protection of Wetlands), and 12898 (Environmental Justice), FEMA finds that the implementation of the proposed action will not have significant impacts to the quality of the human environment. Therefore, an Environmental Impact Statement (EIS) will not be prepared. This FONSI is based upon proposed actions fitting one of the two project types (alternatives) described in the PEA and meeting all conditions prescribed for that particular project type.

APPROVAL

Steven E. Hardegen Date
Regional Environmental Officer, FEMA Region VIII

Final Programmatic Environmental Assessment

Watershed Resiliency Projects in the State of Utah

Utah

May 2017

FEMA

U.S. Department of Homeland Security
Federal Emergency Management Agency
Denver Federal Center
Building 710, Box 25267
Denver, CO 80225-0267

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Acronyms and Abbreviations

AQCR	Air Quality Control Region
BLM	Bureau of Land Management
BLS	Bureau of Labor Statistics
BMP	Best Management Practice
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CICA	Construction Industry Compliance Assistance
CO2	Carbon Dioxide
CRS	Community Rating System
CUP	Central Utah Project
CWA	Clean Water Act
DOT	Department of Transportation
EA	Environmental Assessment
EIA	U.S. Energy Information Administration
EO	Executive Order
ERWP	Escalante River Watershed Partnership
ESA	Endangered Species Act
EWP	Emergency Watershed Protection
FAA	Federal Aviation Administration
FEMA	Federal Emergency Management Agency
FHWA	Federal Highway Administration
FISRWG	Federal Interagency Stream Restoration Working Group
FWCA	Fish and Wildlife Coordination Act
GAP	Gap Analysis Program
GHG	Greenhouse Gas
IBA	Important Bird Areas
LAA	Likely to Adversely Affect
MBTA	Migratory Bird Treaty Act
MMT	Million Metric Tons
NAAQS	National Ambient Air Quality Standards

NEPA	National Environmental Policy Act
NFIP	National Flood Insurance Program
NHPA	National Historic Preservation Act of 1966
NIH	National Institutes of Health
NLAA	Not Likely to Adversely Affect
NO2	Nitrogen Dioxide
NOAA	National Oceanic and Atmospheric Administration
NPDES	National Pollutant Discharge Elimination System
NPL	National Priorities List
NPS	National Park Service
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
OSHA	Occupational Safety and Health Administration
PEA	Programmatic Environmental Assessment
PM	Particulate Matter
PPA	Prototype Programmatic Agreement
PPE	Personal Protective Equipment
ppm	parts per million
PSC	Public Service Commission
RCRA	Resource Conservation and Recovery Act
ROW	Right of Way
SEA	Supplemental Environmental Assessment
SGCN	Species of Greatest Conservation Need
SHPO	State Historic Preservation Officer
SLC	Salt Lake City International Airport
SO2	Sulfur Dioxide
SSA	Sole Source Aquifer
TCP	Traditional Cultural Property
THPO	Tribal Historic Preservation Officer
TRI	Toxic Release Inventory
UDEQ	Utah Department of Environmental Quality
UDNR	Utah Department of Natural Resources
UDOT	Utah Department of Transportation

UDPS	Utah Department of Public Safety
UDWR	Utah Division of Wildlife Resources
UFR	Unified Federal Review
UGS	Utah Geological Survey
UPDES	Utah Pollutant Discharge Elimination System
USACE	U.S. Army Corps of Engineers
U.S.C.	U.S. Code
USDA	U.S. Department of Agriculture
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
UTA	Utah Transit Authority
WAFWA	Western Association of Fish and Wildlife Agencies
WAP	Wildlife Action Plan
WRI	Utah Watershed Restoration Initiative

Section 1 - Introduction

1.1 OVERVIEW

This Programmatic Environmental Assessment was prepared in accordance with Unified Federal Review as outlined in The Sandy Recovery Improvement Act, Section 6: Unified Federal Review mandates the establishment of an "…expedited and unified interagency review process to ensure compliance with environmental and historic requirements under Federal law relating to disaster recovery projects, in order to expedite the recovery process, consistent with applicable law." (Library of Congress, 2014; FEMA, 2013a; FEMA, 2014a)

The Federal government, through multiple agencies and their programs, proposes to perform comprehensive watershed resiliency actions such as river restoration, bank stabilization, and hydraulic capacity mitigation measures to restore watershed function. These actions would be implemented under Federal Emergency Management Agency (FEMA) funding programs, such as, but not limited to: Individual Assistance, Public Assistance, Hazard Mitigation Assistance, and Grants Program Directorate funding (FEMA, 2015a). The Federal Highway Administration (FHWA) may provide funding as part of the Emergency Relief program or Emergency Relief Federally Owned program. The Natural Resources Conservation Service (NRCS) and U.S. Department of Agriculture (USDA) may provide funding as part of the Emergency Watershed Protection (EWP) Program (FHWA, 2016; FHWA, 2015a; NRCS & USDA, 2015). The U.S.

Department of Housing and Urban Development may provide funding as part of the Community Development Block Grant Disaster Recovery program (U.S. Department of Housing and Urban Development, 2015). Other Federal agency grant programs may also be applicable. The U.S. Army Corps of Engineers (USACE) would be responsible for issuing appropriate Clean Water Act (CWA) Section 404 permits as required.

This Programmatic Environmental Assessment (PEA) has been prepared to analyze the potential environmental consequences associated with the proposed actions while providing a permanent (until the time that this PEA is superseded) framework for the evaluation of Federal and State laws and regulations. The proposed action and no action alternative are prepared in accordance with the National Environmental Policy Act of 1969 (NEPA; 42 U.S. Code [U.S.C.] 55 parts 4321 et seq., 2000), the Council on Environmental Quality (CEQ) implementing regulations (40 Code of Federal Regulations [CFR] 30 parts 1500 et seq., 2004), and FEMA Directive 108-1. This analysis is programmatic in nature, is not limited to a specific disaster event or Federal grant program, and does not address individual site-specific impacts, which would be evaluated individually prior to approval (FEMA, 2014b).

This PEA evaluates typical actions undertaken by Federal agencies, or any entity responsible for Federal level environmental compliance, to provide financial support or technical assistance to any watershed resiliency project covered by the scope of this document in Utah. This includes future major disaster events such as flooding, fires, avalanches, and tornados which result in similar impacts to watershed environments, as well as watershed resiliency funding interests. This PEA also provides the public and decision-makers with the information required to understand and evaluate the potential environmental consequences of these actions and to consider these impacts

in decision making. The PEA assesses environmental compliance for watershed hydraulic capacity and floodplain resiliency projects through:

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- Watershed restoration and mitigation including channel shaping or re-profiling, floodplain construction, overflow channel construction, riparian re-vegetation, in- stream habitat improvement, and erosion and sediment control including slope stabilization and sediment detention.
- Upland forest health including fuels mitigation, wildfire suppression, and upland plantings directly tied to watershed and floodplain resiliency.

NEPA and its implementing regulations direct Federal agencies to take into consideration the environmental consequences of proposed actions during the decision-making process. Federal agencies must comply with requirements identified in the NEPA process before making Federal funds available. Federal agencies have determined through experience that the majority of the typical recurring actions proposed for funding, and for which an Environmental Assessment (EA) is required under NEPA, can be grouped by type of action or location. These groups can be evaluated in a PEA for compliance with NEPA without the need to develop project-specific EAs. In accordance with the Unified Federal Review (UFR) process, other federal agencies may use this document to demonstrate NEPA compliance at their discretion and under their own authorities and implementing procedures. In this way, the purpose of this PEA is to streamline the Federal environmental review process while maintaining strict adherence to NEPA requirements.

1.2 BACKGROUND

In 1983, flooding in April through June affected 22 of 29 counties in Utah. Damage from widespread flood events included a landslide that dammed a river and flooded Thistle, a community in Utah County; peak stream flows that exceeded 100-year occurrence intervals; stream discharge records for several streams; and infrastructure failures. Damage from these flood events totaled $621 million. (UDPS, 2014)

In 1984, above average snowpack and heavy spring precipitation resulted in major flooding across 12 counties in Utah. The stream flows in 1984 were second only to the record 1983 flows. Due to mitigation measures implemented after the 1983 flood events, impacts from the 1984 floods were considerably less. The total damage from floods and landslides was estimated at $41 million. (UDPS, 2014)

Following the extensive and widespread flooding in 1983 and 1984, the State made large investments in mitigating future flood events. Floods in the spring of 2010 in the Salt Lake City area indicated that these investments reduced vulnerability to similar flood events. In early summer

of 2010, the heavy snowpack quickly melted due to high temperatures. Water and debris flows caused an estimated $916,900 in damages. The runoff and flooding caused damage to homes, roads, and bridges around Salt Lake City. (UDPS, 2014)

In September 2015, a flash flood event on the Utah-Arizona border was the deadliest single flash flood in Utah's history. The flash flood carried large volumes of debris that caused several fatalities, damaged a municipal water pipeline, and washed out several roads and bridges (NRCS, 2015). Since 1950 there have been 53 deaths caused by flood events with 26 of those occurring between July 2006 and September 2015 (National Weather Service Forecast Office, 2015).

The Utah Department of Public Safety (UDPS), FEMA, and county and local governments collaboratively developed the 2014 Utah Hazard Mitigation Plan. The Utah Hazard Mitigation Plan identifies the risk, vulnerability, severity, and probability of flood events occurring in Utah. Counties, such as Utah and Washington Counties, have high growth rates and are susceptible to flood events. While watershed projects attempt to minimize impacts from future flood events, population growth, development, and conversion of agricultural land to other uses continue to make flooding a hazard. (UDPS, 2014)

In response to the Utah Hazard Mitigation Plan and other initiatives, watershed organizations consisting of Federal, State, and local government representatives have coordinated development of watershed improvement and resiliency projects. Past projects to mitigate flood events include infrastructure improvements, reinforcing strategic locations with rip-rap, and identifying and protecting flood vulnerable areas and structures in those areas (UDPS, 2014). This PEA is intended to assist all future watershed resiliency projects of all types, including projects proposed by these watershed organizations, until superseded.

1.3 AREA OF STUDY

The project area of this PEA encompasses the State of Utah (Figure 1).

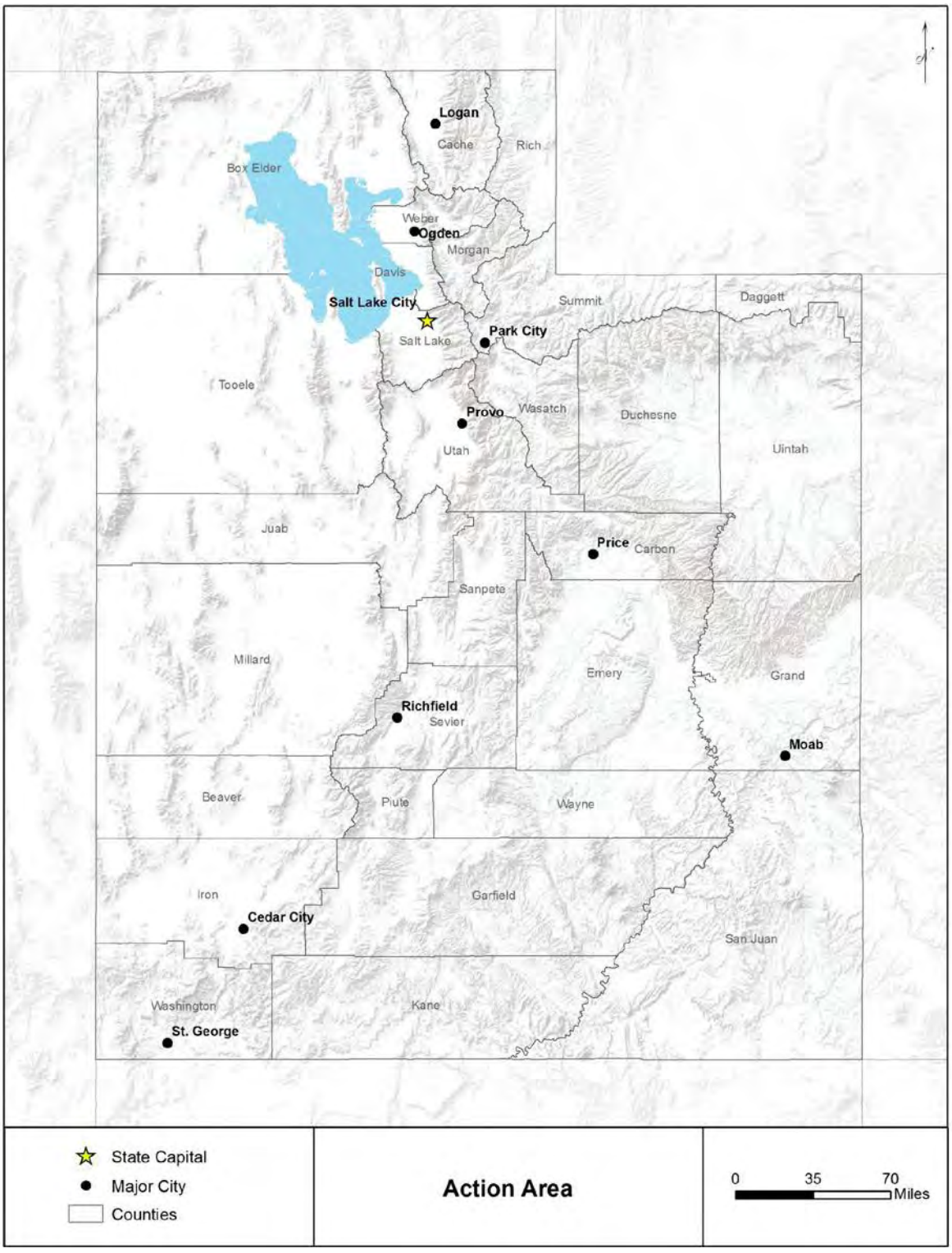


Figure 1: Action Area

1.4 PROCESS FOR USE OF PEA

A PEA is utilized to address a group of projects that are similar in scope, scale, magnitude, and the nature of impact that are recipients of Federal funding. This PEA is statewide in scope, covers numerous ecosystems and political boundaries, and focuses on a range of watershed recovery actions. The use of a PEA can reduce redundant analytical undertakings and identify cumulative impacts created by these actions. In contrast, an EA assesses impacts on a specific project site and the immediate surroundings.

For a project to qualify under this PEA, the scope of the project and the nature of impacts must be evaluated within this document by utilizing the Appendix A – Compliance Checklist. Additional analysis and project-specific mitigation may be required by this document as the context and intensity of proposed project impacts become apparent. All projects using this PEA must undergo standard Federal environmental compliance procedures to verify the project is consistent with scope of this PEA. Federal agencies will use this PEA to determine the level of environmental analysis and documentation required under NEPA for the watershed recovery projects being evaluated. If the description of the site-specific nature of the project and the levels of analysis are fully and accurately described in this PEA, Federal agencies would take no further action other than to document that conclusion using the Compliance Checklist found in Appendix A – Compliance Checklist.

It is expected that some watershed resiliency projects could be more complicated and involve larger-scale geomorphic and water quality restoration efforts than those contemplated for grouping in this PEA. If a specific action is expected to (1) create impacts not described in this PEA; (2) create impacts greater in magnitude, extent, or duration than those described in this PEA; or (3) require mitigation measures to keep impacts below significant levels that are not described in this PEA, then a Supplemental Environmental Assessment (SEA) would be prepared to address the specific action. The SEA would be tiered from this PEA in accordance with the CEQ NEPA implementing regulations (40 CFR 30 parts 1508.28, 2004). Actions that are determined during the preparation of the SEA to require a more detailed or broader environmental review would be subject to the stand-alone EA or other applicable process.

Watershed resiliency activities can be more complex than the typical recurring actions addressed by this PEA. While projects that are covered by this PEA are intended to increase watershed resiliency and health, they could also unintentionally have a detrimental effect on comprehensive watershed master plans and should be integrated into local comprehensive watershed master planning efforts to ensure consistency. Projects that are not part of a comprehensive watershed master plan may not be suitable for establishing a healthy and resilient watershed and may need an individual EA or and EIS.

Any official usage of this document, all supporting documentation, project-specific compliance checklists, and potential SEAs, must be submitted to FEMA Region VIII, Richard Myers, Richard.Myers2@fema.dhs.gov, for purposes of documenting cumulative watershed impacts.

SECTION 2 - PURPOSE AND NEED

The purpose of this PEA is to facilitate environmental review for watershed resiliency activities and track subsequent natural and cultural resources cumulative impacts in Utah.

The need is based on the existence of damages which impede traditional watershed functionality as a result of major disaster events.

SECTION 3 - ALTERNATIVES

3.1 INTRODUCTION

The following alternatives are being considered for further evaluation in this PEA. These alternatives represent classes of actions that may be implemented individually or in combination with one another. Depending upon the action determined necessary by a Federal agency to restore and improve watershed function and the individual characteristics of the specific site, some options may not be viable.

3.2 ALTERNATIVES CONSIDERED

3.2.1 Alternative 1: No Action

A No Action Alternative is required to be included in this PEA in accordance with CEQ NEPA implementing regulations. The No Action Alternative is defined as maintaining the status quo (baseline conditions) without Federal agency involvement. The No Action Alternative is used to evaluate the effects of not performing watershed resiliency activities and provides a benchmark against which other alternatives may be evaluated.

Existing watershed conditions enable chronic infliction of damages to infrastructure, properties, and watershed elements in future disaster events. Additionally, the existing watershed deposition features drainage corridors that run through steep narrow canyons which present threats to downhill communities. Conveyance of large debris can destroy emergency access to communities and cause destruction of private property. In this scenario, communities would become isolated and suffer delayed emergency response actions and medical services. The conveyance of large debris combined with infrastructure damage can also block or destroy safe egress for evacuations creating the potential for loss of life. This alternative may result in undesirable water quality, stream function, and riparian area impacts.

Under the No Action Alternative, there is a likelihood that recovery projects would still be completed by local citizens or private landowners and may be approached in an uncoordinated manner that does not appropriately consider environmental impacts. Individual projects may accomplish inconsistent hydraulic capacity creating upstream or downstream impacts. Collaborative land use decisions, often considered by completing comprehensive watershed plans, and which can be helpful for restoring watershed health, would not be completed. Unpredictable downstream flows could lead to chronic infrastructure and property damages and unpredictable disaster events. Infrastructure with insufficient hydraulic capacity could lead to structural failure and an increased risk of loss of life. A lack of watershed capacity coordination could have lasting effects on Utah agricultural resources.

For the purpose of this programmatic environmental analysis, under the No Action Alternative, the State of Utah and individual project proponents would have to rely on savings, insurance, loans, or other forms of financial assistance to restore watersheds.

3.2.2 Alternative 2: Watershed Resiliency Activities

Alternative 2 applies to the performance of comprehensive watershed resiliency actions through river restoration, bank stabilization, and hydraulic capacity resiliency measures to restore watershed function when funded by a Federal entity. Alternative 2 differs from the No Action Alternative in that it includes watershed restoration activities with natural and cultural resource consideration, bioengineering and multi-objective design considerations as outlined in Section 4 of this PEA. Watershed hazards would be mitigated without major relocation of watershed elements. In some locations, leaving watershed features in post-disaster locations may be the safest, most cost-effective option.

Changes to materials and dimensions are included in Alternative 2. This includes upgrades to meet existing codes and standards, as well as upgrades warranted to address conditions that have changed since the original construction. In the case of stream corridors that no longer serve as functional drainage, bank stabilization or grade control may be needed to restore stream corridor dimension, pattern, profile, function, and stability.

Alternative 2 would result in the redistribution of sediment, rock, woody debris, and other materials within watersheds to re-establish appropriate hydraulic capacity of stream corridors, river channels, and accompanying floodplains. Engineering plans, which define the appropriate geometry and elevations to re-establish desired hydraulic capacity, and a monitoring plan of action that oversees all contractor activity utilized to complete the scope of work, would be required. State and local agency standard Best Management Practices (BMP) to prevent erosion, sedimentation, contamination, and the spread of noxious weeds must be implemented. Standard BMPs are available from State and local agencies such as the Utah Division of Water Quality. Useful resource for BMPs can be found at http://www.utahcleanwater.org/best-management-practices.html.

Watershed resiliency activities covered under Alternative 2 generally involve the following:

- General construction activities within previously defined right of ways (ROW).
- Creation of access and staging areas, when needed, to move trucks and heavy equipment.
- Dewatering to allow operations in-stream.
- Use of heavy equipment within a floodplain, stream bank, or in-stream position.
- Establishment of temporary low-flow channels.
- Grading, shaping, and re-vegetation of watersheds by seeding or planting.
- Restoration of floodplain dimension, pattern and profile.
- Construction or repair of low flow channel alignment, channel meanders, step pool systems, riffle pool systems, flood plain benches, grade control structures, large woody debris structures, habitat complexity features, and wetland/riparian restoration.

Creating access may require removing riparian vegetation, excavating and bank filling, grading, and stabilization. The number of access routes would be minimized. Access routes and staging areas would be located in areas devoid of vegetation and within previously disturbed areas. Existing riparian vegetation would not be disturbed or buried. Dewatering diverts water within a stream, resulting in dry conditions needed to perform work. Some projects could require usage of heavy equipment either from the bank or in-stream. Fish exclusion netting may be required during work in water.

In establishing a low flow channel, heavy equipment could be used to excavate an impaired streambed to restore the stream's channel dimension. The low flow channel would maintain the base flow (normal stream flow during average periods of rainfall) of the stream, aid in transporting fine sediment, and reduce impacts to aquatic habitats by providing adequate depth and habitat features.

Grading and shaping of stream banks could be necessary during the finishing phase of a project to create slopes with a gradient suitable for sustaining vegetative growth. Re-establishing vegetation would be accomplished by hand or mechanical seeding or planting. Any disturbed areas would be restored using native riparian plant species and weed-free mulch and fertilizers.

Debris use or disposal involves a number of choices, and the advantages and disadvantages of each option would be affected by feasibility and cost. The method selected depends on the circumstances at the disposal site and an evaluation of how disposal could affect the environment. Debris could be used for a number of purposes either on- or off-site.

Construction and demolition debris or any debris containing hazardous materials would require special consideration. Disposal would follow all applicable State and local regulations regarding handling and disposal. Regulations can be found through the Utah Department of Environmental Quality (UDEQ), Division of Waste Management and Radiation Control.

Cobbles or boulders could be used to stabilize banks, restore stream bed materials, or create in-stream habitat features. Retention of cobbles on site could contribute to the debris load in future disaster events. Where practical, cobbles and debris would be stabilized within the floodplain or removed to promote channel stability. Cobble and gravel could be used to restore fish habitat and/or to dissipate energy. Root wads (tree trunks with root structure intact) and other large woody debris could also be used to stabilize stream banks, serve as grade control, or promote habitat complexity but would be anchored in a way to prevent release back into the waterway. See Sections 4.9 and 4.10 of this PEA for more information on the types of bank stabilization and fish passage required by this alternative.

Further technical documentation on seed and plant sources and Riparian and Bioengineering can be found through the NRCS Plant Materials Program (NRCS, 2016a).

3.3 ALTERNATIVES NOT CONSIDERED

Applicants for Federal grant funding may repair watershed elements to pre-disaster condition under programs like FEMA's Public Assistance program or make small mitigation upgrades under Hazard Mitigation Grant Programs. These types of projects may fall into a Statutory or Categorical

Exclusion under NEPA and would be evaluated accordingly (FEMA, 2016a). Considerations of these types of projects are not included in this PEA.

This PEA does not consider watershed resiliency projects beyond the scope described in Alternative 2. Examples of these types of projects include property acquisition, construction of new levees or dams, any increase in capacity of existing dams and levees, or any activities facilitating new development of watershed or floodplain areas.

SECTION 4 - AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

4.1 PHYSICAL RESOURCES

4.1.1 Affected Environment

4.1.1.1 Geology and Soils

Utah has widely varied geology. The Wasatch and Uinta Mountains dominate the northeastern portion of Utah. The Colorado Plateaus in eastern Utah are characterized by "a thick sequence of largely undeformed, nearly flat-lying sedimentary rocks" interspersed by dramatic rock formations attributable to erosion (Milligan, 2000). To the west is the arid basin and range area (USGS, 2015a). The U.S. Geological Survey (USGS) identifies 259 distinct geologic units in Utah (USGS, 2016a).

The vertical range in elevation is more than two miles, ranging from a low of 2,350 feet above sea level in Beaver Dam Wash in southern Utah to 13,528 feet at Kings Peak in northeastern Utah. There are 24 mountain peaks that exceed 13,000 feet; all are in the Uinta Mountains. (Fisher, 2016)

Physiographic regions are areas that share commonalities based on topography, geography, and geology. The two physiographic regions in Utah are the Intermontane Plateau and Rocky Mountain System. Regions are further sub-divided into physiographic provinces based on differences observed on a more local scale (Fenneman, 1916). Three primary physiographic provinces are found within Utah: the Middle Rocky Mountains, the Colorado Plateaus, and the Basin and Range. Additionally, small portions of the Wyoming Basin and the Columbia Plateau Provinces extend into Utah (McGinty, 2016).

The Middle Rocky Mountain Province extends from Wyoming, Idaho, and Colorado into Utah consisting of mountainous terrain with glacial influences. Portions of the Middle Rocky Mountains are located in north and northeastern Utah and include the Wasatch and Uinta Mountains. The Wasatch Mountains rise dramatically to the east of Salt Lake City, spanning as far north from the Idaho border to southern Utah County. The Wasatch Mountains have steep, sharp peaks and V-shaped canyons. The Uinta Mountains are a uniquely oriented mountain range which runs from west to east, located in northeast Utah. The Uinta Mountains differ from the Wasatch Mountains in that the Uinta Mountains are more rounded and have U-shaped valleys; however, both mountain ranges were glacially influenced during their development. (McGinty, 2016)

A portion of the Colorado Plateaus Province is located in southern and eastern Utah and includes landforms consisting of flay-lying sedimentary rocks. The combination of sedimentary rocks, geologic uplift, and erosion has created some of the most stunning and geologically spectacular landscapes in the southwestern States. The Colorado Plateaus region in Utah also contains large deposits of coal, natural gas, oil, and tar sands. (McGinty, 2016)

The Basin and Range Province is in western Utah and is characterized by north-south mountain ranges separated by broad basins. Within Utah, this region contains several basin areas which were formed by the ancient Lake Bonneville. The Bonneville Salt Flats in western Utah are the saline

remnants of the enormous prehistoric lake. Mountain ranges of varying stages of elevation and erosion occur running north to south between the basin areas. (McGinty, 2016) A generalized geological map of Utah is included in Figure 2.

The NRCS lists the Mivida soil as a soil representative of Utah and it is considered Utah's unofficial State soil and is widely found throughout southeastern Utah (NRCS, 2016b). The Mivida soil consists of fine sandy loam, has a yellowish-red topsoil and a pinkish-brown subsoil. The soil's parent material is sand from the lower Mesozoic (251.0 to 199.6 million years ago) sandstone prevalent in southern Utah (Case, 2005).

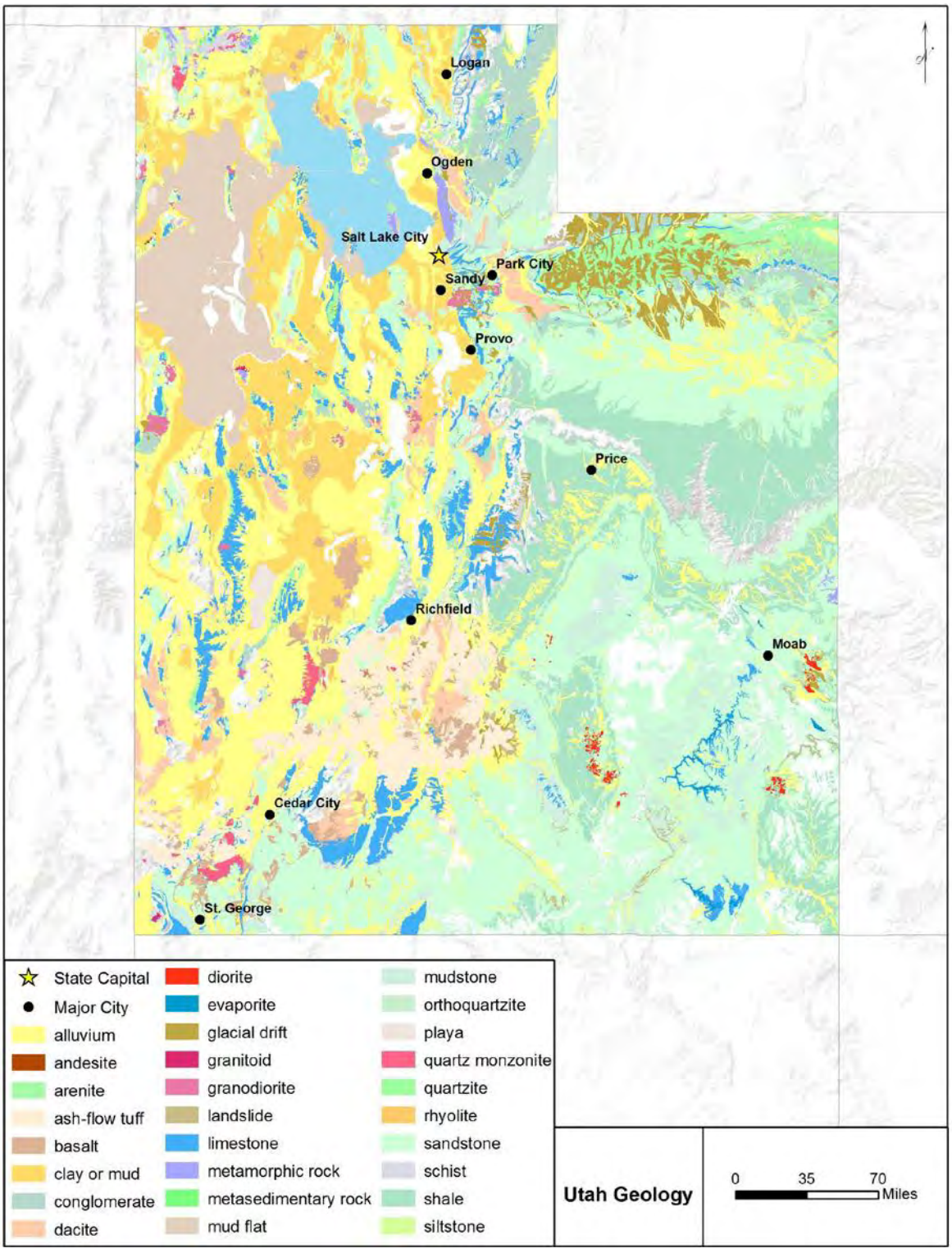
Western Utah is dominated by soils that are moderate to very alkaline and have a light color due to the limited organic matter. These soils can support drought resistant vegetation and can support irrigated agriculture. The center of Utah, trending from north to south, is dominated by thick, dark, and fertile soils. They are high in organic matter and are important agricultural soils. Eastern Utah contains soils associated with valley bottoms and stream floodplains. They vary in color from light to dark depending on the parent soil material. (Boettinger, 2016)

Utah County in north central Utah, contains the unique Peteetneet Soils Series or peat soil. The series consists of "deep, very poorly drained, moderately permeable soils that formed in organic materials" (NRCS, 2008). The Peteetneet soils are found in low lake terraces on nearly level to gently sloping depressions (NRCS, 2008).

Other notable soils in Utah include Mancos shale and biological soil crusts. Mancos shale soils can be a source of saline dissolved solids which are known to contribute salinity in the Green and Colorado Rivers and their tributaries (NRCS, 2016c). Biological, cryptogamic, or cryptobiotic soil crusts are slow-growing living soils composed of cyanobacteria, lichens, algae, microfungi, bacteria, and mosses. The living soil crust binds the soil surface, preventing erosion from wind and rain, and fixes nitrogen into the soil below. The soil crusts are a vital component to desert ecosystems in Utah. Biological soil crusts are vulnerable to damage from foot traffic, vehicles, and machinery. Once the soil crust is crushed or damaged, it can take up to 50 years or longer to fully recover (NPS, 2016a; Belnap & Gillette, 1997).

4.1.1.2 Land Use

Utah is the 12th largest State by land area with 82,170 square miles and a total area of 84,897 square miles (U.S. Census Bureau, 2010). The U.S. Federal government manages 54,899 square miles, the State manages 6,332 square miles, and there are 9,192 square miles of Tribal land (Figure 3) (USGS, 2012). In western and eastern Utah, State land is intermingled with Federal land resulting in a checkerboard pattern of land ownership.


Logan
Ogden
Salt Lake City
Park City
Sandy
Provo
Price
Richfield
Moab
Cedar City
St. George
State Capital
Major City
alluvium
andesite
arenite
ash-flow tuff
basalt
clay or mud
conglomerate
dacite
diorite
evaporite
glacial drift
granitoid
granodiorite
landslide
limestone
metamorphic rock
metasedimentary rock
mud flat
mudstone
orthoquartzite
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schist
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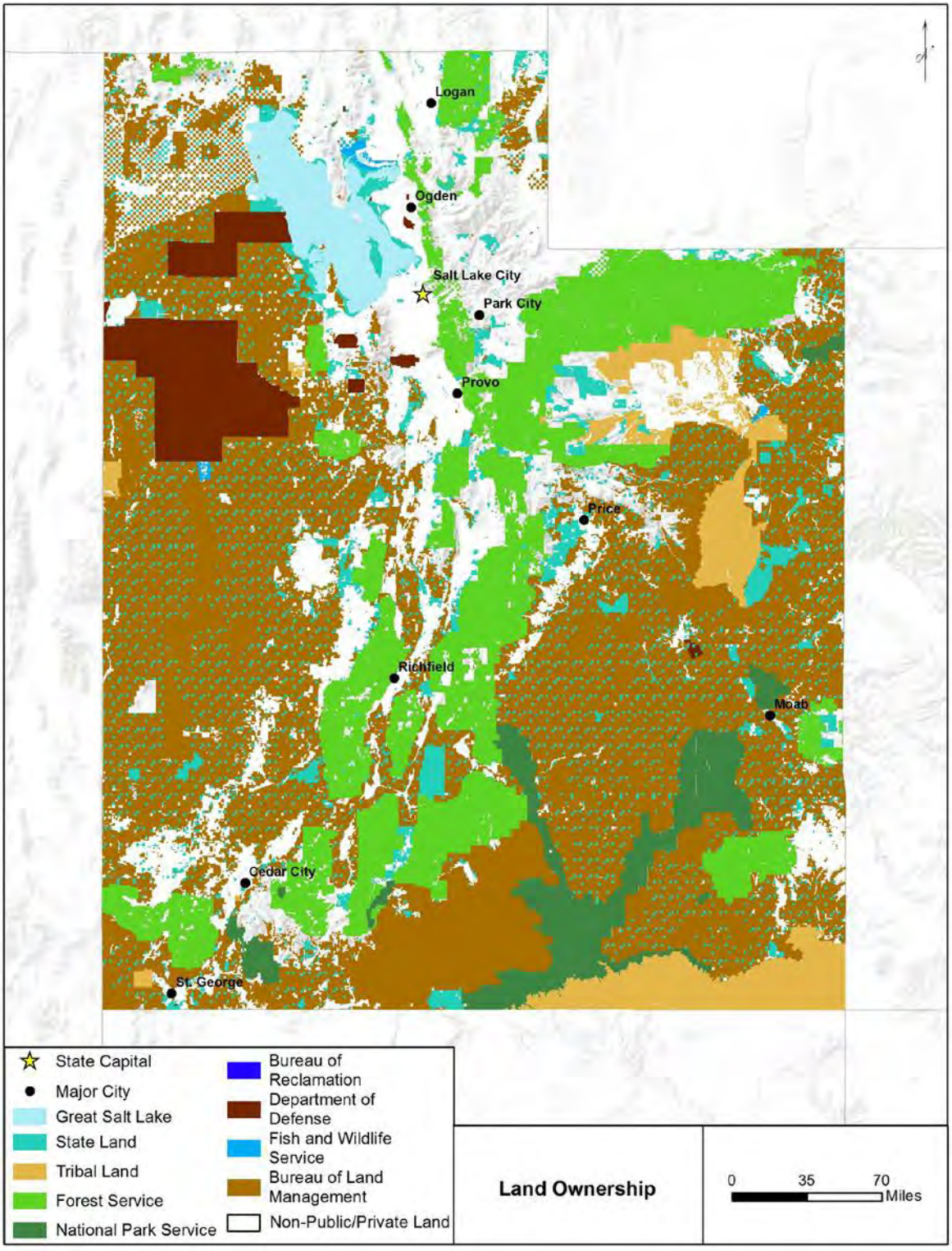


Major land cover groups (more than 4%) in Utah consist of semi-desert (36%), forest and woodland areas (30%), shrubland and grassland (13%), non-vascular and sparse vascular rock

vegetation (10%), and agricultural vegetation (4%) (Table 1 and Figure 4). The remaining percentage includes other land cover as shown in Figure 4. Analyzing land cover is a method of identifying and quantifying specific land uses, as the two are closely related. (USGS, 2016b)

Table 1: Land Cover of Utah[1]

Land Use	Square Miles[2]	Percent of Land
Semi-Desert	30,921	36%
Forest & Woodland (Including Aquatic Vegetation)	25,217	30%
Shrubland & Grassland	10,929	13%
Non Vascular & Sparse Vascular Rock Vegetation	8,124	10%
Agricultural Vegetation	3,379	4.0%
Open Water	2,602	3%
Introduced & Semi Natural Vegetation	1,884	2%
Developed & Other Human Use	1,262	1%
Recently Disturbed or Modified	355	<1%
Polar & High Montane Vegetation	224	<1%

[1] Source: (USGS, 2016b)

[2] Square miles are rounded to the nearest whole number. The maps and tables are prepared from the analysis of geographic information system data and imagery; a margin of error may result in the use of imagery. The accuracy of image interpretation depends on the quality of the imagery, the experience of the image analysts, the amount and quality of the collateral data, and the amount of ground truth verification work conducted. Other Federal or State data sources may have slightly different totals.

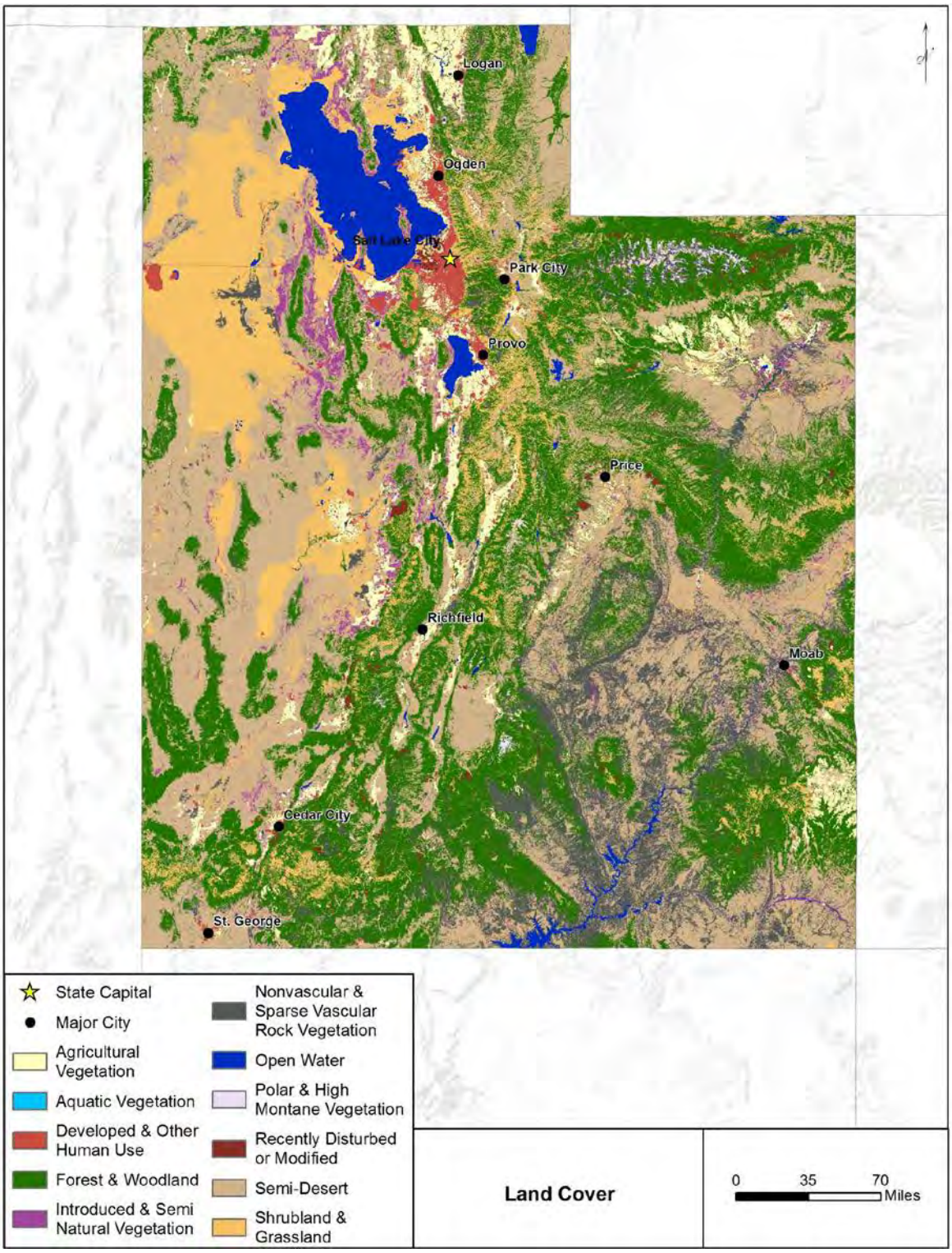


Figure 4: Land Cover

Semi-Desert, Shrub, and Grassland

Semi-desert, shrub, and grassland can be found throughout Utah, with most of these areas typically at the lower elevations and valleys. The largest, most contiguous concentrations of semi-desert are in the western part of Utah (Figure 4). Although these areas are not developed, semi-desert and shrub land sustains multiple uses such as, oil and gas production, recreation, mineral development, rangeland for livestock, scientific study, and preservation of natural resources. Taken together, semi-desert, shrub, and grassland areas account for nearly half (49.2%) of Utah's land area. (USGS, 2016b)

Forest and Woodland

Forest and woodland areas are typically found within the mountainous regions of Utah and along the foothills (Figure 4). Forest and woodlands account for nearly 30 percent (25,217 square miles) of the total land in Utah. These lands serve multiple uses, including the production of forest products, recreation, mineral development, preservation, and scientific study. (USGS, 2016b)

Agricultural Land

Four percent of Utah's total land area is classified as agricultural land (3,379 square miles). In 2012, there were 18,027 farms in Utah; most were owned and operated by small, family businesses, with the average farm size of less than 100 acres (USDA Census of Agriculture, 2012a). Prime farmland, as defined by the USDA, is the "land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops and is also available for these uses" (USDA, 2013). Utah had approximately 715,700 acres of prime farmland (1.4% of Utah's total land area) recorded in 2010. There has been a gradual loss overall of prime farmland in Utah. Approximately 64,600 acres of prime farmland were converted to other uses 1982 and 2010 (USDA, 2013).

4.1.1.3 Recreational Land Use

Utah's diverse terrain of mountains, cliffs, plateaus, canyons, and desert offer a variety of outdoor recreation opportunities. Utah has an abundance of highly visited natural areas most notably Zion National Park, Bryce Canyon National Park, Arches National Park, Canyonlands National Park, Capitol Reef National Park, and Glen Canyon National Recreation Area. Tourism is a major industry centered on national and State parks, world-class ski resorts, Moab's rock climbing and mountain biking routes, and American Indian and Mormon cultural and heritage sites. Major water features that provide a wide variety of recreational opportunities include the Great Salt, Utah, and Bear Lakes, the Green and Colorado Rivers, and many other reservoirs, mountain streams, and lakes. (Utah Office of Tourism, 2016) Additional information about water resources can be found in Section 4.9, Water Resources.

4.1.2 Environmental Consequences

This section describes potential impacts to physical resources associated with the alternatives, as discussed below. There is potential for physical resources impacts to occur when an activity:

- Significantly increases soil erosion or

- Eliminates or significantly restricts residential, commercial, agricultural, or recreational land use.

Qualitative analyses have been used to determine the intensity and magnitude of the environmental impact. The relative degree of severity of environmental impacts are defined as:

- No Impact: No environmental impacts are readily apparent or identified.
- Less than Significant: Indicates that a change to resources would be measurable although the changes would be small and localized. BMPs, identified in Section 5, may be used to decrease the potential for impacts that are less than significant.
- Significant: Changes to resources would be measurable and would have substantial consequences on a local or regional level.

Table 2 presents the impact summary for physical resources.

Table 2: Impact Significance Criteria for Physical Resources

Impact Criteria	Alternative 1 No Action	Alternative 2 Preferred Action
Soil erosion	Less than Significant	Less than Significant
Restricts residential, commercial, agricultural, or recreational land use	Less than Significant	Less than Significant

4.1.2.1 Alternative 1: No Action

Under the No Action Alternative, no Federal action would be completed by FEMA. The No Action Alternative would not directly change geology and soils. However, not implementing the Federal action could result in less than significant impacts, including safety threats, permanent displacement of residents, altering drainage and flow rates, and changes in land use if future flood events were to occur. Disaster events could affect soils by removing existing vegetation and increasing the potential for erosion. Less than significant loss in residential, commercial, agricultural, or recreational land use may occur.

4.1.2.2 Alternative 2: Watershed Resiliency Activities

Under Alternative 2, watershed resiliency activities would be implemented to restore watershed function and would have a beneficial effect on geology and soil resources. Prior to project implementation, a hydrologic and hydraulic study would be conducted to model the effect of the watershed resiliency activities on future watershed function and characteristics. Implementation of watershed resiliency activities would modify the physical environment and watershed through construction; grading, shaping, and re-vegetation; and bank stabilization. However, these activities would be designed to improve watershed function and restore hydraulic capacity of stream corridors, river channels, and floodplains. Improving watershed function would stabilize soils and reduce the potential for soil erosion during future events and would have a less than significant, beneficial effect on soil resources.

Alternative 2 would have a less than significant, beneficial effect on land use. Land use, including agricultural and recreational use, could be maintained and protected by improving watershed function. Improving the hydraulic capacity of watershed features would reduce the potential threats to land uses from disaster events. In addition, watershed resiliency actions would be expected to remain within the ROW and would not encroach on or affect existing land uses.

4.2 TRANSPORTATION FACILITIES

4.2.1 Affected Environment

This section describes the traffic and transportation infrastructure in Utah, including specific information related to the road networks, airport facilities, and rail networks. Utah has 46,254 miles of public roads (FHWA, 2014) (including 3,148 miles of Federal public roads) (FHWA, 2015a); 3,014 bridges (FHWA, 2015b); 1,343 miles of freight rail network, 368 miles of which are shared with passenger railroad operations (UDOT, 2015a); and 152 aviation facilities, including airstrips and heliports (FAA, 2016). Mobility in regional areas is critical for social, recreational, and economic activities.

4.2.1.1 Road Networks

As identified in Figure 5, the major urban center is Salt Lake City-Provo-Orem in the northwest. Utah has five major interstates, listed below in Table 3, connecting its major metropolitan areas to one another, as well as to other States. Travel outside the major metropolitan areas is conducted on interstates, State, and county roads. In addition to major highways, Utah has numerous scenic trails and byways (Figure 5) which are discussed in Section 4.7, Visual Resources. Table 3 lists the interstates and their start/end points in Utah.

Table 3: Utah Interstates[3]

Interstate	Southern or Western Terminus in UT	Northern or Eastern Terminus in UT
I-15	AZ line at St. George	ID line near Portage
I-70	I-15 near Cove Fort	CO line at Cisco
I-80	NV line at Wendover	WY line at Evanston
I-84	I-80 at Echo	ID line near Snowville
I-215	I-80 near Woodridge Terrace	I-15 near North Salt Lake

4.2.1.2 Airports

Air service to the State is primarily provided by Salt Lake City International Airport (SLC), a major international airport. SLC is operated by the Salt Lake City Department of Airports and is five miles to the northwest of downtown Salt Lake City (SLC, 2015a). SLC is the 27th busiest airport in North America and 80th in the world for the number of passengers served (SLC, 2015b).

[3] Source: (FHWA, 2015c)

In 2015, the airport served 22,152,498 passengers, facilitated 311,859 aircraft operations, and offered about 315 daily departures (Salt Lake City International Airport, 2016; SLC, 2015b).

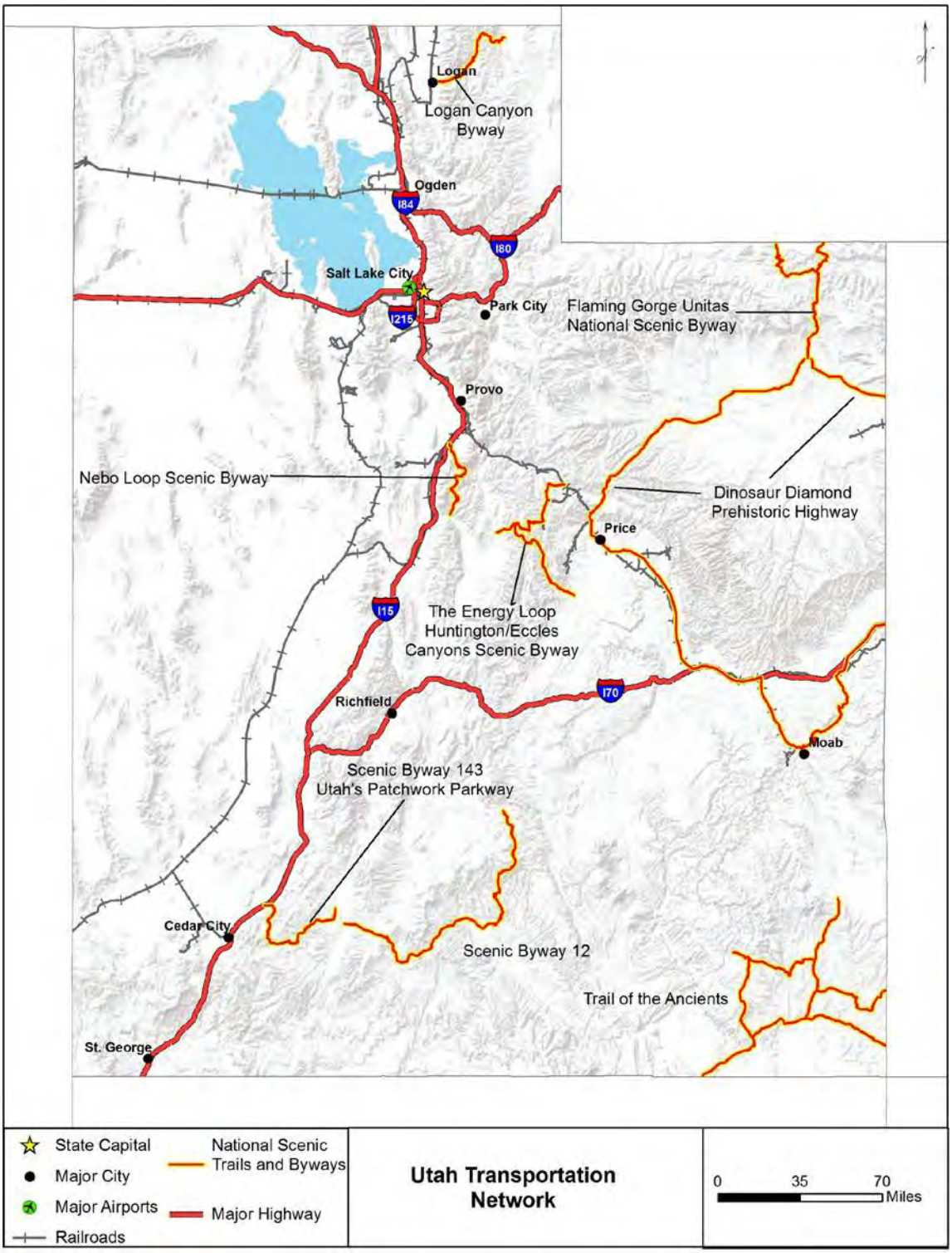


Figure 5: Utah Transportation Network

4.2.1.3 Rail Networks

Utah is connected to a network of passenger rail (Amtrak), public transportation (commuter rail), and freight rail. Amtrak runs one line through Utah, the California Zephyr. The California Zephyr runs daily between Chicago, IL and San Francisco, CA and, cuts across central Utah, and includes stops in Price, Provo, and Salt Lake City. In 2013, Amtrak served 55,283 passengers in Utah (UDOT, 2015a). The Utah Transit Authority (UTA) serves the Salt Lake City metropolitan area with FrontRunner commuter rail, "TRAX" light rail, and streetcar services. The UTA operates on 88 miles of track and served 3,437,925 passengers in 2013 (rail and bus services) (UDOT, 2015a). As of 2015, eight freight railroads were transporting cargo in Utah; the largest carrier being the Union Pacific Railroad (UDOT, 2015b). In 2011, 59.7 million tons of freight traveled by freight rail in Utah (UDOT, 2015a).

4.2.2 Environmental Consequences

This section describes potential impacts to transportation associated with the alternatives, as discussed below. There is potential for transportation impacts to occur when an activity:

- Creates substantial traffic congestion (volume of traffic and capacity of affected infrastructure), delay, or increase in incidents (e.g., accidents).

Qualitative analyses have been used to determine the intensity and magnitude of the environmental impact. The relative degree of severity of environmental impacts are defined as:

- **No Impact:** No environmental impacts are readily apparent or identified.
- **Less than Significant:** Indicates that a change to resources would be measurable although the changes would be small and localized.
- **Significant:** Changes to resources would be measurable and would have substantial consequences on a local or regional level.

Table 4 presents the impact summary for transportation resources.

Table 4: Impact Significance Rating Criteria for Transportation Resources

Impact Criteria	Alternative 1 No Action	Alternative 2 Preferred Action
Traffic congestion (volume of traffic and capacity of affected infrastructure), delay, or incidents	Significant	Less than Significant

4.2.2.1 Alternative 1: No Action

The No Action Alternative does not include any Federal action. Immediate threats would persist unless actions to restore watershed function would be provided by the State and/or local municipalities. This alternative may result in significant impacts due to increased travel times and traffic volumes as potential damages to transportation facilities would remain. Examples include

damage to roadways, bridges, and rail lines from flood events. Any impediment to movement of freight could hinder economic performance and growth.

4.2.2.2 Alternative 2: Watershed Resiliency Activities

Watershed resiliency activities would expect to have less than significant, short-term impacts during construction as traffic delays and alternate routes may be required. Less than significant impacts are expected to the transportation volume, capacity, and time of transit. The transportation facilities would be more resilient and less likely to experience substantial damage from future severe weather events.

4.3 SAFETY AND OCCUPATIONAL HEALTH

4.3.1 Affected Environment

Flooding poses safety risks, hazards, and threats to residents, homes, businesses, and other structures. In Utah, flood events are typically the result of rapid snow melt in late spring and early summer and intense thunderstorms. In 2012, severe flooding in southern Utah resulted in $3.9 million of damage to public infrastructure (UDPS, 2014). In September 2015, a flash-flood in southern Utah caused 20 fatalities and damaged infrastructure (NRCS, 2015; National Weather Service Forecast Office, 2015). Including these fatalities, since July 2006, there have been 26 deaths in Utah caused by flood events (National Weather Service Forecast Office, 2015).

The flood risk in Utah varies across the State. Based on the flood vulnerability analysis from the Utah 2014 State Hazard Mitigation Plan, the areas most vulnerable to flooding include Utah's population centers and areas of population growth. These areas include Ogden, Salt Lake City, Provo in northern Utah, and St. George in the southwestern portion of Utah. Flooding can result in the loss of life, property damage, damage and disruption of infrastructure, communication systems, transportation systems, and utilities; loss of agricultural productivity, and contamination of drinking water supplies. (UDPS, 2014)

Safety and occupational health issues include exposure to natural hazards; one-time and long-term exposure to asbestos, lead, radiation, chemicals, and other hazardous materials; and injuries or deaths resulting from a one-time accident. Safety and occupational health concerns could impact personnel working on the project and in the surrounding area, as well as travelers near the project sites. Buildings, infrastructure, or other materials are damaged or isolated in the streambed creating public safety issues. Structures constructed prior to 1978 have the potential to contain lead-based paint or asbestos. (USEPA, 2016a)

Lead exposure can result from paint chips or dust, or inhalation of lead vapors from torch-cutting operations. Lead exposure can adversely affect the human nervous system. Exposure to lead based paint is especially dangerous to small children (USEPA, 2016b). Occupational Safety and Health Administration (OSHA) considers all painted surfaces in which lead is detectable to have a potential for occupational health exposure (OSHA, 2016a).

Asbestos exposure can result from the inhalation of dust from a plethora construction materials or household products. In 1988, the U.S. Environmental Protection Agency (USEPA) issued regulations requiring certain companies to report the asbestos used in their products. However, to

this day these products can easily be found anywhere in the United States. Asbestos fibers cannot be seen with the naked eye, and when inhaled can cause asbestosis that often progresses to disability and death. (OSHA, 2016b)

Another health and safety hazard in Utah is surface and subterranean mines. Health and safety hazards at active mines and abandoned mines include falling into open shafts, cave-ins from unstable rock and decayed support, deadly gases and lack of oxygen inside the mine, unused explosives and toxic chemicals, horizontal and vertical openings, high walls, and open pits (BLM, 2015a). In Utah, the Department of Natural Resources' Division of Oil, Gas, and Mining administers the Abandoned Mine Reclamation Program, and is responsible for "proper mine operation and reclamation of affected lands" to protect public safety (Utah Department of Natural Resources, Division of Oil, Gas, and Mining, 2014). There are approximately 17,000 mine openings scattered across Utah (Utah Abandoned Mine Reclamation Program, 2016). Abandoned mines pose a risk to human health, safety, and the environment. Acid drainage and alkaline runoff from abandoned mines can lead to high concentrations of contaminants and heavy metals in waterways which pose threats to human health, water quality, wildlife and fish species, and their habitats (Utah Department of Environmental Quality; Division of Water Quality, 2012).

4.3.2 Environmental Consequences

This section describes potential impacts to safety and occupational health associated with the alternatives, as discussed below. There is potential for impacts to safety and occupational health to occur when an activity:

- Substantially increases exposure to safety and occupational health hazards as a result of natural and man-made disasters or
- Substantially increases the response time for emergency services.
- Qualitative analyses have been used to determine the intensity and magnitude of the environmental impact. The relative degree of severity of environmental impacts are defined as:
- No Impact: No environmental impacts are readily apparent or identified.
- Less than Significant: Indicates that a change to resources would be measurable although the changes would be small and localized.
- Significant: Changes to resources would be measurable and would have substantial consequences on a local or regional level.

Table 5 presents the impact summary for safety and occupational health.

Table 5: Impact Significance Rating Criteria for Safety and Occupational Health

Impact Criteria	Alternative 1 No Action	Alternative 2 Preferred Action
Exposure to safety and occupational hazards	Less than Significant	Less than Significant
Response time for emergency services	Less than Significant	Less than Significant

4.3.2.1 Alternative 1: No Action

The No Action Alternative does not include any Federal action. Residents, communities, and properties would be left susceptible to future damages from flood events. Materials could be washed downstream impacting other structures. These materials may have the potential to cause less than significant exposure to lead and asbestos which could pose a risk to human health and safety. A disaster event could result in a less than significant increase the response time for emergency, police and fire services. The No Action Alternative could result in a less than significant risk to the safety of residents of Utah.

4.3.2.2 Alternative 2: Watershed Resiliency Activities

Alternative 2 would have less than significant impacts to public safety or occupational health. Communities would be expected to benefit from watershed resiliency activities as watershed and floodplain areas would function properly. This would pose less of a risk to the safety of neighboring and downstream communities from flooding. This could also reduce the potential for increased response time for emergency, police, and fire services. Removal or redistribution of materials with painted surfaces or asbestos could be required and construction workers would be required to follow OSHA regulations to provide appropriate asbestos abatement and implement measures to avoid the release of lead from paint. Where abandoned mines are present, measures could be taken to avoid disturbance of sites, mine materials, tailings, and waste rock. Construction workers and equipment operators would be required to wear appropriate personal protective equipment (PPE) and would be properly trained to perform the work. Any solid or hazardous wastes generated during restoration or replacement would be removed and disposed of at a permitted facility or designated collection point (e.g., solid waste landfill or an approved hazardous waste disposal facility). During implementation of watershed resiliency activities, standard construction traffic control measures would be used to protect workers, residents, and the travelling public.

4.4 SOCIOECONOMICS AND ENVIRONMENTAL JUSTICE

4.4.1 Affected Environment

According to the U.S. Census (Census), the population of Utah in 2000 was 2,233,169; in 2010, the population increased to 2,763,885 and continued to increase in 2014 to an estimated population of 2,942,902 (U.S. Census Bureau, 2015a; U.S. Census Bureau, 2015b). As of the 2010 Census, the five largest cities in Utah are Salt Lake City/West Valley City with 1,021,243; Ogden/Layton with 546,026; Provo/Orem with 482,819; St. George with 98,370; and Logan with 94,983 (Figure 5) (U.S. Census Bureau, 2012; U.S. Census Bureau, 2015c; U.S. Census Bureau, 2015d). These areas are some of the fastest growing areas in Utah and are also the most vulnerable to flooding (UDPS, 2014).

The 2014 Census data estimated the majority of population of Utah (97.3%) as being of one race. Of those identified as being of one race, 87.3 percent were estimated as being White and 1.1 percent as American Indian or Alaska Native. The 2014 Census data estimated 1.1 percent of the population as Black or African American, 2.2 percent as Asian, 0.9 percent as Native Hawaiian and Other Pacific Islander and 4.7 percent as some other race. (U.S. Census Bureau, 2015e)

According to the Bureau of Indian Affairs and the National Conference of State Legislators, there are seven federally recognized Tribes in Utah (National Conference of State Legislators, 2015). Table 6 lists the Tribes and estimated populations from 2014.

Table 6: Population of Federally Recognized Tribes in Utah (2014)[4]

Federally Recognized Tribe	Population
Confederated Tribes of the Goshute Reservation	120
Navajo Nation	175,462
Northwestern Band of Shoshone Nation of Utah	Data not available
Paiute Indian Tribe of Utah (Cedar Band, Kanosh Band, Koosharem Band, Indian Peaks Band, and Shivwits Band)	281
Skull Valley Band of Goshute Indians of Utah	35
Ute Indian Tribe of the Uintah and Ouray Reservation	25,201
Ute Mountain Ute Tribe	1,579

The location of federally recognized Tribes are shown in Figure 6. The other Tribes depicted on Figure 6 are general locations of Tribes that were known to exist in this region of the United States, but are not officially federally recognized.

In 2013, poverty levels in Utah were 12.7 percent for all people and 14.8 percent for children under age 18 (U.S. Census Bureau, 2015f).

Utah's early industry was based on mining and farming (Rood, R.; Thatcher, L., 2015a; Rood, R.; Thatcher, L., 2015b). During World War I, Utah helped with the war effort by providing coal, copper, and agricultural products which helped grow the State's economy. During the Great Depression, Utah faced extensive unemployment in both the mining and agriculture industries. The New Deal work programs and World War II helped to diversify the State's economy through growth of agricultural industries, military installations, a steel plant, and other war-related industries (Rood, R.; Thatcher, L., 2015c; Powell, 2016). Currently, Utah's largest agricultural uses include cattle, dairy, hay, hogs, chicken eggs, and wheat (USDA Census of Agriculture, 2012b).

By industry, Utah has a mixed economic base. In 2013, Utah had a similar percentage of workers in the agriculture, construction, wholesale trade, finance and insurance, and transportation industries compared to neighboring States and the nation. In comparison to neighboring States, Utah had a notably lower percentage of persons working in the "educational services, and health care and social assistance" industry, and a higher percentage working in the "professional, scientific, management, administrative, and waste management services" industry. According to the Bureau of Labor Statistics (BLS), in 2015, the five largest industries by employment in Utah were educational services, health care, and social assistance (21.9%), retail trade (12.1%),

[4] Source: (U.S. Census Bureau, 2016)

professional and business services (11.8%), manufacturing (11.0%), and arts, entertainment, recreation, accommodation, and food services (9.0%). (U.S. Census Bureau, 2015g)

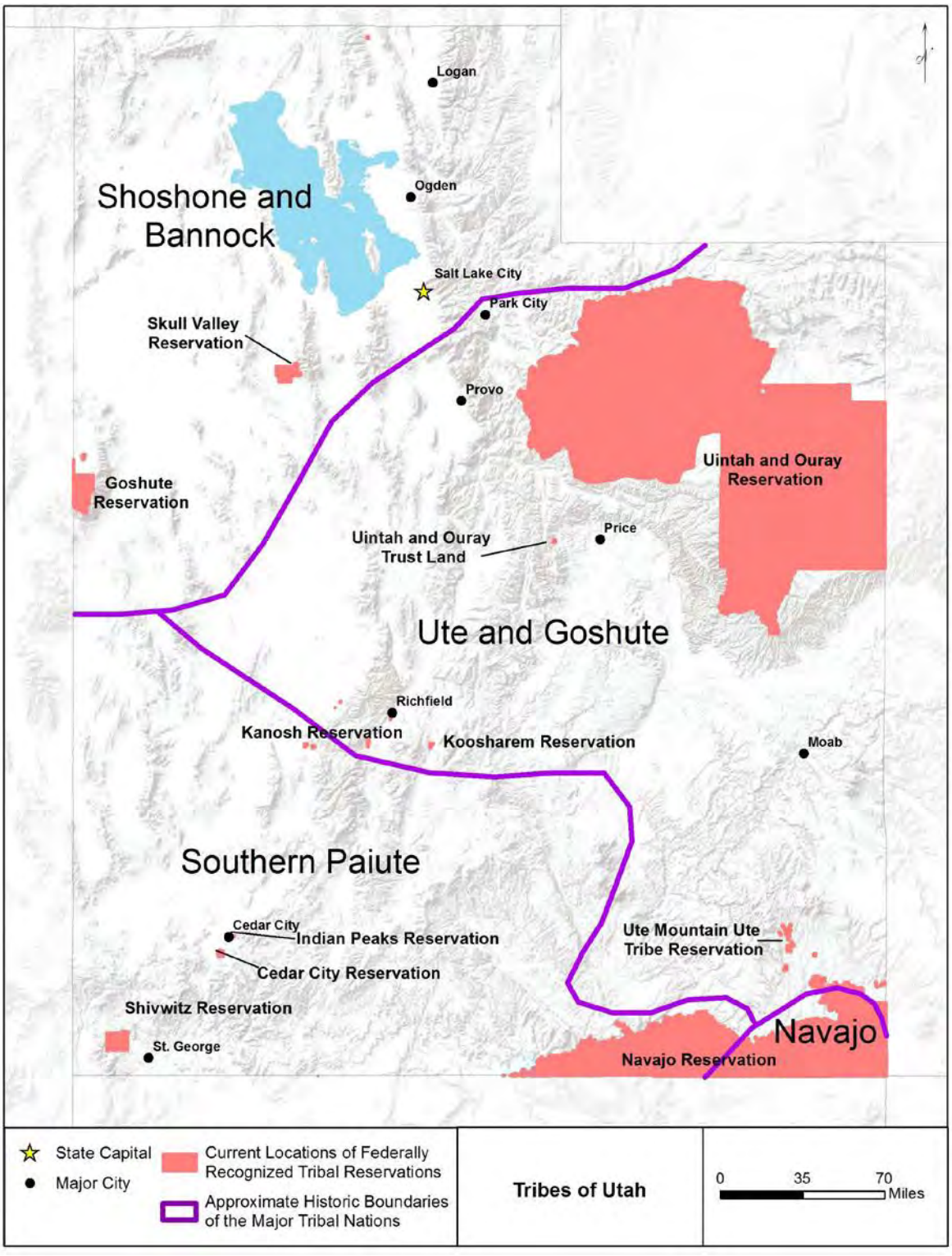


Figure 6: Federally Recognized Tribes in Utah

4.4.2 Environmental Consequences

This section describes potential impacts to socioeconomics and environmental justice associated with the alternatives, as discussed below. There is potential for impacts to socioeconomics and environmental justice to occur when an activity:

- Results in a substantial shift in the real estate market;
- Results in substantial economic changes in spending or income observed through a county or State; or
- Has a disproportionately high and adverse impact on low-income populations and minority populations.
- Qualitative analyses have been used to determine the intensity and magnitude of the environmental impact. The relative degree of severity of environmental impacts are defined as:
- No Impact: No environmental impacts are readily apparent or identified.
- Less than Significant: Indicates that a change to resources would be measurable although the changes would be small and localized.
- Significant: Changes to resources would be measurable and would have substantial consequences on a local or regional level.

Table 7 presents the impact summary for socioeconomics and environmental justice.

Table 7: Impact Significance Rating Criteria for Socioeconomics and Environmental Justice

Impact Criteria	Alternative 1 No Action	Alternative 2 Preferred Action
Shift in real estate market	Less than Significant	Less than Significant
Change in spending or income	Less than Significant	Less than Significant
Disproportionately high and adverse impact on low-income populations and minority populations	Less than Significant	Less than Significant

4.4.2.1 Alternative 1: No Action

The No Action Alternative does not include any Federal action and present day conditions would remain. There is no requirement for compliance with Executive Order (EO) 12898, Environmental Justice, since there is no Federal action. The No Action Alternative has potential to shift the socioeconomics of a community if watershed elements are left in disrepair leaving infrastructure and private property vulnerable to major disaster events. Residents may be isolated from their homes and businesses by damages to roadways and infrastructure. These impacts could result in less than significant impacts to the real estate market and changes in spending and income. The No Action Alternative may cause extensive damage to property and compromise infrastructure.

For example, severe flooding in Washington County in southern Utah in 2012 resulted in $3.9 million of damage to public infrastructure (UDPS, 2014).

Under the No Action Alternative, residents would continue to be at risk of impacts from flood events. The No Action Alternative would not have a disproportionately high and adverse human health or environmental effect on minority or low income populations and would have a less than significant impact on these populations.

4.4.2.2 Alternative 2: Watershed Resiliency Activities

During the construction period, this alternative may provide some short-term benefits by providing construction jobs and a multiple effect of increased expenditures in the local economy. This shift in the job market could result in a less than significant shift in the real estate market and changes in spending and income. There could be effects to populations trying to access watershed features during construction periods due to road detours. Efforts would be made during construction to minimize short-term disruption to the local transportation system in order to avoid delays to resident populations.

Low income and minority populations could benefit during the construction process through the provision of construction jobs and multiplier effects of expenditures in the local economy. This would result in less than significant impacts to low income or minority populations.

4.5 AIR QUALITY

4.5.1 Affected Environment

Air quality in a geographic area is determined by the type and amount of pollutants emitted into the atmosphere, the size and topography of the area, and the prevailing weather and climate conditions. The levels of pollutants and pollutant concentrations in the atmosphere are typically expressed in units of parts per million (ppm) or micrograms per cubic meter ($\mu g/m^3$) determined over various periods of time (averaging time). This section discusses the existing air quality in Utah. The USEPA designates areas within the United States as attainment[5], nonattainment[6], maintenance[7], or unclassifiable[8] depending on the concentration of air pollution relative to ambient air quality standards (USEPA, 2016c).

The Clean Air Act requires that States adopt ambient air quality standards. The standards have been established in order to protect the public from potentially harmful amounts of pollutants. The USEPA has established National Ambient Air Quality Standards (NAAQS) for six air pollutants (USEPA, 2016d). These pollutants include sulfur dioxide (SO_2), particulate matter (PM) with a

[5] Attainment areas: Any area that meets the national primary or secondary ambient air quality standard for the pollutant (USEPA, 2016c).
[6] Nonattainment areas: Any area that does not meet (or that contributes to ambient air quality in a nearby area that does not meet) the national primary or secondary ambient air quality standard for the pollutant (USEPA, 2016c).
[7] Maintenance areas: An area that was previously nonattainment, but has met the national primary or secondary ambient air quality standards for the pollutant, and has been designated as attainment (USEPA, 2016c).
[8] Unclassifiable areas: Any area that cannot be classified on the basis of available information as meeting the national primary or secondary air quality standard for a pollutant (USEPA, 2016c).

diameter less than or equal to ten micrometers (PM_{10}) and less than or equal to 2.5 micrometers ($PM_{2.5}$), carbon monoxide (CO), nitrogen dioxide (NO_2), ozone (O_3), and lead (Pb). The USEPA has designated specific areas as NAAQS attainment or nonattainment areas. Nonattainment areas are any areas that do not meet (or that contribute to ambient air quality in a nearby area that does not meet) the quality standard for a pollutant (USEPA, 2016e).

The majority of Utah is currently in attainment or maintenance for air quality with the exception of the Salt Lake City-Provo-Ogden area which is listed as being in nonattainment for pollutants under the NAAQS (Figure 7). Throughout 2014, O3 measurements exceeded the Federal standard of 0.075 ppm four times at Spanish Fork (Utah County), and one time at Brigham City (Box Elder County), Hawthorne (Salt Lake City County), and Harrisville (Weber County). That same year, $PM_{2.5}$ measurements exceeded the Federal standard of 35 $\mu g/m^3$ over 50 times, including 13 times each at Hawthorne (Salt Lake County) and Rose Park (Salt Lake County), and 11 times at Logan #4 (Cache County). (UDEQ, 2015a)

4.5.1.1 Air Quality Control Regions

The USEPA classified all land in the United States as a Class I, Class II, or Class III Federal Air Quality Control Region (AQCR) (42 U.S.C. 7470). Class I areas include international parks, national wilderness areas which exceed 5,000 acres in size, national memorial parks which exceed 5,000 acres in size, and national parks which exceed 6,000 acres in size. Class I areas cannot be re-designated as Class II or Class III and are intended to maintain pristine air quality. Although the USEPA developed the standards for a Class III AQCR, to date, no areas have been classified as Class III AQCR. Therefore, any area that is not classified as a Class I area is, by default, automatically designated as a Class II AQCR (42 U.S.C. 7472). (USEPA, 2013). Utah Air Quality Rules R307-405-4 designates five Federal Class I areas in Utah: Arches National Park, Bryce Canyon National Park, Canyonlands National Park, Capitol Reef National Park, and Zion National Park (Table 8) (Figure 7). There are two Class I areas located in neighboring states, however the 100 km radius around the areas extends into Utah. The remaining land within Utah is classified as Class II (UDEQ, 2016a).

Table 8: Relevant Federal Class I Areas[9]

#[10]	Area	Acreage	State
1	Zion National Park	142,462	UT
2	Capitol Reef National Park	221,896	UT
3	Canyonlands National Park	377,570	UT
4	Bryce Canyon National Park	35,832	UT
5	Arches National Park	65,098	UT
6	Grand Canyon National Park	1,176,913	AZ
7	Mesa Verde National Park	51,488	CO

[9] Source: (USEPA, 2016f)
[10] The numbers correspond to the shaded areas in Figure 7.

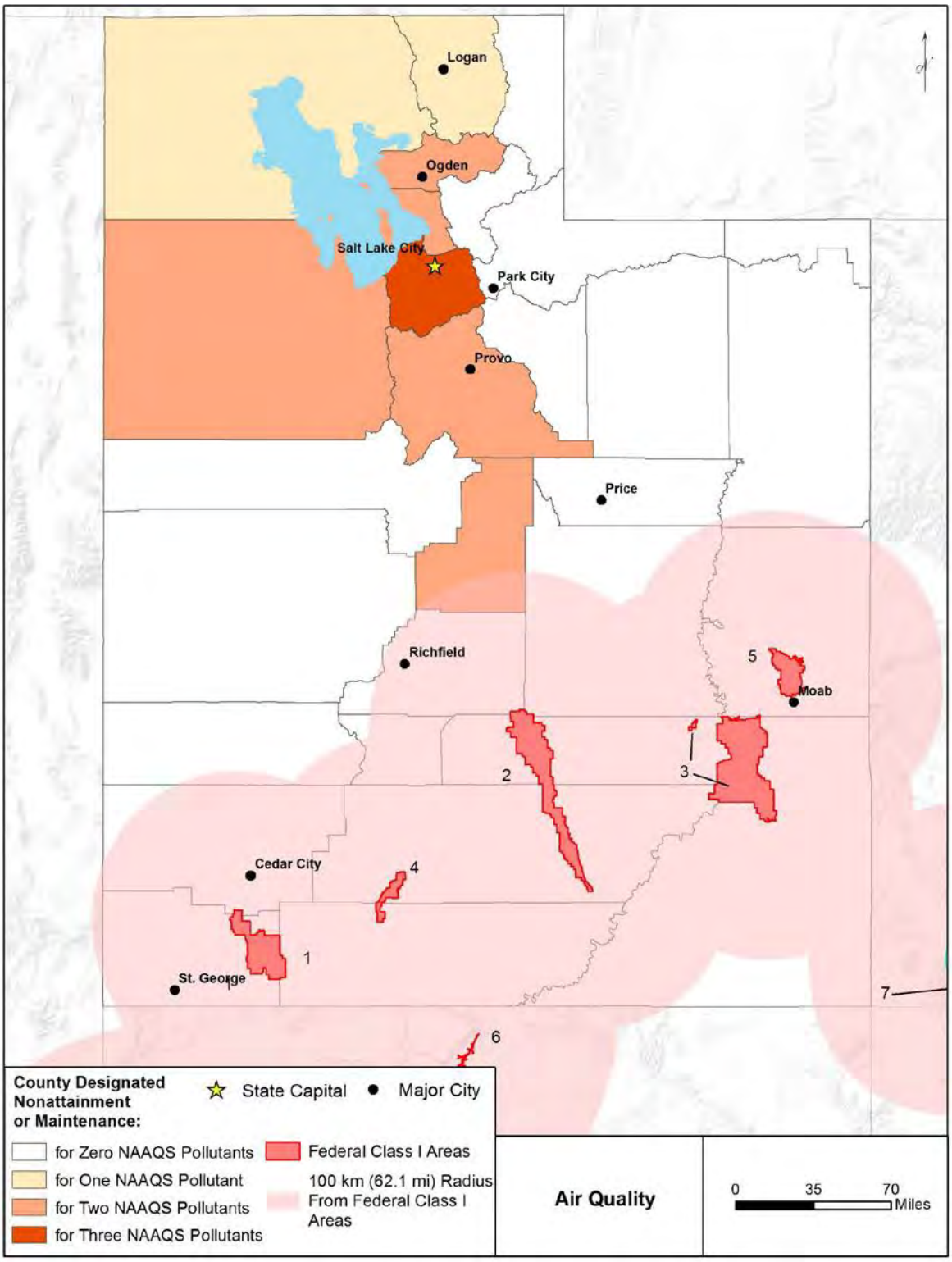


Figure 7: Nonattainment and Maintenance Counties and Federal Class I Areas in Utah[11]

[11] Numbered areas correspond to data in Table 8.

4.5.2 Environmental Consequences

This section describes potential impacts to air quality associated with the alternatives, as discussed below. There is potential for impacts to air quality to occur when an activity:

- Significant increase in air emissions resulting in an exceedance of one or more NAAQS in nonattainment and/or maintenance areas.

Qualitative analyses have been used to determine the intensity and magnitude of the environmental impact. The relative degree of severity of environmental impacts are defined as:

- **No Impact:** No environmental impacts are readily apparent or identified.
- **Less than Significant:** Indicates that a change to resources would be measurable although the changes would be small and localized. BMPs, identified in Section 5, may be used to decrease the potential for impacts that are less than significant.
- **Significant:** Changes to resources would be measurable and would have substantial consequences on a local or regional level.

Table 9 presents the impact summary for air quality.

Table 9: Impact Significance Rating Criteria for Air Quality

Impact Criteria	Alternative 1 No Action	Alternative 2 Preferred Action
Increase in air emissions	Less than Significant	Less than Significant

4.5.2.1 Alternative 1: No Action

The No Action Alternative does not include any Federal action and existing conditions would remain including the threat of future flood events. Air quality in Utah would remain at the current levels. During flood events, vehicle emissions could increase due to alternative transportation routes during disaster events, however it is anticipated that impacts would be less than significant because emissions would be minimal and localized

4.5.2.2 Alternative 2: Watershed Resiliency Activities

Watershed resiliency actions could involve the use of heavy construction equipment to reshape watershed elements. During construction, there could be temporary, short-term increases in emissions from equipment exhaust and fugitive dust. However, the temporary increase in equipment exhaust would be expected to be less than significant because the contractor would be required to keep all equipment in good working order to minimize air pollution and idling would be minimized.

All Federal, State, and local regulations must be met to minimize fugitive dust emissions created during construction activities. If fugitive dust were to become a problem due to activities associated with bank stabilization or construction, the fugitive dust could be mitigated by BMPs such as periodic watering of active construction areas, particularly areas close to any nearby

sensitive receptors (e.g., hospitals, senior citizen homes, schools). For this alternative, impacts from fugitive dust are anticipated to be less than significant because they would be short-term and localized.

After construction, there would be no change in air quality as this alternative would not change roadway length or capacity, and therefore would not change the amount of vehicle emissions.

4.6 NOISE

4.6.1 Affected Environment

Sounds that disrupt normal activities or otherwise diminish the quality of the environment are designated as noise. For environmental noise analyses, a noise metric refers to the unit that quantitatively measures the effect of noise on the environment. The unit used to describe the intensity of sound is the decibel (dB). Audible sounds range from 0 dB ("threshold of hearing") to about 140 dB ("threshold of pain"). (OSHA, 2016c)

Figure 8 presents the sound levels of typical events that occur on a daily basis in the environment. For example, conversational speech is measured at about 55 to 60 dBA, whereas a band playing loud music may be as high as 120 dBA.

Figure 8: Sound Levels of Typical Sounds[12]

[12] Prepared by Booz Allen Hamilton. Source: (Sacramento County Airport System, 2015)

The range and level of ambient noise in Utah varies widely based on the area and environment of the area. The following are types of areas in Utah where the population can potentially be exposed to higher than average noise levels:

- Urban Environments: Urban areas are likely to have higher noise levels on a daily basis due to highway traffic (80 to 100 dBA), construction noise (93 to 108 dBA), and outdoor conversations (e.g., small/large groups of people) (60 to 90 dBA) (Bishop, 2016). The urban areas in Utah that are likely to have the highest ambient noise levels are Salt Lake City, Ogden, and Provo.

- Airports: Areas surrounding airports tend to have higher noise levels due to aircraft operations that occur throughout the day. A jet engine aircraft can produce between 130 to 160 dBA in its direct proximity (FAA, 2007). However, commercial aircraft are most likely to emit noise levels between 50 to 100 dBA depending of the type of aircraft and associated engine (FAA, 2012). In Utah, SLC has annual operations of more than 311,859 flights (SLC, 2015b). These operations result in increased ambient noise levels in the surrounding communities.

- Highways: Communities near major highways may also experience higher than average noise levels when compared to areas that are not in close proximity to a highway (FHWA, 2015d). Major highways in Utah tend to have higher than average ambient noise levels on nearby receptors, ranging from 52 to 75 dBA (FHWA, 2015d).

- Railways: Like highways, railways tend to have higher than average ambient noise levels for residents living in close proximity to train tracks (Federal Transit Authority, 2006). Railroad operations can produce noise ranging from 70 dBA for an idling locomotive to 115 dBA when the locomotive engineer sounds the horn while approaching a crossing (DOT, FRA, 2015). Utah has three passenger rail corridors with high levels of commercial and commuter rail traffic. The Utah section of the California Zephyr extends from Green River to Helper, Provo, and Salt Lake City. The Heber Valley Railroad extends from Heber City to Vivian Park in Provo Canyon. Finally, the UTA's Frontrunner provides commuter rail services that link Ogden with Salt Lake City (UDOT, 2015a).

- National and State Parks: The majority of national and State parks are likely to have lower than average ambient noise levels given their size and location in remote areas. National and State parks, historic areas, and monuments are protected areas, which are regions that are given legal safeguards in order to maintain biological diversity and natural resources (NPS, 2013). These areas typically have lower noise levels, as low as 30 to 40 dBA (NPS, 2014). Utah has five National Parks and four National Natural Landmarks (NPS, 2016b).

4.6.2 Environmental Consequences

This section describes potential impacts to noise associated with the alternatives, as discussed below. There is potential for impacts to noise to occur when an activity:

- Increases noise levels: exceeding 55 dBA at noise sensitive receptors; greater than 10 dBA increase from baseline noise levels at other locations; or greater than 65 dBA near noise receptors at National Parks.

Qualitative analyses have been used to determine the intensity and magnitude of the environmental impact. The relative degree of severity of environmental impacts are defined as:

- **No Impact:** No environmental impacts are readily apparent or identified.
- **Less than Significant:** Indicates that a change to resources would be measurable although the changes would be small and localized. BMPs, identified in Section 5, may be used to decrease the potential for impacts that are less than significant.
- **Significant:** Changes to resources would be measurable and would have substantial consequences on a local or regional level.

Table 10 presents the impact summary for noise.

Table 10: Impact Significance Rating Criteria for Noise

Impact Criteria	Alternative 1 No Action	Alternative 2 Preferred Action
Increase in noise levels	No Impact	Less than Significant

4.6.2.1 Alternative 1: No Action

This alternative does not include any Federal action and existing conditions would remain. There would be no impact from noise levels in the project area. Noise levels would remain as they are currently.

4.6.2.2 Alternative 2: Watershed Resiliency Activities

Under Alternative 2, noise from construction activities could result in less than significant impact to persons who live near the construction areas. Noise levels could be minimized through mitigation efforts described in Section 5, Best Management Practices. Noise levels of construction equipment (70 to 72 dBA) at the distance in which noise receptors would likely be located (>200 feet/60 meters) would be less than significant.

4.7 VISUAL RESOURCES

4.7.1 Affected Environment

Visual resources influence the human experience of a landscape. Various aspects combine to create visual resources, such as color, contrast, texture, line, and form. Features (e.g., mountain ranges, city skylines, ocean views, unique geological formations, rivers) and constructed landmarks (e.g., bridges, memorials, cultural resources, or statues) are considered visual resources. For some, cityscapes are valued visual resources, whereas others prefer natural areas. While many aspects of visual resources are subjective, evaluating potential impacts on the character and continuity of the landscape is a consideration when evaluating proposed actions for NEPA and National Historic Preservation Act (NHPA) compliance. The Federal government does not have a definition of what constitutes a visual resource; therefore, this PEA uses the general definition of visual resources by the Bureau of Land Management (BLM) of “the visible physical features on a landscape (e.g., land, water, vegetation, animals, structures, and other features).” (BLM, 1984).

Figure 9: Double Arch, Arches National Park[13]

Federal land management agencies consider visual resources in their NEPA processes. Many counties and municipalities also consider visual, scenic, and aesthetic resources in their land use or city planning. Utah does protect certain scenic resources such as scenic byways, historic sites, and State parks (Utah State Parks, 2015). Scenic byways, highways, and trails in Utah include the following (Figure 5):

- Flaming Gorge-Uintas National Scenic Byway
- Dinosaur Diamond Prehistoric Highway
- Logan Canyon Byway
- Nebo Loop Scenic Byway
- Scenic Byway 143, Utah's Patchwork Parkway
- Scenic Byway 12
- The Energy Loop, Huntington/Eccles Canyons Scenic Byway
- Trail of the Ancients.

Utah has 1,544 National Register of Historic Places (NRHP) listed sites and 14 National Historic Landmarks (NPS, 2016b). In addition, there are two National Heritage Areas, the Mormon Pioneer National Heritage Area, and the Great Basin National Heritage Route (NPS, 2015a).

In Utah, scenic resources are wide ranging—from the red rock spires and cliffs in the southern desert areas of Moab and St. George, to the Colorado, Green, and Virgin River canyons, the steep, snow-capped peaks of the Wasatch Mountains, and the famous Bonneville Salt Flats. Utah's visual resources bring visitors from around the world to see the National Parks, National Monuments,

[13] Source: (NPS, Frank, J.W., 2016)

State parks, and the variety of cultural, historic, and paleontological sites. There are five National Parks in Utah: Arches National Park (Figure 9), Bryce Canyon National Park, Canyonlands National Park, Capitol Reef National Park, and Zion National Park (Table 8 and Figure 7). These and other State, Federal, and county lands with visual resources should be considered when any land disturbing activities take place to ensure that the resources remain intact and protected.

Figure 10: Green River, Vernal, Utah[14]

4.7.2 Environmental Consequences

This section describes the potential impacts to visual resources associated with the alternatives as discussed below. There is potential for impacts to visual resources to occur when an activity:

- Substantially affects the scenic vista by changing the form, line, texture, or color of the landscape;
- Substantially damages scenic resources;
- Substantially degrades the existing visual character of a site and/or its surroundings;

Qualitative analyses have been used to determine the intensity and magnitude of the environmental impact. The relative degree of severity of environmental impacts are defined as:

- **No Impact:** No environmental impacts are readily apparent or identified.
- **Less than Significant:** Indicates that a change to resources would be measurable although the changes would be small and localized. BMPs, identified in Section 5, may be used to decrease the potential for impacts that are less than significant.

[14] Source: (BLM, Wick. B, 2016)

- **Significant:** Changes to resources would be measurable and would have substantial consequences on a local or regional level.

Table 11 presents the impact summary for visual resources.

Table 11: Impact Significance Rating Criteria for Visual Resources

Impact Criteria	Alternative 1 No Action	Alternative 2 Preferred Action
Substantially affects the scenic vista by changing the form, line, texture, or color of the landscape	Less than Significant	Less than Significant
Substantially damages scenic resources	Less than Significant	Less than Significant
Substantially degrades the existing visual character of a site and/or its surroundings	Less than Significant	Less than Significant

4.7.2.1 Alternative 1: No Action

Under the No Action Alternative, watershed resiliency activities would not be completed. No Federal action would occur. No work would occur in viewsheds; therefore, no direct impacts to visual resources would occur from water resiliency activities. However, because no actions would be taken, the threat of major flooding in rivers in Utah could continue, which could result in less than significant impacts to visual resources. Major flood disasters could affect visual resources and scenic vistas by removing soils and vegetation, damaging streamside cultural resources, or from the deposition of sediments over previously rocky or vegetated areas. The effects of flooding could alter or degrade natural landscapes or their surroundings, impacting the visual character.

4.7.2.2 Alternative 2: Watershed Resiliency Activities

Watershed resiliency activities could result in less than significant, short-term impacts to scenic vistas during and within a year following construction activities due to surface disturbance and removal of invasive vegetation species. Water resiliency activities, such as revegetation with native riparian plant species would support the visual character of streams or rivers. Riparian plant species are adapted to rapid establishment following disturbance, such as flooding. Visual resources could be mitigated between one and five years using revegetation, depending on the availability of ground water and precipitation. Over the long-term, visual resources would be restored and would likely be more stable and resilient during large flood events, protecting visual resources from future damage or loss from flooding.

4.8 PUBLIC SERVICES AND UTILITIES

4.8.1 Affected Environment

Public services and utilities are the essential systems that support daily operations in a community and cover a broad array of public services, such as electricity, water, wastewater, and solid waste Utility lines often cross or run along stream corridors, either overhead or underground. Public services and utilities include fire protection, law enforcement, Emergency Medical Services,

schools, water, wastewater, sanitation, solid waste disposal, stormwater drainage, electric utilities, natural gas, and telephone/telecommunications.

4.8.1.1 Public Services

Utah public safety services generally consist of public safety infrastructure and first responder personnel. Table 12 presents Utah's public safety infrastructure, including fire and rescue stations, law enforcement facilities, and fire departments.

Table 13 identifies first responder personnel including dispatch, fire and rescue, law enforcement, and emergency medical personnel in Utah.

Table 12: Public Safety Infrastructure in Utah by Type[15]

Infrastructure Type	Number
Fire and Rescue Stations	335
Law Enforcement Agencies[16]	136
Fire Departments	196

Table 13: First Responder Personnel in Utah by Type[17]

First Responder Personnel	Number
Police, Fire and Ambulance Dispatchers[18]	540
Fire and Rescue Personnel[19]	6,303
Law Enforcement Personnel[20]	8,237
Emergency Medical Technicians and Paramedics[21,22]	2,260

4.8.1.2 Public Utilities

The bulk of the electricity generated in Utah comes from coal-fueled power plants. In 2014, coal plants generated 76 percent of Utah's electricity, or 33,376,688 megawatt-hours of the total 43,784,526 megawatts. Of the remainder of Utah's electricity generation, 19 percent was generated

[15] Sources: (U.S. Fire Administration, 2015; Bureau of Justice Statistics, 2011)
[16] Number of agencies from State and local law enforcement include: local police departments, sheriffs' offices, primary State law enforcement agencies, special jurisdictional agencies, and other miscellaneous agencies, collected by the U.S. Bureau of Justice Statistics in 2008.
[17] Sources: (U.S. Fire Administration, 2015; Bureau of Justice Statistics, 2011; BLS, 2015)
[18] BLS Occupation Code: 43-5031
[19] BLS Occupation Codes: 33-2011 (Firefighters), 33-2021 (Fire Inspectors and Investigators), 33-1021 (First- Line Supervisors of Fire Fighting and Prevention Workers), and 53-3011 (Ambulance Drivers and Attendants, Except Emergency Medical Technicians). Volunteer firefighters reported by the U.S. Fire Administration.
[20] Full-time employees from State and local law enforcement agencies which include: local police departments, sheriffs' offices, primary State law enforcement agencies, special jurisdictional agencies, and other miscellaneous agencies, collected by the U.S. Bureau of Justice Statistics in 2008.
[21] BLS Occupation Code: 29-2041.
[22] All BLS data collected in 2015.

by natural gas facilities, with hydroelectric power and other renewable sources accounting for the rest. (EIA, 2015c)

The regulation of drinking water standards falls under the jurisdiction of the UDEQ (UDEQ, 2015b). The Safe Drinking Water Act requires utilities to prepare annual reports on water quality detailing any contaminants in treated water, likely sources of contamination, and the findings of source water assessments (UDEQ, 2015c). The Utah Public Services Commission regulates wastewater utilities including the regulation of utility rates and the quality of their service, but has no jurisdiction over municipal (government owned) utilities (PSC, 2015a). Facilities wishing to discharge treated wastewater in Utah must obtain a Utah Pollutant Discharge Elimination System (UPDES) permit which is issued by the Utah Division of Water Quality. There are 142 active UPDES permits in Utah (UDEQ, 2015d).

The management of solid waste in Utah is overseen by the UDEQ through its Solid Waste Program (UDEQ, 2015e). In 2014, there were 3,598,574 tons of waste disposed of in 116 State facilities, with 2,121,447 tons (59%) comprised of municipal waste. The remainder came from industrial or construction sources, with 37,739 (1%) being recycled (UDEQ, 2016b).

4.8.2 Environmental Consequences

This section describes potential impacts to public services and utilities associated with the alternatives, as discussed below. There is potential for impacts to public services and utilities to occur when an activity:

- Affects the capacity of local health, public safety, and emergency response services diminished so that individuals or communities cannot access health care and/or emergency services, or access is delayed; or
- Substantially disrupts the delivery of electric power or to physical infrastructure that results in disruptions at a large geographic scope (i.e., county-wide) or over a long duration (i.e., weeks to months).

Qualitative analyses have been used to determine the intensity and magnitude of the environmental impact. The relative degree of severity of environmental impacts are defined as:

- **No Impact:** No environmental impacts are readily apparent or identified.
- **Less than Significant:** Indicates that a change to resources would be measurable although the changes would be small and localized.
- **Significant:** Changes to resources would be measurable and would have substantial consequences on a local or regional level.

Table 14 presents the impact summary for public services and utilities.

Table 14: Impact Significance Rating Criteria for Public Services and Utilities

Impact Criteria	Alternative 1 No Action	Alternative 2 Preferred Action
Alteration of the capacity of local health, public safety, and emergency response services	Significant	Less than Significant
Disruption of the delivery of electric power or to physical infrastructure	Significant	Less than Significant

4.8.2.1 Alternative 1: No Action

The No Action Alternative does not include any Federal action and existing conditions would remain. As a result, this alternative has the potential to have significant effects on public services and utilities as watershed hazards could undermine, damage, or destroy facilities in future disaster events. Fire, emergency, law enforcement, and school services could be delayed as a result of continued inaccessibility of the route due to closed roads or bridges. Depending on the length of detour required these services could be significantly impacted. In addition, utility repair crews may not be able to reach damaged utility lines, resulting in lengthy service outages.

4.8.2.2 Alternative 2: Watershed Resiliency Activities

During construction, delays in fire, emergency, law enforcement, and school services may continue, but these would be less than significant, short-term impacts. Once completed, public services would be restored to pre-disaster levels. Utilities that cross or run along the watershed could be temporarily interrupted, but this would be a short-term, less than significant, impact. No long-term impacts would occur under this alternative.

4.9 WATER RESOURCES

4.9.1 Affected Environment

Utah has approximately 89,000 miles of rivers and streams, and over 2,000 ponds and lakes. The Great Salt Lake is the sixth largest lake nationwide, and is three to five times more saline than ocean waters (Utah State University, 2016). Other large lakes in Utah include Lake Powell, Sevier Lake, and Utah Lake (Figure 11). Drinking water in Utah typically comes from surface water and wells for larger cities, while smaller communities usually depend on springs and wells. There are over 1,800 drinking water sources in Utah (UDEQ, 2015f).

The Colorado River is the largest river in Utah, along with its tributaries, the Green and San Juan Rivers (Figure 11). The Colorado River supplies industrial and municipal water to nearly 30 million people in the western United States, and provides irrigation water for nearly four million acres of land (Bureau of Reclamation, 2016). The Colorado River in Utah, as well as the Green River, are also highly regarded for their recreation and scenic values (UDNR, 2001a). Salinity is a major concern for the Colorado River. Much of the land in the Colorado River Basin is underlain by the Mancos Shale formation, a highly saline formation from which many soils are formed. When these lands are irrigated, salts are turned into solution and carried into surface water. In 1974, Congress enacted the Colorado River Basin Salinity Control Act. This Act and subsequent

public law created a program to protect the water quality of the Colorado River in the U.S. and Mexico, and is administered by the Bureau of Reclamation (Bureau of Reclamation, 2016).

There are several endangered native Colorado River fish species (see Section 4.10, Biological Resources). The Upper Colorado River Endangered Fish Recovery Program, as well as the San Juan River Basin Recovery Implementation Program, are in place to recover these fish populations while still allowing for development of the water supply (UDNR, 2001a).

Fed by the Provo River, Utah Lake is the largest freshwater lake in Utah and one of the largest in the western United States (Utah State Parks, 2016). The lake measures 12 by 24 miles and reaches a maximum depth of 14 feet. Bear Lake is located on the northern Utah boarder with Idaho. More than half of the 110 square mile lake is located within Utah. The total length of the lake is 20 miles and the width is more than seven miles. The maximum depth of the lake is 208 feet, with the average depth being 94 feet. The Bear River is the main surface water source of inflow and outflow while groundwater also recharges the lake (Figure 11) (Davis, 2011).

Figure 11: Surface Water and Watersheds

Lake Powell is approximately 180 miles long, covering an area of 160,000 acres (Figure 11). Its shoreline is nearly 2,000 miles long, and at full capacity, stores 27 million acre-feet of water. The

reservoir was created in 1963 as water impounded behind Glen Canyon Dam, and is part of the Glen Canyon National Recreation Area. Lake Powell receives water from the Colorado, San Juan, and Escalante Rivers (DOW, 2015). Aquatic invasive and nonnative species, along with grazing, sedimentation, and hydrologic alteration (including water flows dictated by the Colorado River Compact) can all affect the water quality and quantity of the lake (NPS, 2015b).

Threats to surface water in Utah can come from non-point sources, such as agricultural activities that can cause excess sediment, nutrients, salinity, pesticides, and pathogens to enter rivers and lakes. Urban runoff is a small source of non-point source pollution, but can be significant in localized areas. Urban runoff can carry toxins and pathogens into local surface waterbodies. Additionally, hydrologic modifications, abandoned mines, silviculture, and erosion and sedimentation can be sources of non-point source pollution. (UDEQ, 2013)

Groundwater systems are sources of water that result from precipitation infiltrating the ground surface and include underground water that occupies pore spaces between sand, clay, or rock particles. An aquifer is a permeable geological formation that stores or transmits water to wells and springs. Groundwater is contained in either confined (bound by clays or nonporous bedrock) or unconfined (no layer to restrict the vertical movement of groundwater) aquifers (USGS, 1999). When the water table reaches the ground surface, groundwater reappears as either streams, surface bodies of water, or wetlands. This exchange between surface water and groundwater is an important feature of the hydrologic (water) cycle. Table 15 provides details on aquifer characteristics in Utah.

Utah's principal aquifers consist of basin-fill aquifers, alluvial aquifers, and carbonate-rock[23] aquifers (Figure 12). Generally, the water quality of Utah's aquifers is good. Statewide, the most serious threats to groundwater quality include increased runoff from urban areas, mining activities including leaching from tailings[24], and irrigation use of surface water that has depleted groundwater recharge sources. (UDNR, 2015a)

The USEPA defines sole source aquifers (SSA) as an aquifer that "supplies at least 50 percent of the drinking water consumed in the area overlying the aquifer" and are areas with no other drinking water sources (USEPA, 2015c). Utah has three designated SSAs within the State as shown in Figure 12. The Western Uinta Arch Paleozoic SSA is near the town of Oakley in Summit County; the Castle Valley SSA includes the town of Castle Valley in Grant County; and the Glen Canyon SSA is near the town of Moab in Grand County (USEPA, 2015d). Designating a groundwater resource as a SSA helps to protect the drinking water supply in that area and requires reviews for all federally funded proposed projects to ensure that the water source is not jeopardized (USEPA, 2015c).

[23] Carbonate-rock aquifers typically consist of limestone with highly variable water-yielding properties (some yield almost no water and others are highly productive aquifers) (Olcott, 1995).
[24] Tailings are "residue of raw material or waste separated out during the processing of crops or mineral ores" (USEPA, 2009).

Table 15: Description of Utah's Principal Aquifers[25]

Aquifer Type and Name	Location	Groundwater Quality
Basin and Range basin-fill aquifers. Typically, unconfined and not hydraulically connected, consisting primarily of unconsolidated alluvial-fan deposits.	Found throughout the north and western half of Utah.	Generally useable with localized dissolved solids concentrations that can exceed standards. Deep, confined basin-fill aquifers, including those in the Salt Lake Valley, are susceptible to contamination from recharge.
Pacific Northwest basin-fill aquifers. Unconsolidated and semi-consolidated sand and gravel.	Far northwestern corner of Utah.	Generally useable with localized dissolved solids concentrations that can exceed standards. Deep, confined basin-fill aquifers are susceptible to contamination from recharge.
Colorado Plateau aquifers; Sandstone aquifers	Found throughout the southern and eastern half of Utah.	Groundwater quantity and quality is extremely variable; however, water quality is generally suitable for most domestic and agricultural uses.
Basin and Range carbonate-rock aquifers. Typically, unconfined and not hydraulically connected, consisting primarily of unconsolidated alluvial-fan deposits.	Found throughout the north and western half of Utah.	Suitable for most uses, although dissolved solids concentrations can be high in localized areas.

Watersheds, or drainage areas, consist of surface water and all underlying groundwater, and encompass an area of land that drains streams and rainfall to a common outlet (e.g., reservoir, bay). Utah's waters (lakes, rivers, and streams) are divided into 10 major watersheds (Figure 11). The Great Salt Lake, Western Colorado, and Weber River Watersheds are discussed below, and are representative of the types of watersheds found in Utah.

- The Great Salt Lake Watershed includes much of western Utah, and extends west from the Great Salt Lake to beyond Utah's border with Nevada. This basin encompasses nearly 19,000 square miles, and contains some of the nation's most arid lands with scarce and often intermittent water resources (UDNR, 2001b). The lake itself is approximately 75 miles long and 35 miles wide, with a maximum depth of roughly 33 feet. The Great Salt Lake is terminal, and receives water from surface water (66%) including 4 main rivers (Bear, Weber, Ogden, and Jordan rivers), many small streams, direct precipitation (31%), and groundwater (3%); yearly inflows equate to roughly 3 million acre-feet of water. Water in the lake is primarily lost from evaporation (UGS, 2015).

- The Western Colorado Watershed, in south-central Utah, encompasses approximately 15,000 square miles. It includes the stretch of Colorado River from its confluence with the Green River, to the eastern shore of Lake Powell, and includes the entire reservoir. This watershed has a variety of climates and topography, with elevations ranging from 3,700 feet to over 11,500 feet, and precipitation variations of 30 inches to no more than 8 inches per year. (UDNR, 2000)

- The Weber River Watershed is in north-central Utah, and includes the majority of the Wasatch Range and the Uinta Mountain northwest slopes. It not only receives more

[25] Source: (Moody, Carr, Chase, & Paulson, 1986; USGS, 1995; USGS, 2015b)

average precipitation than any other watershed in Utah (26 inches per year), but it is also one of the most developed. Waters in this basin are used for agricultural purposes and supply drinking water for a significant amount Utah's population. (UDNR, 2009)

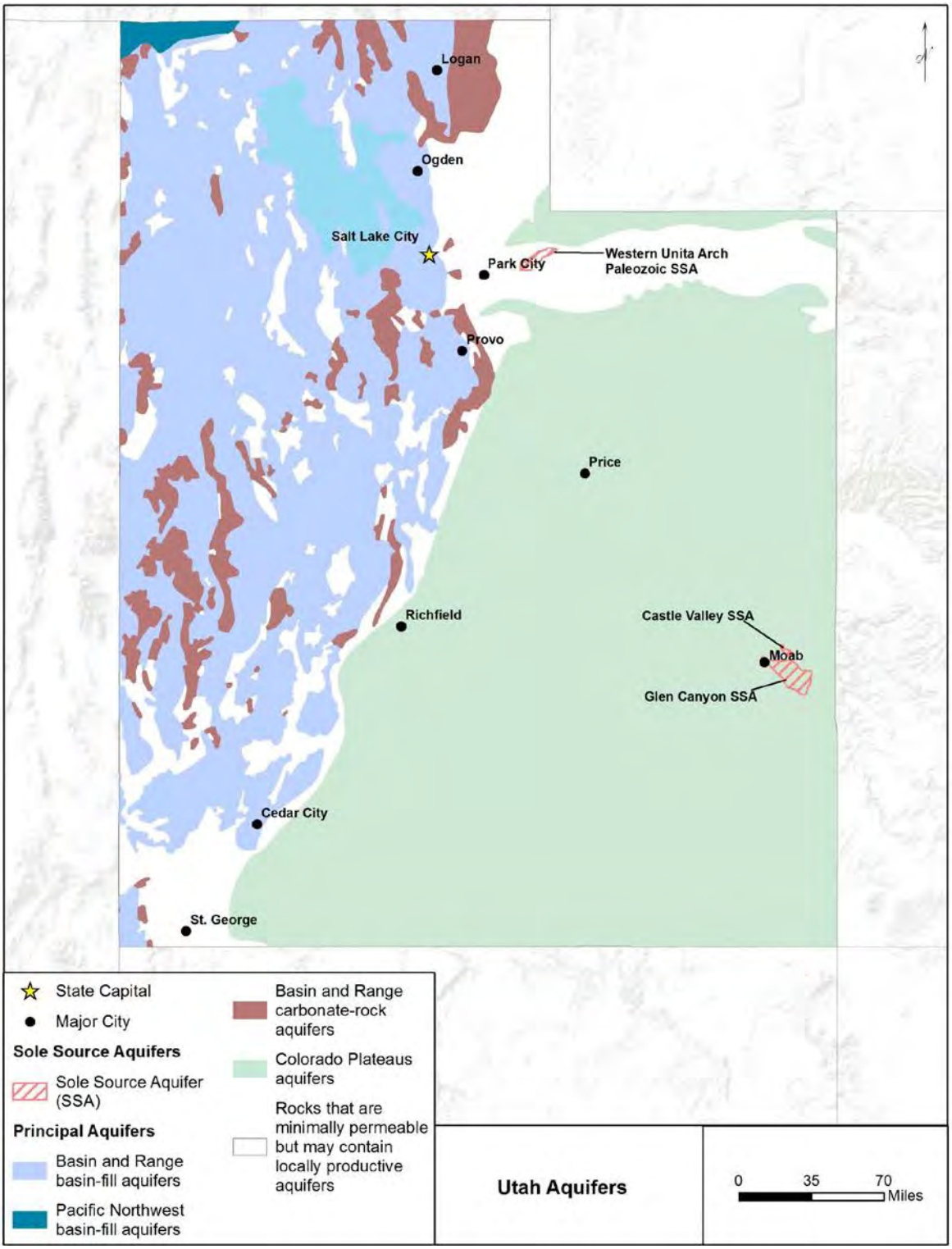


Figure 12: Sole Source Aquifers and Principal Aquifers

4.9.1.1 Wild and Scenic Rivers

Nearly 170 miles of the Virgin River and its tributaries within Zion National Park and adjacent BLM wilderness have been designated a National Wild and Scenic River in Utah (Figure 11). The river's riparian areas contain prehistoric Native American sites and habitat for many wildlife species and rare plant communities. (National Wild and Scenic Rivers System, 2016)

4.9.1.2 Impaired Waterbodies

Several elements, including temperature, dissolved oxygen, suspended sediment, nutrients, metals, oils, observations of aquatic wildlife communities, and sampling of fish tissue, are used to evaluate water quality. Under Section 303(d) of the CWA, States are required to assess water quality and report a listing of impaired waters[26], the causes of impairment, and probable sources. Table 16 summarizes the water quality of Utah's assessed major waterbodies by category, percent impaired, designated use[27], cause, and probable sources (USEPA, 2015e).

As shown in Table 16, various sources affect Utah's waterbodies, causing impairments. Approximately one-third of Utah's assessed rivers and streams and lakes, reservoirs, and ponds were impaired in 2014. Designated uses of the impaired rivers and streams include agricultural, cold and warm water aquatic life, domestic water supply, non-game fish and other aquatic life, secondary recreation, and wildlife habitat. Designated uses of the impaired lakes, reservoirs, and ponds include agriculture, and cold and warm water aquatic life (USEPA, 2015f).

Table 16: Section 303(d) Impaired Waters of Utah, 2014[28]

Water Type[29]	Amount of Waters Assessed[30] (Percent)	Amount Impaired (Percent)	Designated Uses of Impaired Waters	Top Causes of Impairment	Top Probable Sources for Impairment
Rivers and Streams	12%	34%	Agricultural, cold and warm water aquatic life, domestic water supply, non-game fish and other aquatic life, secondary recreation, wildlife habitat	Benthic macroinvertebrate bioassessments, total phosphorus, water temperature, total dissolved solids	Agriculture, natural sources, minor industrial point sources, habitat modification

[26] Impaired waters: "waterways that do not meet state water quality standards. Under the CWA, Section 303(d), states, territories, and authorized tribes are required to develop prioritized lists of impaired waters." (USEPA, 2015e)
[27] Designated Use: "an appropriate intended use by humans and/or aquatic life for a waterbody. Designated uses mayinclude recreation, shellfishing," or drinking water supply. (USEPA, 2015e)
[28] Source: (USEPA, 2015f)
[29] Some waters may be considered for more than one water type.
[30] Utah has not assessed all waterbodies within the State.

Water Type[29]	Amount of Waters Assessed[30] (Percent)	Amount Impaired (Percent)	Designated Uses of Impaired Waters	Top Causes of Impairment	Top Probable Sources for Impairment
Lakes, Reservoirs, and Ponds	97%	33%	Agricultural, cold and warm water aquatic life	Total phosphorus, total dissolved solids, polychlorinated biphenyls in fish tissue, dissolved oxygen	Managed pasture grazing, irrigated crop production, animal feeding operations, municipal and industrial point source discharges

4.9.1.3 Floodplains

FEMA defines a floodplain or flood-prone area as "any land area susceptible to being inundated by water from any source" (44 CFR 59.1) (FEMA, 2000). Through its flood hazard mapping program, FEMA identifies flood hazards and risks associated with the 100-year flood, which is defined as "a flood that has a one percent chance of occurring in any given year," to allow communities to prepare and protect against flood events (FEMA, 2013b).

Floodplains provide suitable and sometimes unique habitat for a wide variety of plants and animals, and are typically more biologically diverse than upland areas due to the combination of both terrestrial and aquatic ecosystems. Vegetation along stream banks provides shade, which helps to regulate water temperature for aquatic species. During flood events, sediment and debris settle out and collect on the floodplain, enriching the soil with additional nutrients. Pollutants from floodwater runoff are also filtered by floodplain vegetation and soils; thereby improving water quality. Floodplains protect natural and built infrastructure by providing floodwater storage, erosion control, water quality maintenance, and groundwater recharge. Historically, floodplains have been favorable locations for agriculture, aquaculture, and forest production due to the relatively flat topography and nearby water supply. Floodplains can also offer recreational activities, such as boating, swimming, and fishing, as well as hiking and camping. (FEMA, 2014c)

There are two primary types of floodplains in Utah: riverine and lake floodplains. Riverine floodplains occur along rivers and streams, where overbank flooding may occur. In mountainous areas, such as the steep Wasatch Mountains (near Salt Lake City), floodwaters can build and recede quickly, with fast moving and deep water. Flooding in these areas can cause greater damage than typical riverine flooding due to the high velocity of water flow, the amount of debris carried, and the broad area affected by floodwaters (Utah State Floodplain Management Office, 2006). Lake floodplains are present around the Great Salt Lake, which has no outlet. Lakes with no outlets are described as closed basin lakes, and are subject to large fluctuations in water surface elevation within their floodplains (FEMA, 2015b). Flooding is the leading cause for disaster declaration by the President in the United States and results in significant damage throughout the State annually (NOAA, 2015). There are several causes of flooding in Utah, often resulting in loss of life and damage to property, infrastructure, agriculture, and the environment. These include flooding due to rapid snowmelt in the late spring and early summer, along with intense precipitation events in the summer. Flash flooding from summertime thunderstorms in the southern desert areas pose dangers to recreationists and roadways where washes intersect. Flooding resulting from watersheds damaged by wildfires is also a growing concern. The two fastest growing areas, the

Wasatch Front and the southwestern corner of Utah (near St. George), are also the most vulnerable to flooding. These areas include Salt Lake, Washington, Utah, and Weber Counties (UDPS, 2014).

Local communities often have floodplain management or zoning ordinances that restrict development within the floodplain. FEMA provides floodplain management assistance, including mapping of 100-year floodplain limits, to approximately 215 communities in Utah through the National Flood Insurance Program (NFIP) (FEMA, 2016b). Established to reduce the economic and social cost of flood damage by subsidizing insurance payments, the NFIP encourages communities "to adopt and enforce floodplain management regulations and to implement broader floodplain management programs" and allows property owners in participating communities to purchase insurance protection against losses from flooding (FEMA, 2015c). As an incentive, communities can voluntarily participate in the NFIP Community Rating System (CRS), which is a program that rewards communities by reducing flood insurance premiums in exchange for doing more than the minimum NFIP requirements for floodplain management. As of October 2015, Utah had 11 communities participating in the CRS (FEMA, 2015d).

4.9.1.4 Wetlands

The CWA defines wetlands as "those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs and similar areas" (40 CFR 230.3(t), 1993).

The USEPA estimates that "more than one-third of the United States' threatened and endangered species live only in wetlands, and nearly half of such species use wetlands at some point in their lives". In addition to providing habitat for many plants and animals, wetlands also provide benefits to human communities. Wetlands store water during flood events, improve water quality by filtering polluted runoff, help control erosion by slowing water velocity and filtering sediments, serve as points of groundwater recharge, and help maintain base flow in streams and rivers. Additionally, wetlands provide recreation opportunities for people, such as hiking, bird watching, and photography. (USEPA, 2016g)

EO 11990, Protection of Wetlands, requires Federal agencies to "minimize the destruction, loss, or degradation of wetlands and to preserve and enhance the natural and beneficial values of wetlands." The EO requires Federal agencies to meet the EO objectives by "planning their actions to consider project alternatives to sites with wetlands, and limit potential damage if an activity affecting a wetland cannot be avoided." (FEMA, 2015e)

In Utah, wetlands constitute approximately one percent of the total landscape (Figure 13). Wetland types include marshes and wet meadows, playas, fens, and lake-fringe varieties (Utah Geological Survey, 2015). The largest singular wetland area in Utah includes lacustrine (i.e., lake fringe) wetlands around the Great Salt Lake (Yuhas, 1996). The wetlands area surrounding the Great Salt Lake fluctuates between 400,000 and 500,000 acres (UDEQ, 2009). In Utah, palustrine wetlands (i.e., freshwater) are the dominant type of wetland, primarily found on river floodplains. Riverine wetlands comprise approximately two percent of the wetlands in Utah (UDEQ, 2009).

Palustrine wetlands include freshwater emergent marshes, wet meadows or fens, and playas. Emergent marshes are usually found next to lake fringes, or edges of rivers or ponds. They are typically flooded with water, with water levels ranging from a couple of inches up to three feet. Wet meadows, or fens, are typically fed by groundwater, with a high water table. They usually have a high cover of thick grasses that makes them appear dry, but they are saturated. These wetlands can generally be found on the outside of a depression, or on a slope. Playa wetlands are generally found around the Great Salt Lake, and are characterized as depressions with scarce vegetation, no water outlets, and are highly saline (UDOT, 2015c). Vegetation of the wetlands surrounding Great Salt Lake varies, based on the salinity of the water. There are currently about 366,000 acres of palustrine (freshwater) wetlands in Utah (UDEQ, 2009).

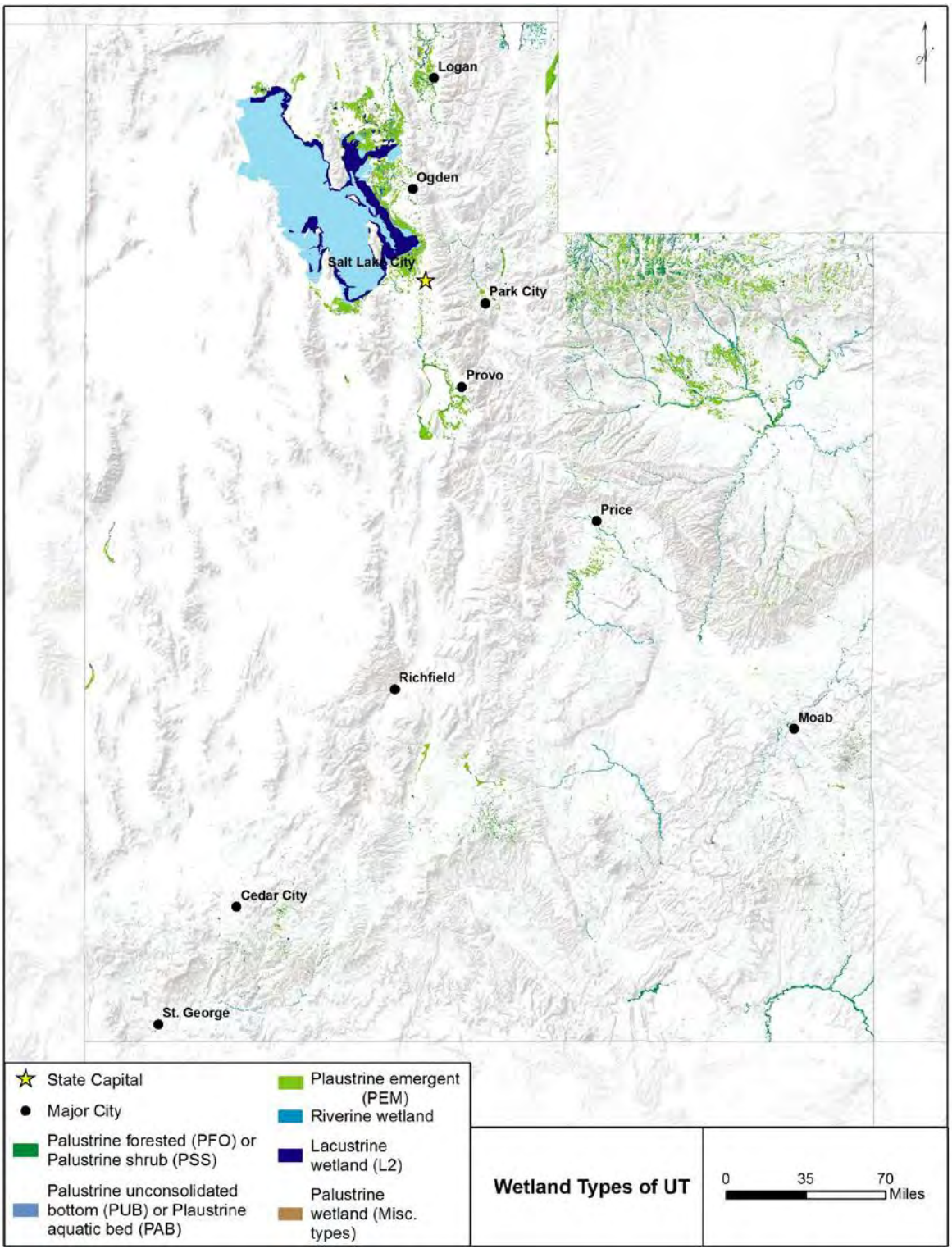


Figure 13: Wetland Types in Utah

The amount and condition of Utah wetlands continues to decline. This loss is mostly a result of human activities. Development, including businesses, houses, roads, and energy development, damage or destroy wetland habitats. Drought and water demands in Utah have also diverted water

from native wetlands. Selenium and other pollutants can accumulate in wetlands, and non-native, invasive species, such as tamarisk, outcompete native plants. Finally, improper grazing practices and agriculture have resulted in both habitat loss and increased water pollution in wetlands. (Lee, 2001)

4.9.2 Environmental Consequences

This section describes potential impacts to water resources associated with the alternatives, as discussed below. There is potential for impacts to water resources to occur when an activity causes:

- Groundwater or aquifer contamination degrading drinking water quality; or
- Floodplain, wetland, or surface water degradation or alteration of stream flow.

Qualitative analyses have been used to determine the intensity and magnitude of the environmental impact. The relative degree of severity of environmental impacts are defined as:

- **No Impact:** No environmental impacts are readily apparent or identified.
- **Less than Significant:** Indicates that a change to resources would be measurable although the changes would be small and localized. BMPs, identified in Section 5, may be used to decrease the potential for impacts that are less than significant.
- **Significant:** Changes to resources would be measurable and would have substantial consequences on a local or regional level.

Table 17 presents the impact summary for water resources.

Table 17: Impact Significance Rating Criteria for Water Resources

Impact Criteria	Alternative 1 No Action	Alternative 2 Preferred Action
Degradation of drinking water quality	Less than Significant	No Impact
Degradation of floodplains, wetlands, and surface water quality, or alteration of stream flow	Less than Significant	Less than Significant

4.9.2.1 Alternative 1: No Action

Under the No Action Alternative, there would be no Federal action and watershed resiliency activities would not be undertaken. No work would occur in water, thus there would be no direct impact to water resources due to the proposed action. However, large flood events could occur if water resiliency activities were not implemented, resulting in less than significant impacts to surface and drinking water quality, floodplains, wetlands, or stream flow. Flood events could remove sediment and streambank soils, which could degrade water quality if large quantities of runoff were deposited in drinking water sources. Flooding could result in damage or loss of floodplains and wetlands. Hazards may cause a flow impediment, potentially causing significant impacts to stream and floodplain hydraulics and function.

4.9.2.2 Alternative 2: Watershed Resiliency Activities

Under this Alternative, watershed resiliency activities would be performed within waterways and floodplains. Excavation, redistribution, and fill materials may be necessary for the proposed project thus impacting waters of the U.S. Discharge into surface waters may provide a temporary alteration of surface water quality including but not limited to temperature, dissolved oxygen, or turbidity, but would not result in impacts to drinking water quality.

Watershed resiliency activities include bioengineering inspired bank stabilization, utilization of engineering woody debris, re-vegetation, and in-stream grade control that does not restrict aquatic species passage. Additionally, watershed resiliency activities are composed primarily of multi-objective design projects such as reactional usages for floodplains. Activities would occur within stream channels and floodplains, avoiding aquifers and drinking water sources.

Water resiliency actions could result in less than significant, short-term impacts to rivers or streams through channel alteration or vegetation removal. This could affect water quality in streams during and immediately following the project application, but would not affect drinking water quality. Over the long-term, Alternative 2 would provide stable stream channels and flow regimes, overall improving the resiliency and stability of the river system. Flooding would be reduced and water would remain within the stream channel.

Wetlands and floodplains could be damaged or removed during project application, which could result in reduced water storage or absorption at least over the short-term. Less than significant impacts could continue until the project is completed and proper mitigation is applied to restore wetlands and floodplains. Removal of invasive plant species, such as tamarisk, which have deep root systems and require large quantities of water, could increase water quantity and allow more subsurface water to be available for wetlands and river systems (BLM, 2011).

Activities that result in hardened channelization or the creation of new impervious surfaces are not covered in Alternative 2[31]. Figure 14 and Figure 15 show bioengineering methods for streambanks; Figure 16 shows stream design to reduce gradient and water speed.

[31] For examples of the types of biologically inspired engineering covered in Alternative 2, see FEMA's *Engineering with Nature* guide (https://www.fema.gov/pdf/about/regions/regionx/Engineering_With_Nature_Web.pdf).

Figure 14: Bioengineered Revegetation Using Live Woody Debris[32]

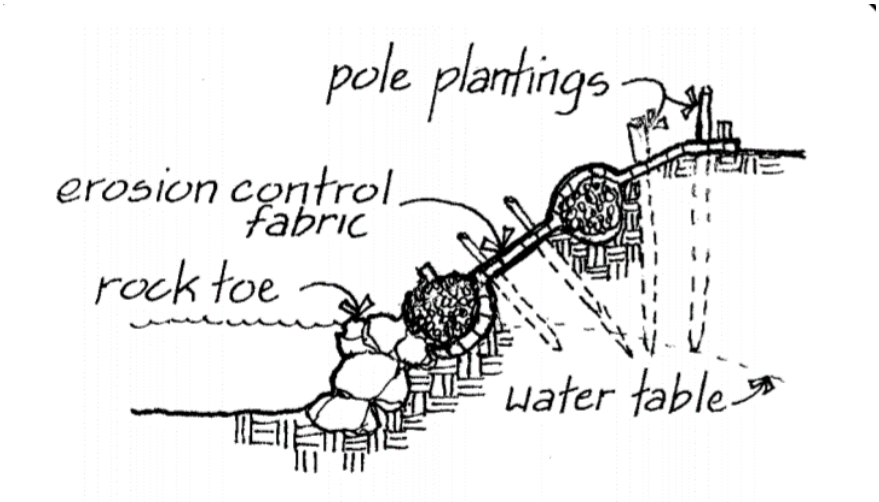


Figure 15: Woody Debris Bank Stabilization Cross-Section[33]

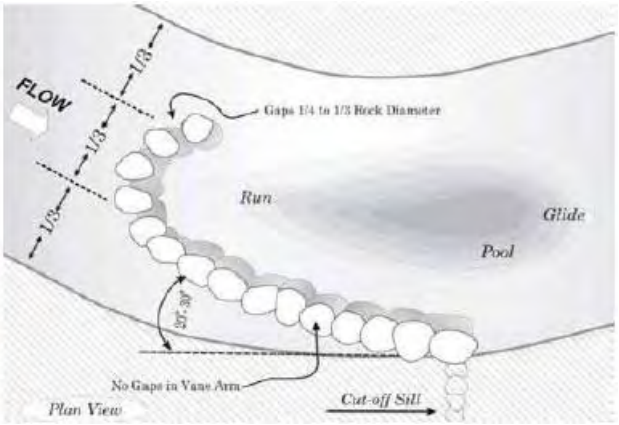


Figure 16: Grade Control

[32] Source: (FISRWG, 2001)
[33] Source: (Bentrup & Hoag, 1998)

Through the NRCS and USEPA, bioengineering resources and case studies for stream bank restoration are available:

- The Practical Stream Bank Bioengineering Guide (Bentrup & Hoag, 1998);
- Stream Restoration Design (National Engineering Handbook 654) (NRCS, 2007);
- Federal Stream Corridor Restoration Handbook (National Engineering Handbook 653) (NRCS, 2010);
- Emergency Watershed Protection Program Final Programmatic Environmental Impact Statement (NRCS, 2004); and
- Identifying and Protecting Healthy Watersheds (USEPA, 2012b).

Waters of the U.S. are heavily regulated. Watershed resiliency activities could require a hydrologic and hydraulic analysis to determine magnitude and frequency of flows. During construction for these types of projects, Federal agencies would mitigate impacts by requiring the applicant to apply BMPs (Section 5) to reduce sediment and fill material from entering the water. The applicant may be required to obtain a UPDES Storm Water permit (UDEQ, 2016c). The applicant may also be required to obtain a Section 404 permit from the USACE and a Section 401 Water Quality Certification permit from UDEQ, Division of Water Quality or the USEPA (USEPA, 2016h; UDEQ, DWQ, 2016). Certain limited discharges of dredged and fill material within waters of the U.S. associated with stream habitat improvement or habitat improvement for Upper Colorado River Endangered Fish Species may be eligible under *Regional General Permit Number 04 – Activities Beneficial to the Recovery of the Upper Colorado River Endangered Fish Species or Programmatic General Permit Number 10 – Minimal Impact Activities Authorized in Conjunction with the State of Utah's Stream Alteration Program* from the USACE (USACE, 2014; USACE, 2016). Discharges of water encountered during excavation or work in wet areas may require a Construction Dewatering Discharge Permit (UDEQ, 2016d). The applicant is responsible for complying with any conditions outlined within these permits. Compliance with local floodplain ordinances would also be required.

Certain activities could result in new construction, materials, or fill being placed in a floodplain or a wetland. Wetland boundaries would be determined in accordance with the latest regulatory guidance from the USACE and the U.S. Fish and Wildlife Service (USFWS) (USFWS, 2016a; CICA, 2016). Regulatory floodplain boundaries and designations can be found at the FEMA Map Service Center (FEMA, 2016c). In these situations, Federal agency projects are required to implement the Eight-step Planning Process for Floodplain/Wetland Management to evaluate effects (FEMA, 2015f).

Less than significant impacts to stream water quality could occur through the transmission of sediment, debris, oils, and hazardous substances into surface waters. During construction, Federal agencies would mitigate these impacts by requiring the applicant to apply BMPs (see Section 5) to reduce impacts on wetlands and waterways. For any work completed within the designated section of the Virgin River that is listed wild and scenic, Federal agencies must confer with the regulatory agency overseeing that section of the river.

4.10 BIOLOGICAL RESOURCES

4.10.1 Affected Environment

Biological resources include native or naturalized plants and animals and the habitats (e.g., wetlands, forests, and grasslands) in which they exist. Protected and sensitive biological resources include federally listed (endangered or threatened), proposed, and candidate species designated by the USFWS. Sensitive habitats described in this chapter include those areas designated by the USFWS as critical habitat protected by the Endangered Species Act (ESA) and sensitive ecological areas as designated by State or Federal rulings. Sensitive habitats also include wetlands, plant communities that are unusual or of limited distribution, and important seasonal use areas for wildlife (e.g., migration routes, breeding areas, crucial summer and winter habitats).

4.10.1.1 Vegetation

The distribution of vegetation within Utah is a function of the characteristic geology, soils, climate, and water of a given geographic area and correlates with distinct areas identified as ecoregions. Ecoregions are areas that share similar characteristics and environmental conditions (e.g., climate, geology, soils) within a region having similar ecosystem types, functions, and qualities. As shown in Table 18, Utah contains parts of seven major USEPA Level III ecoregions. The most prominent ecoregions in Utah are the Colorado Plateaus to the east, Central Basin and Range to the west, and the Wasatch and Uinta Mountains. Other ecoregions include the Wyoming Basin, Northern Basin and Range, Mojave Basin and Range, and Southern Rockies. (USEPA, 2000)

Table 18: USEPA Level III Ecoregions of Utah[34]

Ecoregion Number	Physiographic Province: Ecoregion Name	Abiotic Characterization	General Vegetative Communities	Typical Dominant Vegetation
13	Basin and Range: Central Basin and Range	Composed of northerly trending, fault-block ranges and intervening, drier basins where valleys, slopes, and alluvial fans are either shrub and grass-covered, shrub- covered, or barren.	Saltbush-greasewood, Great Basin sagebrush, Juniper-pinyon woodland, Spruce fir forest	**Shrub** - Wyoming big sagebrush (*Artemisia tridentata ssp. wyomingensis*), black sagebrush (*Artemisia nova*), mountain big sagebrush (*Artemisia tridentate ssp. vaseyana*)
14	Basin and Range: Mojave Basin and Range	Made up of basins and scattered mountains that are generally lower, warmer, and drier than those of the Central Basin and Range.	Creosote bush, Juniper-pinyon woodland	**Shrub -** Creosote bush (*Larrea tridentata*), Joshua tree (*Yucca brevifolia*), black brush (*Coleogyne ramosissima*), big sage brush (*Artemisia tridentata*)
80	Basin and Range: Northern Basin and Range	Consists of dissected lava plains, rolling hills, alluvial fans, valleys, and scattered mountains.	Sagebrush steppe, Juniper woodlands, Grasses	**Shrub -** Wyoming big sagebrush, black sagebrush **Forbs/Grasses -** Bluebunch wheatgrass (*Pseudoroegneria spicata*), and Idaho fescue (*Festuca idahoensis*)
18	Colorado Plateaus: Wyoming Basin	This area is a broad intermontane basin containing rolling plains, high hills, mesas, and low mountains and dominated by arid grasslands and shrublands.	Douglas fir forest, Lodgepole pine forest	**Conifer Trees -** Douglas fir (*Pseudotsuga menziesii*), lodgepole pine (*Pinus contorta*), and western white pine (*Pinus monticola*).
20	Colorado Plateaus: Colorado Plateaus	An area of uplifted, eroded, and deeply dissected tableland where benches, mesas, buttes, salt valleys, cliffs, and canyons are formed in and underlain by thick layers of sedimentary rock.	Juniper-pinyon woodland, Saltbush-greasewood	**Hardwood Trees** - Junipers (*Juniperus* spp.), singleleaf ash (*Fraxinus anomala*) **Conifer Trees** - Pinyon pines (*Pinus edulis* and *Pinus monophylla*), singleleaf ash (*Fraxinus anomala*) **Shrub** - Utah service berry (*Amelanchier utahensis*)
21	Colorado Plateaus:	Made up of isolated, laccolithic mountains that protrude from the dry expanses of the	Subalpine forests, Dry forests, Shrublands	**Conifer Trees** - Pines (*Pinus* spp.), Douglas fir, ponderosa pine (*Pinus ponderosa*)

Key Habitats

The Utah Division of Wildlife Resources (UDWR) has identified wildlife Species of Greatest Conservation Need (SGCN) and corresponding key habitats in their 2015 Wildlife Action Plan (WAP) (Tables 19 and 20). Within the 2015 WAP, eight terrestrial habitats and five aquatic habitats were identified as key habitat, which are the most important habitats with the greatest

[34] Sources: (USEPA, 2015g; UDNR, 2015b)

threats to those habitats, while supporting many SGCN, along with other wildlife and plant species. (Utah Wildlife Action Plan Joint Team, 2015)

Table 19: Utah's Terrestrial Key Habitats[35]

Terrestrial Key Habitat	Acres	Percent of Utah's Land Area
Aspen-Conifer	2,988,620	5.50%
Desert Grassland	331,185	0.61%
Gambel Oak	2,042,775	3.76%
Lowland Sagebrush	11,695,319	21.52%
Mojave Desert Shrub	482,009	0.89%
Mountain Meadow	74,419	0.14%
Mountain Sagebrush	2,338,378	4.30%
Mountain Shrub	1,436,147	2.64%
Total	**21,388,852**	**39.36%**

Table 20: Utah's Aquatic Key Habitats[36]

Aquatic Key Habitat	Acres	Percent of Utah's Land Area
Aquatic-Forested	4,460	0.01%
Aquatic Scrub/Shrub	54,428	0.10%
Riverine	120,256	0.22%
Emergent	375,399	0.69%
Open Water	882,641	1.62%
Total	**1,437,184**	**2.64%**

Nuisance and Invasive Plants

There are a large number of undesirable plant species that are considered nuisance and invasive. Noxious weeds are typically non-native species that have been introduced into an ecosystem inadvertently; however, on occasion native species can be considered a noxious weed. Noxious weeds greatly affect agricultural areas, forest management, natural, and other open areas (Government Printing Office, 2011). The U.S. government has designated certain plant species as noxious weeds in accordance with the Plant Protection Act of 2000 (7 U.S.C. 7701 et seq.).

Within Utah, a noxious weed is "any plant the commissioner determines to be especially injurious to public health, crops, livestock, land, or other property" (Utah State Legislature, 1991). The Utah Noxious Weed Control Act (Title 4, Chapter 17) stipulates that the commissioner be responsible for the establishment of the statewide noxious weed list and updates to that list, as necessary. In addition, the Act further stipulates that each county is responsible for implementing and enforcing

[35] Source: (Utah Wildlife Action Plan Joint Team, 2015)
[36] Source: (Utah Wildlife Action Plan Joint Team, 2015)

noxious weed management. Further, individual counties in Utah may also develop a list of noxious weeds to be regulated at the county level. The USDA NRCS lists 19 introduced, invasive, and noxious plants in Utah (Table 21) (NRCS, 2003). Utah considers the NRCS invasive species as their State invasive species list, along with numerous others. Other invasive species of concern in Utah include tamarisk/saltcedar (*Tamarix ramosissima*), Russian olive (*Elaeagnus angustifolia*), phragmites (*Phragmites australis* ssp), and puncturevine/goathead (*Tribulus terrestris*) (Utah Department of Agriculture and Food, 2016a).

Table 21: NRCS Introduced, Invasive, and Noxious Plants in Utah[37]

Common Name	Scientific Name
Bermudagrass	*Cynodon dactylon* (L.) Pers.1
Canada thistle	*Cirsium arvense* (L.) Scop.
Diffuse knapweed	*Centaurea diffusa* Lam.
Dyers woad	*Isatis tinctoria* L.
Field bindweed	*Convolvulus arvensis* L.
Hoary cress	*Cardaria draba* (L.) Desv.
Johnsongrass	*Sorghum halepense* (L.) Pers.
Leafy spurge	*Euphorbia esula* L.
Medusahead	*Taeniatherum caput-medusae* (L.) Nevski
Musk thistle	*Carduus nutans* L.
Perennial pepperweed	*Lepidium latifolium* L.
Perennial sorghum	*Sorghum almum* Parodi
Purple loosestrife	*Lythrum salicaria* L.
Quackgrass	*Elymus repens* (L.) Gould
Russian knapweed	*Acroptilon repens* (L.) DC.
Scotch thistle	*Onopordum acanthium* L.
Spotted knapweed	*Centaurea stoebe* L. ssp. *micranthos* (Gugler) Hayek
Squarrose knapweed	*Centaurea virgata* Lam. ssp. *squarrosa* (Willd.) Gugler
Yellow starthistle	*Centaurea solstitialis* L.

4.10.1.2 Wildlife

Utah is home to 134 mammal species, 335 resident bird species, 100 migratory bird species, 57 reptile species, 17 amphibian species, more than 10,000 invertebrate species, and 83 fish species (UDWR, 2015a). Utah's 2015 WAP lists 141 SGCN, including 26 mammals, 26 birds, 12 reptiles, 8 amphibians, 2 crustaceans, 45 mollusks, and 22 fish. These wildlife species are considered those most important for State conservation efforts, some include federally listed endangered, threatened, proposed, or candidate species. State Wildlife Grants can provide funding for efforts

[37] Source: (NRCS, 2003)

to reduce their potential to be listed as threatened or endangered. Although these species have been targeted for conservation, not all are currently warranted legal protection (e.g., via the ESA). Section 4.10.1.3, Protected Species, describes Utah's federally listed species in greater detail. (Utah Wildlife Action Plan Joint Team, 2015)

The UDWR and USGS have mapped wildlife habitat used for seasonal or sensitive time periods in their life history (e.g., nesting, breeding, birthing, and parturition) (USGS, 2016c; Utah Wildlife Action Plan Joint Team, 2015). Seasonal restrictions for construction or disruptive activities could be required or recommended for projects to protect wildlife or fish during sensitive seasonal timeframes (WAFWA, 2016; Utah Wildlife Action Plan Joint Team, 2015).

Common and widespread mammalian species in Utah include mule deer (*Odocoileus hemionus*), coyote (*Canis latrans*), and black-tailed jackrabbit (*Lepus californicus*) (UDWR, 2016a; UDWR, 2016b; UDWR, 2016c). Many mammals are widely distributed; however, some species, such as snowshoe hare (*Lepus americanus*), moose (*Alces alces*), and black bear (*Ursus americanus*) are found primarily in the higher elevations and coniferous forests within Utah (UDWR, 2016d; UDWR, 2016e; UDWR, 2016f).

In Utah, mule deer, elk, moose, pronghorn (*Antilocapra americana*), big horn sheep (*Ovis canadensis*), mountain goat (*Oreamnos americanus*), mountain lion (*Puma concolor*), bison (*Bison bison*), and black bear are classified as big game species. Small game species include small mammals (e.g., squirrels and rabbits), furbearers, and upland and migratory game birds (UDWR, 2015a). The following species of furbearers may be legally hunted or trapped in Utah: beaver (*Castor canadensis*), badger (*Taxidea taxus*), red fox (*Vulpes vulpes*), grey fox (*Urocyon cinereoargenteus*), kit fox (*Vulpes macrotis*), ringtail (*Bassariscus astutus*), striped skunk (*Mephitis mephitis*), spotted skunk (*Spilogale* spp.), weasel (*Mustela* spp.), muskrat (*Ondatra zibethicus*), mink (*Neovison vison*), marten (*Martes* spp.) and bobcat (*Lynx rufus*) (UDNR, 2015c).

The number of native bird species documented in Utah varies according to the timing of the data collection effort, changes in bird taxonomy, and the reporting organization's method for categorizing occurrence and determining native versus non-native status. The diverse ecological communities (i.e., mountains, lakes, plains, etc.) found in Utah support a large variety of bird species. As of 2015, 435 species of resident and migratory birds have been documented in Utah, and about 231 bird species, excluding waterfowl, breed in Utah. (UDWR, 2015a; Parrish, 2002)

Migratory birds use flyways during annual migrations northward in the spring and southward in the fall. The Migratory Bird Treaty Act (MBTA), enforced by the USFWS, prohibits take, possession, importing, exporting, transporting, selling, purchasing, bartering, or sale migratory birds, their nests, eggs, or their parts except by permit (USFWS, 2013). Both the Central and Pacific Flyways pass over Utah. Covering the eastern region of Utah, the Central Flyway spans from the Gulf Coast of Texas to the Canadian boreal forest. The Pacific Flyway covers the remainder of Utah and spans from the west coast of Mexico to the Arctic. Large numbers of migratory birds utilize these flyways and other migration corridors and pathways throughout Utah each year during annual migrations northward in the spring and southward in the fall. Wetlands surrounding the Great Salt Lake are an important stopover for many migratory birds traveling from as far away as South America. The USFWS maintains the list of species protected under the Act. Migratory birds protected under the MBTA are listed in 50 CFR 10.13 (USFWS, 2013).

The Important Bird Area (IBA) program is an international bird conservation initiative with a goal of identifying the most important places for birds, and conserving these areas. These IBAs are identified according to standardized, scientific criteria through a collaborative effort among State, national, and international conservation-oriented non-governmental organizations (NGOs), State and Federal government agencies, local conservation groups, academics, grassroots environmentalists, and birders. Global IBAs are sites determined to be important for globally rare species or to support bird populations at a global scale. State IBAs are sites determined to be important for State rare species or to support local populations of birds. (Audubon, 2015)

According to the National Audubon Society, as of 2013, a total of 22 IBAs have been identified in Utah; 12 are global priority areas and 10 are State priority areas for a total of 3,558,338 acres (Figure 17). These areas include breeding range, migratory stop-over, feeding, and over- wintering areas, and cover a variety of habitats such as native grasslands, grasslands, sage brush, and wetland/riparian areas. These IBAs are distributed throughout Utah. The largest concentrations of IBAs are located in the Canyonlands area in the Colorado Plateau in the southeast region of Utah and the Great Salt Lake area in the Basin and Range area in the northwest region. Other IBAs such as Upper Strawberry Watershed, in central Utah, are important migration stops and breeding grounds for many waterfowl species. (Audubon, 2016)

Bald eagles (*Haliaeetus leucocephalus*) and golden eagles (*Aquila chrysaetos*) are protected under the Bald and Golden Eagle Protection Act. Bald eagles are generally found year-round near large rivers and lakes throughout the State (eBird, 2015a). Golden eagles are generally found in a variety of habitats within their known range, but they generally nest in mountains and cliffs. Golden eagles are also found throughout the State all year (eBird, 2015b).

A total of 71 reptile and amphibian species occur in Utah including 17 frogs and toads, 21 lizards, and 30 snakes (UDWR, 2015b; UDWR, 2015c). These species occur in a wide variety of habitats from the dry basin ranges in the west to the Colorado Plateau and Middle Rocky Mountains. Utah's reptile and amphibian species are covered under Utah Administrative Code R-657-53, Amphibian and Reptile Collection, Importation, Transportation and Possession (Utah Department of Administrative Services, 2015).

Utah is home to more than 10,000 species of invertebrates, including a wide variety of bees, hornets, wasps, butterflies, moths, beetles, flies, dragonflies, damselflies, spiders, mites, and nematodes (UDWR, 2015a). These invertebrates provide an abundant food source for mammals, birds, reptiles, amphibians, and other invertebrates. Utah is home to more than 20 percent of the 4,000 native bees of North America, including 900 species native to the State (Utah State University Extension, 2013). The number of butterfly and skipper species that occur in Utah is unknown, but species from eight families (more than 250 known species) have been recorded (Utah Lepidopterists' Society, 2007).

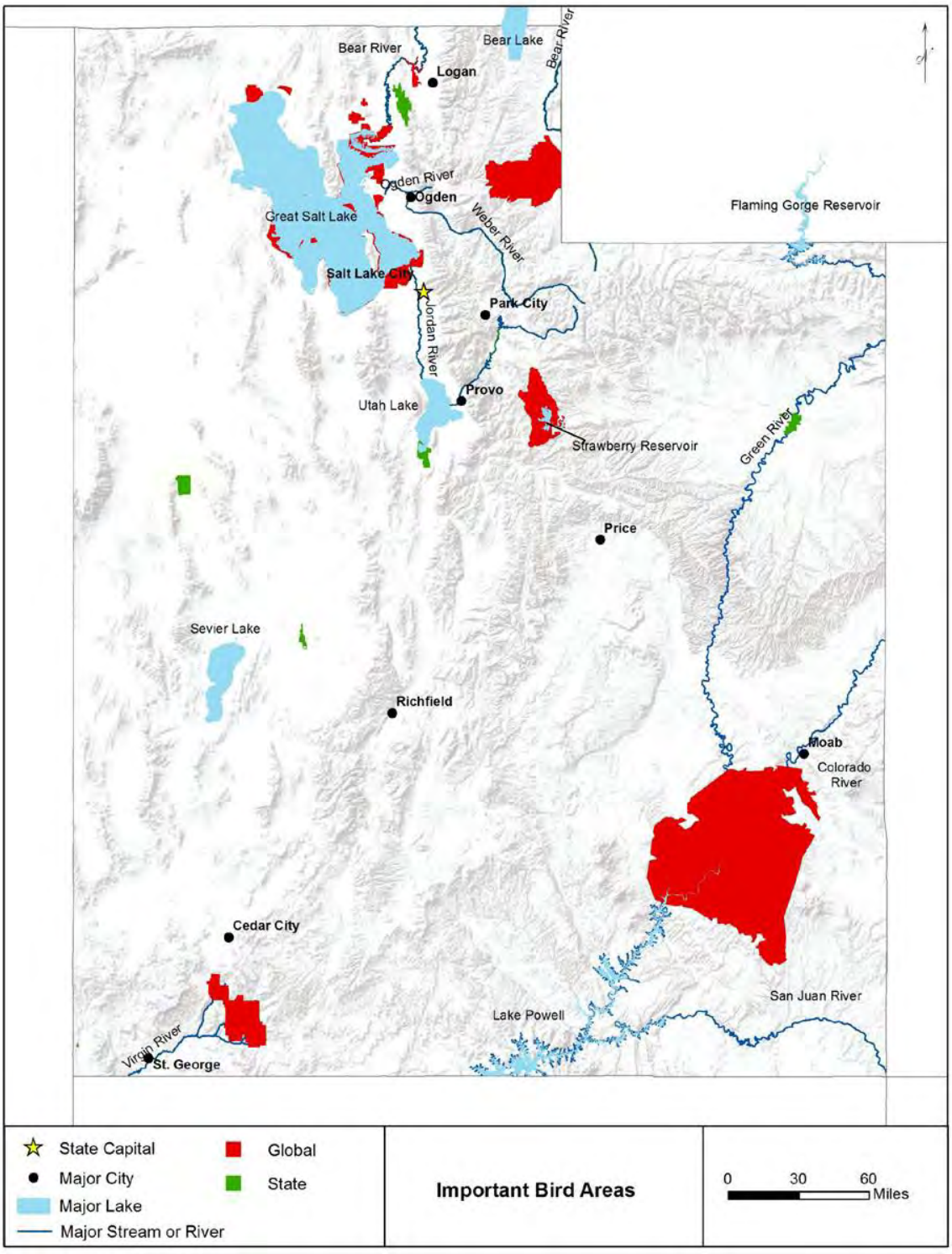


Figure 17: Important Bird Areas

Utah is home to breeding populations of more than 83 species of freshwater fish, ranging in size from minnows to larger species such as the land-locked sockeye (or kokanee) salmon. These species are grouped into 14 families, bullheads/catfishes, burbot, killfishes, livebearers (i.e., mosquito fish, mollies, and sword tails), minnows, perches, pikes/pickerels, sculpins, sticklebacks,

suckers, sunfishes, temperate basses, trout, and trout-perch (UDWR, 2015d). Utah native fish species include the Bear Lake whitefish (*Prosopium abyssicola*), leatherside chub (*Gila copei*), and Virgin spinedace (*Lepidomeda mollispinis*) (UDNR, DWR, 2016)

Utah is home to 69 mollusk species, including 6 freshwater bivalve species (Oliver, 1999). Two of the freshwater bivalve species, the California floater (*Anodonta californiensis*) and western pearlshell (*Margaritifera falcata*), are listed as SGCN (UDWR, 2015a). The western pearlshell inhabits coldwater trout streams in Utah, while the California floater is found in slow-moving streams, lakes, and reservoirs. River diversions and impoundments are a primary threat to these species. Aside from a multitude of freshwater invertebrates whose adult forms are terrestrial insects (e.g., flies, beetles, etc.), other well-known Utah freshwater invertebrates include a variety of crayfish, fairy shrimp, amphipods, and pill bug species (UDWR, 2015a).

Invasive Wildlife Species

Utah has adopted regulations that prohibit or regulate the possession, transport, importation, sale, purchase, and introduction of select wildlife species (e.g., Aquatic Invasive Species Interdiction Act [Chapter 27]). Following the NRCS, Utah maintains a list of non-native species that could pose a risk to cropland, rangeland, or wildlands; this list includes an amphibian species, five invertebrates, and five mammal species. In addition, the list includes all non-native agricultural pests, all non-native, non-sport fish, and sport fish in sensitive, non-game areas (NRCS, 2011). The list of prohibited aquatic species includes only Dreissena mussels (*Dreissena* spp.). However, the New Zealand mudsnail (*Potamopyrgus antipodarum*), Eurasian watermilfoil (*Myriophyllum spicatum*), Quagga (*Dreissena bugensis*), and Zebra mussels (*Dreissena polymorpha*) are considered nuisance aquatic species within Utah (UDWR, 2013).

4.10.1.3 Protected Species

The USFWS is responsible for administering the ESA (16 U.S.C. §1531 et seq.) in Utah. The USFWS has identified 21 federally endangered and 21 federally threatened species known to occur in Utah (USFWS, 2016b). Of the 42 species, 17 have designated critical habitat[38] in Utah (Figure 18) (USFWS, 2016b). Three candidate species[39] are identified by USFWS as occurring within Utah (USFWS, 2015a). Candidate species are not afforded statutory protection under the ESA. However, the USFWS recommends taking these species into consideration during environmental planning and impact assessment because they could be listed in the future (USFWS, 2014). The 42 species (Table 22) include 2 mammals, 4 birds, 1 reptile, 9 fish, 1 invertebrate, and 25 plants (USFWS, 2016b). Federal land management agencies maintain lists of species of concern for their landholdings; these lists are not discussed below as they are maintained independently from the

[38] Critical habitat includes "the specific areas (i) within the geographic area occupied by a species, at the time it is listed, on which are found those physical or biological features (I) essential to conserve the species and (II) that may require special management considerations or protection; and (ii) specific areas outside the geographic area occupied by the species at the time it is listed upon determination that such areas are essential to conserve the species" (16 U.S.C. §1532(5)(A)).

[39] Candidate species are plants and animals that the USFWS has "sufficient information on their biological status and threats to propose them as endangered or threatened under the ESA, but for which development of a proposed listing regulation is precluded by other higher priority listing activities" (USFWS, 2014).

ESA. For future site-specific analysis on those lands, consultation with the appropriate land management agency would be required.

Table 22: Federally Listed Species of Utah[40]

Class	Common Name	Scientific Name	Federal Status[41]	Critical Habitat in Utah	Habitat Description
Mammals	Canada lynx	Lynx canadensis	T	No	Found in spruce/fir forests in northeastern Utah.
Mammals	Utah prairie dog	Cynomys parvidens	T	No	Found in moist, herbaceous vegetation with well- drained soils in southwestern Utah.
Birds	Gunnison sage-grouse	Centrocercus minimus	T	Yes: in Grand and San Juan Counties.	Occurs in sagebrush and sagebrush grasslands in southeastern Utah.
Birds	Mexican spotted owl	Strix occidentalis lucida	T	Yes: in Carbon, Emery, Garfield, Grand, Iron, Kane, San Juan, Washington, and Wayne Counties.	Occurs in canyonlands in the western and southwestern portions of Utah.
Birds	Southwestern willow flycatcher	Empidonax traillii extimus	E	Yes: in Kane, San Juan, and Washington Counties.	Occurs in riparian and shrub communities in southern Utah.
Birds	Western yellow-billed cuckoo	Coccyzus americanus	T	Yes: in Uintah, Duchesne, Grand, San Juan, Wayne and Washington Counties.	Occurs in riparian, forested habitat in the eastern portion of Utah.
Reptiles	Desert tortoise	Gopherus agassizii	T	Yes: in the Mojave Desert region including Washington County.	Occurs in a variety of habitats from flats and slopes typically characterized by creosote bush scrub in the lower southwestern portion of Utah.
Fish	Bonytail chub	Gila elegans	E	Yes: in the Green and Colorado Rivers in Uintah, Grand, Garfield, and San Juan Counties.	Occurs in river channels and flooded, ponded, or inundated river eddies and pools. Found in the upper Colorado and Green Rivers in 16 counties in Utah.

[40] Source: (USFWS, 2016b)

[41] E = Endangered, T = Threatened

Class	Common Name	Scientific Name	Federal Status[41]	Critical Habitat in Utah	Habitat Description
Fish	Colorado pikeminnow (Squawfish)	Ptychocheilus lucius	E	Yes: along the Green, Colorado, and Yampa rivers in Uintah, Carbon, Grand, Emery, Wayne, and San Juan Counties.	Occurs only in portions of the Green River, upper Colorado River, and a small numbers of individuals in the San Juan River, Utah.
Fish	Greenback cutthroat trout	Oncorhynchus clarki stomias	T	No	Occurs in cold water streams and lakes with adequate spawning habitat. Found in San Juan County, in the southeastern corner of Utah.
Fish	Humpback chub	Gila cypha	E	Yes: along the Green and Colorado Rivers in Uintah, Grand, Garfield, and San Juan Counties.	Occurs in the Colorado and Green Rivers. Found in 16 counties in Utah.
Fish	June sucker	Chasmistes liorus	E	Yes: from Utah Lake to the Provo River.	Occurs only in Utah Lake.
Fish	Lahontan cutthroat trout	Oncorhynchus clarkii henshawi	T	No	Occurs in cold, clear, flowing water.
Fish	Razorback sucker	Xyrauchen texanus	E	Yes: Utah in the Green, White, Colorado, and Duchesne rivers in Uintah, Carbon, Garfield, Grand, Emery, Wayne, and San Juan Counties.	Occurs in warm water reaches of larger rivers of the Colorado River Basin in Utah.

Class	Common Name	Scientific Name	Federal Status[41]	Critical Habitat in Utah	Habitat Description
Fish	Virgin River chub	Gila seminuda	E	Yes: portions of the Virgin River in Washington County.	Occurs only in the Virgin River.
Fish	Woundfin	Plagopterus argentissimus	E	Yes: along portions of the main stem of the Virgin River and its associated 100- year floodplain in Utah.	Occurs in warm, quiet water habitats with sand substrates within the mainstem of the Virgin River in Utah.
Invertebrates	Kanab ambersnail	Oxyloma haydeni kanabensis	E	No	Marshes and other wetlands watered by springs and seeps. Found in Three Lakes, Kane County, in southern Utah.
Plants	Autumn buttercup	Ranunculus aestivalis	E	No	Occurs only in Sevier River Valley in western Garfield County.
Plants	Barneby reed-mustard	Schoenocrambe barnebyi	E	No	Red clay soils that are covered with sandstone talus on steep slopes facing north. Found in Emery and Wayne Counties in central Utah.
Plants	Barneby ridge-cress	Lepidium barnebyanum	E	No	Poorly developed soils on lime-rich mud shale barrens occurring over petroleum deposits. Found in Duchesne County, northeastern Utah.
Plants	Clay phacelia	Phacelia argillacea	E	No	A limited strip of soil called Green River Shale on steep hillsides of shale clay. Found in Utah County, central Utah.
Plants	Clay reed-mustard	Schoenocrambe argillacea	T	No	Gypsum-rich clay covered in sandstone talus on steep hillsides. Found in Uintah County, northeastern Utah.
Plants	Deseret milk-vetch	Astragalus desereticus	T	No	Sandy-gravelly, steep, erosive hillsides in sagebrush- juniper communities of the Moroni Formation near Birdseye. Found in Utah County, central Utah.

Class	Common Name	Scientific Name	Federal Status[41]	Critical Habitat in Utah	Habitat Description
Plants	Dwarf bear-poppy	Arctomecon humilis	E	No	Selected sites on the Moenkopi formation from 2,700 to 3,300 feet in elevation. Found in Washington County, in the southwestern corner of Utah.
Plants	Gierisch mallow	Sphaeralcea gierischii	E	Yes: Starvation Point in Washington County.	Gypsum outcrops associated with the Harrisburg Member (topmost geologic layer) of the Kaibab Formation, within warm desert scrub plant community.
Plants	Heliotrope milk-vetch	Astragalus montii	T	Yes: western Heliotrope Mountain in Sanpete County.	Shallow, poorly developed clay soil covered with rocks on shale limestone barrens over coal and petroleum deposits at the timberline of the Flagstaff Geological Formation. Found in Sanpete and Sevier Counties, central Utah.
Plants	Holmgren milk-vetch	Astragalus holmgreniorum	E	Yes: 23 units in Washington County.	Elevations between 2,480 and 2,999 feet in soils with small stone and gravel deposits on the skirt edges of hill and plateau formations that are a little above or at the edge of drainage areas that drain to the Santa Clara and Virgin Rivers.
Plants	Jones cycladenia	Cycladenia humilis var. jonesii	T	No	Gypsum-rich, salty soils in plant communities of mixed desert scrub, juniper, or wild buckwheat-Mormon tea at elevations of 4,390 to 6,000 feet. Found in Emery, Garfield, Grand, and Kane Counties, in the eastern and southern portions of Utah.
Plants	Kodachrome bladderpod	Lesquerella tumulosa	E	No	White, bare shale mounds with not much vegetation at an elevation of about 5,700 feet. Found in Kane County, southern Utah.
Plants	Last chance townsendia	Townsendia aprica	T	No	Fine-textured shale soils in a variety of plant communities such as saltbush, pinyon-juniper woodlands, and ponderosa pine woodlands, within the Moenkopi Formation, Morrison Formation, Mancos Shale Group, and the San Rafael Group. Found in Emery, Sevier, and Wayne Counties, central Utah.

Class	Common Name	Scientific Name	Federal Status[41]	Critical Habitat in Utah	Habitat Description
Plants	Maguire primrose	Primula maguirei	T	No	Cool, moss-covered dolomite, north-facing cliff tops, indentations, and boulders in patches of soil. Found in Logan Canyon in Cache County, northern Utah.
Plants	Navajo sedge	Carex specuicola	T	No	Moist soil in shallow caves on sandstone cliffs at elevations of 4,200 to 7,600 feet in pinon-juniper woodland communities. Found in San Juan County, in the southeastern corner of Utah.
Plants	Pariette cactus	Sclerocactus brevispinus	T	No	Fine soils, frequently covered in thin rock fragments, on gravelly hills in desert shrubland with little vegetation. Found in Duchesne and Uintah Counties, eastern Utah.
Plants	San Rafael cactus	Pediocactus despainii	E	No	Fine textured soils rich in calcium from limestone substrates; mainly on benches, hill tops, and gentle slopes facing south; and in open woodlands of pinyon-juniper woodland plant communities. Found in Emery and Wayne Counties, central Utah.
Plants	Shivwits milk-vetch	Astragalus ampullarioides	E	Yes: 5 units of Washington County.	Grows in dense patches in secluded pockets of purple colored, soft clay soil found on the Chinle formation at elevations between 3,018 and 4,363 feet with sparse vegetation.
Plants	Shrubby reed-mustard	Schoenocrambe suffrutescens	E	No	Found on a limited strip of soil on a white shale layer from the Green River geologic formation that looks like small, dry, desert islands. Found in Duchesne and Uintah Counties, eastern Utah.
Plants	Siler pincushion cactus	Pediocactus sileri	T	No	Gypsum and calcium-rich clay soils that are high in soluble salts and usually white in color, or sometimes red; found on low, rolling hills supporting sparse vegetation. Found in Kane and Washington Counties, in southern Utah.

Class	Common Name	Scientific Name	Federal Status[41]	Critical Habitat in Utah	Habitat Description
Plants	Uinta Basin hookless cactus	Sclerocactus wetlandicus	T	No	Coarse soils from cobble and gravel river and stream deposits, or rocky surfaces on plateau slopes at elevations between 4,400 and 6,200 feet. Found in Carbon, Duchesne, and Uintah Counties, eastern Utah.
Plants	Ute ladies'-tresses	Spiranthes diluvialis	T	No	Moist soils in wetlands, wet meadows, and swales near perennial streams or lakes with vegetation that is not too dense. Found in 11 counties throughout Utah.
Plants	Welsh's milkweed	Asclepias welshii	T	Yes: the Coral Pink Sand Dunes and the Sand Hills in Kane County.	Unstable aeolian sand on active sand dunes in plant communities mostly consisting of sand, but also including groves of ponderosa pine and Gambel oak.
Plants	Winkler cactus	Pediocactus winkleri	T	No	Benches, hill tops, and gentle slopes facing south in fine textured, somewhat alkaline soils from siltstone and shale substrates of the Dakota and Morrison formations. Found in Emery, Garfield, Sevier, and Wayne Counties, central Utah.
Plants	Wright fishhook cactus	Sclerocactus wrightiae	E	No	Typically soils with some cryptogamic crust, and scattered with sandstone or basalt gravel, cobble, and boulders. Grows in gypsum-rich layers as well as areas with little to no gypsum. Surrounding habitat is usually dry and consists of widely spaced shrubs, herbs, bunch grasses, or pinyon and juniper without a lot of surface coverage. Found in Emery, Garfield, Sevier, and Wayne Counties, southern Utah.

Two mammals are federally listed as threatened for Utah, as summarized in Table 22. The Canada lynx (*Lynx canadensis*) is found in northeastern Utah, and the Utah prairie dog (*Cynomys parvidens*) is found in southwestern Utah. Neither species has critical habitat in Utah. There is a population of the endangered black-footed ferret (*Mustela nigripes*) in eastern Utah that is classified as experimental/non-essential by USFWS (USFWS, 2015b; USFWS, 2016b).

One federally listed endangered and three federally listed threatened bird species occur in Utah; all four species have critical habitat in Utah. The Southwestern willow flycatcher (*Empidonax traillii extimus*) is listed as endangered, and the three threatened species are the Gunnison sage-grouse (*Centrocercus minimus*), Mexican spotted owl (*Strix occidentalis lucida*), and the Western

yellow-billed cuckoo (*Coccyzus americanus*). Table 22 describes the habitat for each avian species and the counties which contain critical habitat. Figure 18 displays critical habitat for the birds and other threatened and endangered species in Utah. (USFWS, 2016b)

One threatened reptile, the desert tortoise (*Gopherus agassizii*), is federally listed for Utah as summarized in Table 22. The desert tortoise has critical habitat (59 FR 5820 5866, February 8, 1994) within the Mojave Desert region including Washington County, in the lower southwestern portion of Utah (Figure 18). (USFWS, 2016b)

Seven endangered and two threatened fish species are federally listed for Utah, as summarized in Table 22. The razorback sucker (*Xyrauchen texanus*) occurs in the Colorado River Basin. The humpback chub (*Gila cypha*) occurs in the Colorado and Green Rivers. The Colorado pikeminnow (*Ptychocheilus lucius*) occurs in the Colorado, Green, and San Juan Rivers. The bonytail chub (*Gila elegans*) occurs in the Colorado and Green Rivers. The Virgin River chub (*Gila seminuda* (=*robusta*)) and the woundfin (*Plagopterus argentissimus*) occur in the Virgin River. The June sucker (*Chasmistes liorus*) occurs in Utah Lake. The Lahontan cutthroat trout (*Oncorhynchus clarkii henshawi*) occurs in various streams and lakes in Utah. The greenback cutthroat trout (*Oncorhynchus clarki stomias*) occurs in streams and lakes in San Juan County, in the southeastern corner of Utah. All of the listed fish, with the exception of the two cutthroat species, have critical habitat in Utah (Figure 18). (USFWS, 2016b)

One federally listed endangered invertebrate species is found in Utah, as summarized in Table 22. The Kanab ambersnail (*Oxyloma haydeni kanabensis*) is a terrestrial snail species found in one naturally occurring population in the southern portion of Utah. There is no critical habitat designated for this species.

Twelve endangered and 13 threatened plant species are federally listed for Utah as summarized in Table 22. Five of these species have critical habitat in Utah: Gierisch mallow (*Sphaeralcea gierischii*), Holmgren milk-vetch (*Astragalus holmgreniorum*), heliotrope milk-vetch (*Astragalus montii*), Shivwits milk-vetch (*Astragalus ampullarioides*), and Welsh's milkweed (*Asclepias welshii*) (Figure 18). The Maguire primrose (*Primula maguirei*) occurs in northern Utah and the Barneby ridge-cress (*Lepidium barnebyanum*) and clay reed-mustard (*Schoenocrambe argillacea*) occur in northeastern Utah. Autumn buttercup (*Ranunculus acriformis var. aestivalis*), occurs in western Utah. Jones cycladenia (*Cycladenia humilis var. jonesii*), Pariette cactus (*Sclerocactus brevispinus*), shrubby reed-mustard (*Schoenocrambe suffrutescens*), and Uinta Basin hookless cactus (*Sclerocactus wetlandicus*) occur in eastern Utah. Jones cycladenia, Kodachrome bladderpod (*Lesquerella tumulosa*), Siler pincushion cactus (*Pediocactus sileri*), Welsh's milkweed, and Wright fishhook cactus (*Sclerocactus wrightiae*) occur in southern Utah. Dwarf bear-poppy (*Arctomecon humilis*), Gierisch mallow, Holmgren milk-vetch, and the Shivwits milk-vetch occur in southwestern Utah. The Navajo sedge (*Carex specuicola*) occurs in southeastern Utah. Barneby reed-mustard (*Schoenocrambe barnebyi*), clay phacelia (*Phacelia argillacea*), Deseret milk-vetch (*Astragalus desereticus*), heliotrope milk-vetch, last chance townsendia (*Townsendia aprica*), San Rafael cactus (*Pediocactus despainii*), and the Winkler cactus (*Pediocactus winkleri*) occur in central Utah. Ute ladies'-tresses (*Spiranthes diluvialis*) occurs throughout Utah (USFWS, 2016b). Frisco buckwheat (*Eriogonum soredium*), Frisco clover (*Trifolium friscanum*), and Ostler's peppergrass (*Lepidium ostleri*) have been identified by USFWS as candidate species in Utah (USFWS, 2015a).

The 2015 WAP identified 141 SGCN throughout Utah. These species have been identified as a proactive measure to prevent the need for listing them under the ESA. The 13 key habitats mentioned under Section 4.10.1.1, Vegetation, are those that are most important to support these species. These species, key habitats, and conservation actions to support these species are described in the 2015 WAP and should be considered when any construction activity is being planned (https://wildlife.utah.gov/wap/Utah_WAP.pdf). (Utah Wildlife Action Plan Joint Team, 2015)

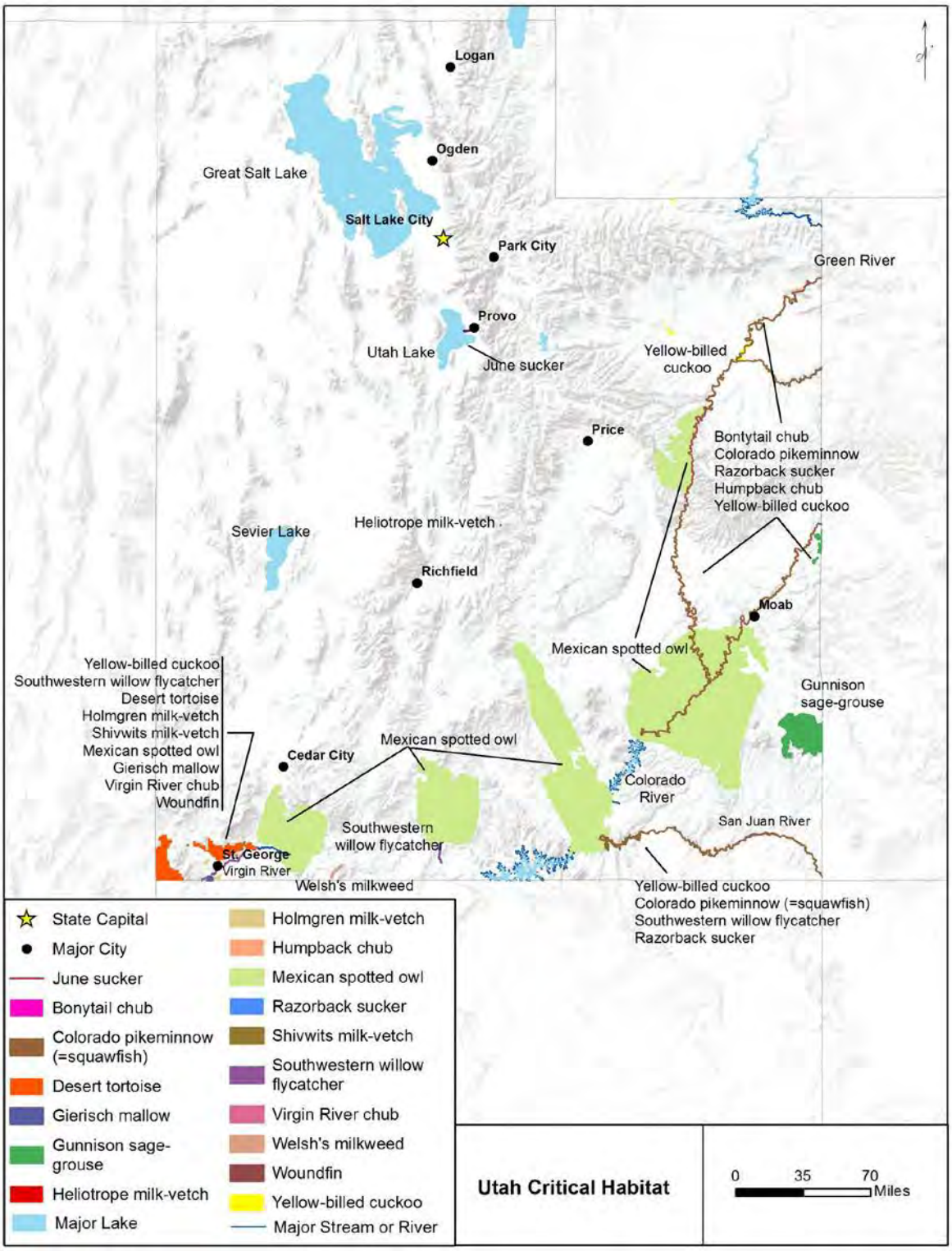


Figure 18: Critical Habitat for Threatened and Endangered Species

4.10.2 Environmental Consequences

This section describes potential impacts to biological resources associated with the alternatives, as discussed below. There is potential for impacts to biological resources to occur when an activity:

- Direct or indirect injury or mortality of a non ESA-listed species at the population level;
- Habitat loss or fragmentation at the population-level, sub-population effects observed for at least one species or vegetation cover type;
- Effects to migratory pattern, path, or rest stops for migratory birds at the population level for at least one species.

Qualitative analyses have been used to determine the intensity and magnitude of the environmental impact. The relative degree of severity of environmental impacts are defined as:

- **No Impact:** No environmental impacts are readily apparent or identified.
- **Less than Significant:** Indicates that a change to resources would be measurable although the changes would be small and localized. BMPs, identified in Section 5, may be used to decrease the potential for impacts that are less than significant.
- **Significant:** Changes to resources would be measurable and would have substantial consequences on a local or regional level.

Table 23 presents the impact summary for biological resources.

Table 23: Impact Significance Rating Criteria for Biological Resources

Impact Criteria	Alternative 1 No Action	Alternative 2 Preferred Action
Non-ESA listed species injury or mortality at the population level	No Impact	No Impact
Habitat loss or fragmentation	Less than Significant	Less than Significant
Migratory pattern, path, or rest stops	Less than Significant	Less than Significant

There is potential for impacts to ESA-listed species to occur when an activity:

- Any impact to an ESA-listed species that would constitute a take under the ESA; or
- Habitat alteration in locations designated as Critical Habitat.

Impacts to species listed under the ESA are described in specific terms by the USFWS (USFWS & NOAA Fisheries, 1998). For ESA-listed species or designated critical habitat, the possible effects determinations are:

- **No Effect:** If the alternative does not affect listed species or designated critical habitat;
- **Not Likely to Adversely Affect (NLAA):** If effects on listed species or designated critical habitat are expected to be discountable, insignificant, or completely beneficial; or

- **Likely to Adversely Affect (LAA):** If any adverse effect to a listed species or designated critical habitat may occur as a direct or indirect result of the alternative, or an interrelated or interdependent action, and the effect is not discountable, insignificant, or beneficial.

Table 24 presents the impact summary for ESA-listed species and designated critical habitat.

Table 24: Impact Significance Rating Criteria for ESA Listed Species

Impact Criteria	Alternative 1 No Action	Alternative 2 Preferred Action
Jeopardy of an ESA-listed species or other special status species	No Effect	Determined on a site-specific basis
Habitat alteration or loss in designated Critical Habitat	NLAA	Determined on a site-specific basis

4.10.2.1 Alternative 1: No Action

Under the No Action Alternative, no localized or regional effects to threatened or endangered species are expected. This alternative does not include any Federal action; therefore, the applicants would not be required to consult with USFWS to comply with the ESA, MBTA, Fish and Wildlife Coordination Act (FWCA), or State laws. No impacts to species are expected to occur.

Under the No Action Alternative, present day conditions would remain, which could result in future flooding events and less than significant impacts to/NLAA habitats. Major flooding events could result in damaging, altering, and modifying current watershed elements, which could modify species habitats. Impacts to watershed elements could include alteration in stream flows, changes in substrates, removal of vegetation, and increased sedimentation. Damage to watershed elements could potentially cause less than significant impacts to species habitats habitat fragmentation, and damage to migratory stops along waterways. The magnitude, intensity, and duration of the impacts would be dependent on various characteristics of the disaster event including the season, amount of damage, length of the event, and intensity of the disaster. As a result, the impacts associated with a future disaster event are difficult, if not impossible, to quantify.

4.10.2.2 Alternative 2: Watershed Resiliency Activities

The actions under Alternative 2 may have less than significant impacts to sensitive biological resources, wetlands, or waterways due to watershed resiliency activities. No impacts would be expected to occur to non-listed plant or animal species. Prior to project approval, a review of available data and information on the potential for species and critical habitat occurrence in the project area would be conducted. Federal agencies will determine if consultation or coordination under the ESA, MBTA, or the Bald and Golden Eagle Protection Act is warranted on a site-specific basis. The proposed action could require the distribution or removal of hazards, materials, vegetation, and possibly structures from the waterway. Embankment work and in-water work could occur. Overall, watershed resiliency activities would protect and enhance the river corridor, improve native habitat, and support the riparian ecosystem, once the project is complete and vegetation has been established.

The proposed actions could result in less than significant impacts; however, short-term habitat loss for vegetation and wildlife could occur from removal of soil or vegetation. Displacement of wildlife could occur during project application due to human presence, use of machinery, and habitat loss. Over the long-term, habitat would be restored through project design and revegetation, which could improve overall habitat health and conditions. Removal of invasive plant species, such as tamarisk, would improve habitat for native vegetation and wildlife and enhance overall conditions of the river system.

Any alteration of the stream channel could result in sediment or soil runoff to downstream habitat. If this occurred, it could lead to accumulation of sediment in downstream gravels, possibly altering spawning habitat through sediment build up or cementation. Following the project, new habitat for fish and aquatic macroinvertebrates could be established, which could support aquatic wildlife, provide quality habitat, and result in less than significant impacts to these species.

Actions under Alternative 2 would be NLAA species or their critical habitat. However, Federal agencies would coordinate with USFWS and would review the project to make a determination of effect. If an agency determines that a project has the potential to affect sensitive biological resources, the agency would initiate the review process under Section 7 of the ESA, MBTA, or FWCA, as appropriate; the results of this consultation with USFWS would be documented in a memorandum to this PEA or in a SEA. If work occurs on U.S. Forest Service or BLM managed land, additional coordination with these agencies would be required. Specific project areas can be searched for presence of federally listed threatened or endangered species through the USFWS online Information, Planning and Consultation System (IPaC) (USFWS, 2016c).

In order to avoid and minimize potential impacts to federally listed threatened and endangered species and their habitats, applicants should implement conservation measures and BMPs (Section 5) provided by USFWS to the extent possible. Conservation measures include, but are not limited to the following:

- Locate access routes, staging areas, etc. within previously disturbed areas.
- Avoid disturbing or burying any existing riparian (streamside) habitat.
- Implement local BMPs for control of erosion and sedimentation.
- Incorporate consideration of fish passage into project design.
- Restore any disturbed areas using native riparian plant species to prevent erosion.
- Integrate native vegetation into rip rap slope protection.
- Avoid fragmenting or isolating riparian corridors or wetlands.
- Identify areas of ground disturbance and conservation measures implemented.
- Contact USFWS immediately by telephone at (801) 975–3330 if any threatened or endangered species are found alive, dead, injured, or hibernating within the project area.

Actions under Alternative 2 would result in less than significant impacts to migratory bird species. In addition to the conservation measures listed above, the project area must be surveyed for nesting activity prior to required cutting of trees or shrubs in compliance with the MBTA and the Bald and Golden Eagle Protection Act. Because migratory birds nest on many substrates (e.g., ground, shrubs, trees, and utility boxes), trees must be surveyed for nesting activity prior to activities. Some migratory birds could nest outside of the primary nesting season. If a nest or bird is taken outside the parameters of these guidelines, that take is considered a violation of the MBTA. The USFWS document "*Utah Field Office Guidelines for Raptor Protection from Human and Land Use Disturbances*" describes appropriate management strategies for raptor species to protect and conserve habitat and populations (Romin & Muck, 1999). The recommended spatial buffer distances and seasonal closures for disturbance during sensitive life cycles (e.g., breeding, brooding, incubation, and fledging) should be followed when conducting water resiliency projects to protect raptors and migratory bird species.

4.11 CULTURAL RESOURCES

4.11.1 Affected Environment

To preserve historic properties and archaeological sites in the United States the NHPA was established in 1966 (16 U.S.C. 470). The act created the NRHP, the list of National Historic Landmarks, and State Historic Preservation Offices (SHPO). Later amendments to the NHPA in 1992, affirmed the importance of also preserving and protecting religious and/or culturally significant Traditional Cultural Properties (TCP) of Native American tribes and Native Hawaiian organizations.

The NRHP is the Nation's official list of cultural resources worthy of preservation and is part of a national program to coordinate and support public and private efforts to identify, evaluate, and protect our historic and archeological resources. Properties listed in the NRHP include districts, sites, buildings, structures, objects, and landscapes that are significant in American history, architecture, archeology, engineering, and culture. To be eligible for listing, a property must meet one of four eligibility criteria and have sufficient integrity.

In 2016, FEMA signed a Prototype Programmatic Agreement (PPA) with the Utah Division of Emergency Management and the Utah SHPO in order to "effectively integrate historic preservation compliance considerations into the delivery of FEMA assistance." Activities covered under the PPA include (FEMA, 2016e):

- "Ground disturbing activities and site modification, when proposed activities described below substantially conform to the original footprint and/or are performed in previously disturbed soils, including the area where the activity is staged." This category includes: debris and snow removal[42], temporary structures and housing, and recreation and landscaping.

[42] Debris removal includes "Wildfire Mitigation Projects involving the removal woody debris such as branches, limbs and uprooted trees (under a 6-inch diameter) by non-mechanical means from within the defined wildfire boundaries of improved property or infrastructure. This allowance includes the transport on existing road surfaces and disposal of such waste to existing approved waste facilities or landfills and establishing or expanding temporary non-hazardous

- Buildings and structures; and
- Transportation facilities, when proposed activities substantially conform to the original footprint and/or performed in previously disturbed soils, including staging areas. This category includes roads and roadways, airports, and rail systems.

Utah has a rich cultural history of diverse groups traveling through and inhabiting its borders, with each leaving behind physical remains of their activities. Native Americans have left petroglyphs, abandoned villages, and many other items from their life and travels through Utah (Utah State Historical Society, 2015). Spanish explorers, fur trappers and traders, and Mormons made their way through and settled in Utah (Rood, R.; Thatcher, L., 2015d; Rood, R.; Thatcher, L., 2015e). Archaeological sites in Utah are present in the desert, high mountains, badlands, and marshes (Utah State Historical Society, 2015).

Evidence at most archeological sites in Utah are in relatively shallow deposits, on the surface or within 1 to 2 feet of the surface. In some cases, natural factors have buried sites beneath multiple 12 Debris removal includes "Wildfire Mitigation Projects involving the removal woody debris such as branches, limbs and uprooted trees (under a 6-inch diameter) by non-mechanical means from within the defined wildfire boundaries of improved property or infrastructure. This allowance includes the transport on existing road surfaces and disposal of such waste to existing approved waste facilities or landfills and establishing or expanding temporary non-hazardous debris staging and disposal areas at licensed transfer stations, or existing hard-topped or gravel surfaces." (FEMA, 2014e) layers of sediment or organic materials, such as in floodplain deposits found along streams and rivers or peat deposits in wetlands. These deposits can range between one and ten feet below the current surface, with older sites in the deeper sediments. Disturbed ground, including urban areas, may contain archaeological resources in deeper or shallower strata than undisturbed areas. (Harris, 1979)

In Utah, local governments that have developed a local preservation ordinance meeting the standards of a State's SHPO and the NPS are identified as Certified Local Governments (CLG)[43]. A CLG is "a city or county that has been 'certified' as eligible to apply for federal grants for historic preservation." CLGs in Utah are designed to integrate additional planning efforts into the preservation of cultural resources. Both the SHPO and the NPS are responsible for certifying each local government for them to receive funding. The goal of the program is to help local governments to "gain tools and resources to help historic buildings become a more vital part of the community's social and economic fabric" (Utah Division of State History, 2017). Table 19 provides a list of CLGs in Utah.

debris staging and disposal areas at licensed transfer stations, or existing hard-topped or gravel surfaces." (FEMA, 2014e)

[43] Certified Local Government – "Jointly administered by the National Park Service (NPS) and the State Historic Preservation Offices (SHPOs), each local community works through a certification process to become recognized as a Certified Local Government (CLG). Once certified CLGs become an active partner in the Federal Historic Preservation Program" (NPS, 2017).

Certified Local Government		
Alpine, UT	Holladay, UT	Salt Lake City, UT
American Fork, UT	Hurricane, UT	San Juan County, UT
Beaver City, UT	Hyrum, UT	Sandy, UT
Beaver County, UT	Kanab, UT	Sanpete County, UT
Bluffdale, UT	Layton, UT	Santa Clara, UT
Bountiful, UT	Leeds, UT	Scipio, UT
Box Elder County, UT	Lehi, UT	South Jordan, UT
Brigham City, UT	Lindon, UT	Spring City, UT
Castle Dale, UT	Logan, UT	Springdale, UT
Cedar City, UT	Manti, UT	St. George, UT
Centerfield, UT	Mapleton, UT	Summit County, UT
Centerville, UT	Mendon, UT	Syracuse, UT
Cottonwood Heights, UT	Midvale, UT	Taylorsville, UT
Delta, UT	Midway, UT	Tooele City, UT
Draper, UT	Morgan County, UT	Tooele County, UT
Duchesne, UT	Moroni, UT	Torrey, UT
Duchesne County, UT	Mt. Pleasant, UT	Uintah County, UT
Emery, UT	Murray, UT	Utah County, UT
Emery County, UT	Ogden, UT	Washington, UT
Enterprise, UT	Orem, UT	Weber County, UT
Ephraim, UT	Panguitch, UT	Wellsville, UT
Eureka, UT	Park City, UT	West Bountiful, UT
Fairview, UT	Parowan, UT	West Jordan, UT
Farmington, UT	Payson, UT	Willard, UT
Ferron, UT	Pleasant Grove, UT	
Fillmore, UT	Price, UT	
Grand County, UT	Providence, UT	
Grantsville, UT	Provo, UT	
Green River, UT	Richfield, UT	
Gunnison, UT	Richmond, UT	
Hanksville, UT	Riverton, UT	
Heber, UT	Rockville, UT	
Helper, UT	Salina, UT	

Figure 19: Utah Certified Local Governments[44]

Utah has 1,544 NRHP listed sites, as well as 14 National Historic Landmarks (NPS, 2016b). Utah contains two National Heritage Areas: the Mormon Pioneer National Heritage Area, and the Great Basin National Heritage Area (NPS, 2015a). There are also 14 non-resident tribes in Utah[45].

[44] Source: (Utah Division of State History, 2016)

[45] Non-resident tribes in Utah include: Kaibab Band of Paiute Indians of the Kaibab Indian Reservation; Las Vegas Tribe of Paiute Indians of the Las Vegas Indian Colony; Moapa Band of Paiute Indians of the Moapa River Indian Reservation; Paiute Indian Tribe of Utah (Cedar City Band of Paiutes, Kanosh Band of Paiutes, Koosharem Band of Paiutes, Indian Peaks Band of Paiutes, Shivwits Band of Paiutes); Navajo Nation; Confederated Tribes of the Goshute Reservation; Northwestern Band of Shoshone Nation of Utah; Skull Valley Band of Goshute Indians;

4.11.2 Environmental Consequences

This section describes potential impacts to cultural resources associated with the alternatives, as discussed below. There is potential for impacts to cultural resources to occur when an activity:

- Physically damages and/or destroys a contributing portion of a cultural resource or historic properties

Qualitative analyses have been used to determine the intensity and magnitude of the environmental impact. The relative degree of severity of environmental impacts are defined as:

- **No Impact:** No environmental impacts are readily apparent or identified.
- **Less than Significant:** Indicates that a change to resources would be measurable although the changes would be small and localized. BMPs, identified in Section 5, may be used to decrease the potential for impacts that are less than significant.
- **Significant:** Changes to resources would be measurable and would have substantial consequences on a local or regional level.

Impacts were evaluated using the significance criteria presented in Table 25. The impact levels for historic properties differ from those for other resources described in this PEA as historic properties are non-renewable resources by nature. As such, any and all unavoidable adverse effects to historic properties, per Section 106 of the NHPA (as codified in 36 CFR Part 800.6), would require consultation with the SHPO/Tribal Historic Preservation Officer (THPO) and other consulting parties, including Native American Tribes, to develop appropriate mitigation.

Table 25 presents the impact summary for cultural resources.

Table 25: Impact Significance Rating Criteria for Cultural Resources

Impact Criteria	Alternative 1 No Action	Alternative 2 Preferred Action
Physical damage or destruction to a contributing portion of a cultural resource or historic property	Less than Significant	Less than Significant

4.11.2.1 Alternative 1: No Action

Under the No Action Alternative, no Federal action would occur and present conditions would remain. However, new and less than significant impacts to historic resources would be possible as exposed or otherwise disrupted cultural resources would remain vulnerable to future events and accelerated deterioration. If State or local actions using State funds were to occur, compliance with applicable State law would be required (Utah Division of State History, 2015).

Shoshone- Bannock Tribes of the Fort Hall Reservation; Shoshone Tribe of the Wind River Reservation; Southern Ute Indian Tribe; Ute Indian Tribe (Uintah & Ouray Reservation); Pueblo of Hopi; and Pueblo of Zuni.

4.11.2.2 Alternative 2: Watershed Resiliency Activities

Alternative 2 has the potential to affect historic or cultural resources depending on the project location, project description, and proposed project methods. Given that archaeological sites and historic properties are present throughout Utah, destruction or alteration of archaeological sites and historic properties could occur as a result of watershed resiliency activities. Redistribution of alluvium or other watershed elements may have exposed areas of high archaeological sensitivity. Physical change could affect unique cultural values. In addition, watershed resiliency activities have the potential to effect existing TCPs within and adjacent to a watershed resiliency project location. BMPs, as defined through consultation with the appropriate resource agency, could help avoid or minimize the potential impacts mitigation measures. Additional mitigation measures identified in Section 5 may be implemented as appropriate to further minimize potential less than significant impacts.

Any agencies that have entered into Programmatic Agreements with the Utah SHPO or THPO would determine if a project meets programmatic allowances outlined in that agreement. If so, Federal agencies would consider the project to be in compliance with Section 106 of NHPA and no further review would occur. If a project type does not fall within the provisions of an existing Programmatic Agreement, then Federal agencies would make a determination of effect in accordance with NHPA Section 106 and initiate consultation with the SHPO.

Additional archaeological surveys of locations that involve ground disturbing activities or architectural surveys of projects impacting built environments may be required depending on consultation with the SHPO and/or THPO. Section 106 compliance resources are available at https://heritage.utah.gov/history/shpo-compliance or by contacting the Utah Division of State History.

4.12 HAZARDOUS MATERIALS

4.12.1 Affected Environment

Hazardous wastes are defined by the Resource Conservation and Recovery Act (RCRA) as "a solid waste, or combination of solid wastes, which because of its quantity, concentration, or physical, chemical, or infectious characteristics may; (A) cause, or significantly contribute to, an increase in mortality or an increase in serious irreversible or incapacitating reversible illness or; (B) pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported or disposed of or otherwise managed." (42 U.S.C. § 6903)

The National Institutes of Health (NIH), U.S. National Library of Medicine, provides an online mapping tool called TOXMAP®, which allows users to graphically explore and research data from the USEPA Toxic Release Inventory (TRI) and Superfund Program (NIH, 2015). Figure 20 provides an overview of potentially hazardous sites in Utah.

Stormwater, sewer discharge from industrial and manufacturing facilities, and other pollutant discharges from a point source into a water of the United States are regulated by the National Pollutant Discharge Elimination System (NPDES). NPDES permits limit what can be discharged, and establish monitoring and reporting requirements to ensure the discharge does not cause water quality or human health issues. Permitted discharge facilities are potential sources of toxic

constituents that are harmful to human health or the environment. As of December 2016, Utah had 43 major NPDES permitted facilities registered with the USEPA Integrated Compliance Information System (USEPA, 2016i).

Hazardous materials and wastes are regulated in Utah by a combination of Federal and State laws. Federal regulations governing the assessment and disposal of hazardous wastes include RCRA, the RCRA Hazardous and Solid Waste Amendments, Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), Solid Waste Act, and Toxic Substances Control Act.

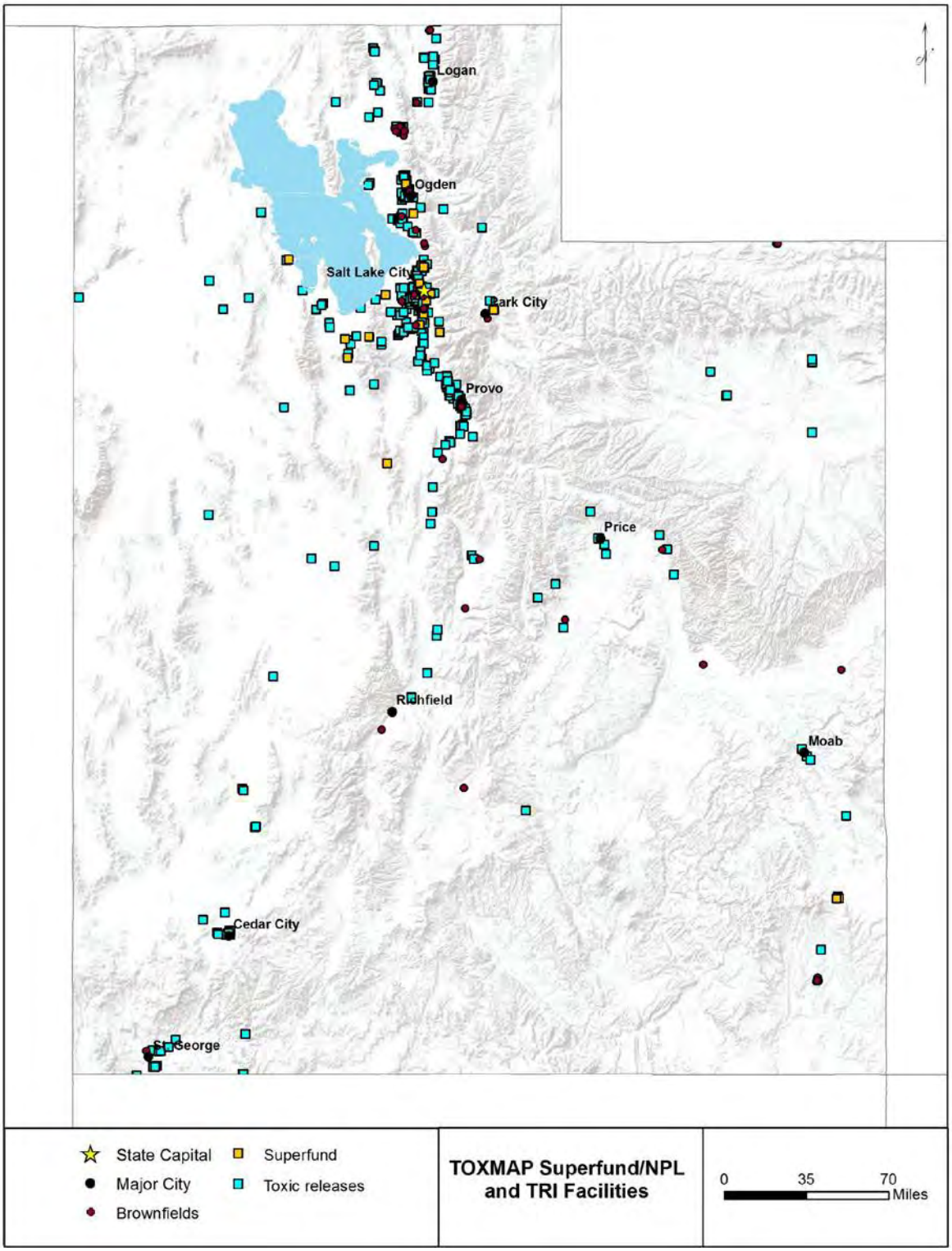


Figure 20: TOXMAP Superfund/NPL and TRI Facilities in Utah

The UDEQ Division of Environmental Response and Remediation assists the USEPA's Superfund program by performing activities in accordance with CERCLA (UDEQ, 2015g). As of December 2016, Utah had 23 RCRA Corrective Action sites, 143 brownfield sites, and 18 proposed or final

Superfund/National Priorities List (NPL) sites. Based on a December 2016 search of USEPA Cleanups in My Community database, there are 15 Superfund sites in Utah (Figure 20) (USEPA, 2016j).

4.12.2 Environmental Consequences

This section describes potential impacts to hazardous materials associated with the alternatives, as discussed below. There is potential for impacts to hazardous materials to occur when an activity:

- Causes exposure to concentrations of hazardous materials above regulatory limits, or USEPA screening levels protective of the general public.

Qualitative analyses have been used to determine the intensity and magnitude of the environmental impact. The relative degree of severity of environmental impacts are defined as:

- **No Impact:** No environmental impacts are readily apparent or identified.
- **Less than Significant:** Indicates that a change to resources would be measurable although the changes would be small and localized. BMPs, identified in Section 5, may be used to decrease the potential for impacts that are less than significant.
- **Significant:** Changes to resources would be measurable and would have substantial consequences on a local or regional level.

Table 26 presents the impact summary for hazardous materials.

Table 26: Impact Significance Rating Criteria for Hazardous Materials

Impact Criteria	Alternative 1 No Action	Alternative 2 Preferred Action
Exposure to concentrations of hazardous materials	Less than Significant	Less than Significant

4.12.2.1 Alternative 1: No Action

The No Action Alternative would not disturb any hazardous materials or create any potential hazard to human health. There would be no changes to or increases in hazardous material levels in the project area. However, under the No Action Alternative, the potential for flood events would not be reduced. If a hazardous waste site were involved in a flood event, the materials could contaminate flood waters and pose less than significant hazards and risks to the community.

4.12.2.2 Alternative 2: Watershed Resiliency Activities

Alternative 2 would not disturb known hazardous materials or create any potential hazard to human health. If hazardous constituents are encountered during the proposed construction of watershed resiliency projects, appropriate measures for the proper assessment, remediation and management of the contamination would be initiated in accordance with applicable Federal, State, and local regulations. Impacts would likely be less than significant since Federal agencies would ensure appropriate measures are taken to prevent, minimize, and control the spill of hazardous materials.

4.13 CUMULATIVE IMPACTS

The CEQ regulations implementing the procedural provisions of NEPA of 1969, as amended defines cumulative effects as:

> *"the impact on the environment which 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 undertakes such other actions"* (40 CFR § 1508.7).

Based on these regulations, if the alternative does not have direct or indirect effects, there can be no cumulative effects resulting from the project because there would be no impacts added to past, present, or reasonably foreseeable actions.

The CEQ regulations also describe cumulative impacts as impacts that "can result from individually minor but collectively significant actions taking place over a period of time" (40 CFR 1508.7). On a programmatic level and combined with other actions affecting watersheds, Alternative 2 could lead to cumulative impacts depending on the scale (number of projects) or geography (localized area) in which the actions are performed.

4.13.1 Summary of Cumulative Impacts

Individual projects proposed under this PEA have the potential to cause significant impacts when compounded and undocumented. In an effort to track and mitigate cumulative impacts, any official usage of this PEA must be documented by the completion of the Compliance Checklist found in Appendix A. All supporting documentation, completed project specific compliance checklists, and SEAs, must be submitted to FEMA Region VIII, Richard Myers, mailto:Richard.Myers2@fema.dhs.gov.

Cumulative impacts could occur from private development activities throughout Utah, such as residential and business development, new infrastructure expansion and construction (buildings, roads, utilities), as well as vegetation management activities. While private development activities would continue to occur, their intensity and magnitude are difficult to foresee. These activities would be required to comply with applicable laws and regulations. Private development, vegetation removal, and deforestation could increase erosion, decrease channel capacity, increase runoff, and contribute to flooding. The cumulative effects of this development and other human activities can influence the peak discharge of floods by "modifying how rainfall and snowmelt are stored on, and run off the land surface into streams" (USGS, 2016d). In developed areas, where much of the land surface is covered by roads and buildings, the capacity to store rainfall and snowmelt is greatly reduced (USGS, 2016d).

Cumulative impacts can also occur from government projects and programs. Several Federal, State, and local agencies conduct watershed management projects and programs throughout Utah, including the U.S. Forest Service; the Utah Division of Forestry, Fire, and State Lands; UDEQ; USGS; NRCS; BLM; and UDWR, as well as others. Current project types include improving wildlife habitat, decreasing sedimentation to streams and rivers, restoration of past grazing areas along riverbanks, logging, revegetation along streams and rivers, wildland fire suppression and

fuel reduction, and stream and meadow restoration and stabilization. Specific projects and programs are identified in Table 27.

Table 27: Description of Watershed Projects/Programs

Project/Program	Description
Utah Watershed Restoration Initiative (WRI)	The WRI is a partnership based program to improve high priority watersheds throughout Utah. The WRI is sponsored by the Utah Partners for Conservation and Development and is in its 11th year. The program focuses on three ecosystem values: 1) wildlife and biological diversity, 2) water quality and yield, and 3) opportunities for sustainable uses of natural resources. Project planning, review, and ranking occur at a local level. Five regional teams elect their own leaders, establish focus areas, review, score, and rank project proposals using a comprehensive project prioritization score sheet, and assist their members in implementing projects. Currently, there are 248 projects in progress, 1,578 completed, and 4 proposed.
Emergency Watershed Protection (EWP) Program	Administered by the NRCS, the EWP Program provides technical assistance and funding to protect life and property from damage created by natural disasters (floods, fires, windstorms, and other natural occurrences). Funding for the EWP Program is obtained through supplemental appropriations approved by Congress. Current EWP projects in Utah include the Hanksville Diversion Structure and the Green River/Tusher Diversion Rehabilitation project. Since 2011, 11 projects have been completed in Utah.
Central Utah Project (CUP)	The CUP is the largest water resources development project in Utah. It transfers water from the Colorado River Basin in eastern Utah to the main population areas along the Wasatch Mountains (Great Basin) in central Utah by means of a system of reservoirs, pipelines, and tunnels. Major construction on the CUP began about 1965. Completion of the Bonneville Unit, the final unit of the project, is scheduled for 2021.
Escalante River Watershed Partnership (ERWP)	The ERWP has restored 64 river miles, or 4,782 acres, of the Escalante River, encompassing land on Grand Staircase Escalante National Monument, Glen Canyon National Recreation Area, Dixie National Forest, and private lands in the Escalante and Boulder communities. There are 26 miles left to be treated (2,200 acres) – less than a third of the river corridor. The ERWP has developed a science-based Ten Year Action Plan and a Woody Invasive Control Plan, which guides efforts to restore the ecological functions and processes of a healthy watershed.

Project/Program	Description
Bear River Development Project	Established by the Bear River Development Act of 1991, the purpose of project is to develop Bear River water and deliver it to Box Elder, Cache, Weber, Davis, and Salt Lake Counties. The overall project consists of conveyance facilities and reservoir storage necessary to deliver water from the Bear River to the three participating water agencies and Cache County. Proposed construction of the project is anticipated to begin in 2028, with completion in 2033.

In areas where watersheds have been restored, rainfall and snowmelt collect and are held in place by the vegetation, in the soil, or in surface depressions. The cumulative effects of several restoration projects currently underway or planned in Utah could reduce the effects of prior development and erosion, restore degraded river banks, revegetate barren surfaces, increase wildlife habitat, improve watershed function, increase hydraulic capacity, and reduce the effects of future disaster and flood events.

4.13.1.1 Coordinating Natural and Cultural Resource Compliance Review

A number of agencies coordinate watershed projects including the Utah Clean Water Partnership. The partnership includes citizens and organizations working together to protect and restore Utah's waters (Utah Clean Water Partnership, 2016). The Utah Water Quality Task Force leads this effort, with its mission to protect and restore Utah's surface and ground waters from the impacts of nonpoint source pollution through coordinated and holistic management of Utah's watersheds.

The Utah Water Quality Task Force is co-chaired by the Utah Division of Water Quality and the Utah Department of Agriculture and Foods. Membership includes representatives from agencies and organizations with the common goal of reducing impacts to Utah's waters from nonpoint source pollution. (Utah Clean Water Partnership, 2016)

4.13.1.2 Mitigation

Under this PEA, project impacts that are implemented at an individual or cumulative scale, such as to produce significant impacts may potentially be reduced by implementing BMPs and conservation measures for individual impacts outlined in Section 5. A SEA would be completed for any projects that are anticipated to surpass the scope of this document such that impacts cannot be contained utilizing the BMPs and mitigation measures outlined in Section 5.

For any official usage of this PEA, all supporting documentation, completed project specific compliance checklists, and SEAs, must be submitted to FEMA Region VIII, Richard Myers, Richard.Myers2@fema.dhs.gov, for purposes of documenting cumulative watershed restoration mitigation project impacts.

SECTION 5 - BEST MANAGEMENT PRACTICES AND MITIGATION MEASURES

Section 4 includes descriptions of the affected environment and potential cumulative environmental consequences (beneficial or adverse) resulting from Alternative 1 (No Action) and Alternative 2 (Watershed Resiliency Activities). For those impacts that may be potentially significant, the level of significance may be reduced to less than significant through avoidance, minimization, or by mitigating for individual impacts using BMPs and mitigation measures as described below. If impact avoidance cannot be achieved, specific BMPs and mitigation measures including Federal agency consultation would be undertaken by Federal agencies to reduce any potentially significant impacts to less than significant levels. One useful resource for BMPs can be found at http://www.utahcleanwater.org/best-management-practices.html. In addition, Table 28 lists the specific mitigation measures Federal agencies can use when necessary.

Table 28: BMPs and Mitigation Measures by Resource Area

Resource Area	BMPs and Mitigation Measures
General	Assess impacts to, and initiate proper coordination for, resource areas to be impacted by project components as outlined in Section 4. Assess and coordinate actively as project specifics are identified. This includes consultation with individual agencies including USFWS, USACE, USEPA, etc. as needed on individual projects.
Physical Resources	For projects in which soil erosion potential is determined to be significant, a project erosion control plan to minimize soil loss, including the use of construction practices such as the use of temporary sediment barriers, to isolate the construction site and minimize adverse effects of soil loss and sedimentation on soil and water resources would be implemented.
Physical Resources	To avoid unnecessary ground disturbance, project activities involving heavy equipment and machinery would avoid wet seasons. All disturbed areas including skid trails, landings, and staging areas would be restored using native, weed-free seed or mulch.
Safety and Occupational Health	To minimize any potential to safety and occupational health, construction workers, and equipment operators are required to wear appropriate PPE and to be properly trained for the work being performed, including removal and disposal of asbestos and lead-based paint for demolition projects.
Safety and Occupational Health	All waste material associated with the project must be disposed of properly and not placed in identified floodway or wetland areas or in habitat for threatened or endangered species. All hazardous material resulting from demolition activities, including asbestos and lead paint would be disposed of in hazardous waste landfill.
Air Quality	To mitigate for fugitive dust during construction periodic watering of active construction areas, particularly in areas close to sensitive receptors (e.g., hospitals, senior citizen homes, and schools) would be implemented.
Noise	Construction noise levels would be minimized by ensuring that construction equipment is equipped with a recommended muffler in good working order. Impact to noise levels would be minimized by limiting construction activities that occur during early morning or late evening hours.

Resource Area	BMPs and Mitigation Measures
Water Resources	For projects where wetland areas would be impacted, Federal agencies would evaluate individual and cumulative impacts and implement BMPs (such as erosion control [silt fencing, straw wattles, brush mats] and streambank reinforcement using biological components [willow wattles, willow sprigs, or direct planting] or riprap); avoidance, minimization and/or mitigation measures as necessary to reduce impacts below level of significance. Compensatory mitigation could be applied, such as purchasing mitigation credits from a mitigation bank or contributing to an in-lieu fee program.
Water Resources	To mitigate for impacts to floodplain, a hydrology and hydraulics study would be completed to ensure the flow of flood waters. The project must not serve as a dam or otherwise impede water movement thus aggravating flooding upstream of the roadway.
Water Resources	Federal agencies would consult with the USFWS and/or NRCS for any project which extends outside of the original ROW and has the potential to affect land use, including USFWS easements, prime farmland, or farmland of State/local significance.
Water Resources	Utilize vegetative stabilization measures, bioengineered alternatives and multi-objective designs.
Biological Resources	Federal agencies would consult with USFWS on any actions that have the potential to affect biological resources including listed species and would include measures to avoid or minimize potential impacts as grant conditions. This includes migratory birds and raptors.
Biological Resources	Fill material must neither come from nor be deposited in habitat for threatened or endangered species.
Biological Resources	Federal agencies would coordinate with the Utah Department of Natural Resources Division of Wildlife Resources concerning guidelines regarding impacts to State species of interest. Coordination may include measures to avoid or minimize potential impacts as grant conditions. This includes migratory birds and raptors.
Biological Resources	Implement USFWS conservation measures such as: • Locate access routes and staging areas within previously disturbed areas • Avoid disturbing or burying any existing riparian (streamside) habitat • Restore any disturbed areas using native riparian plant species to prevent erosion • Integrate native vegetation into slope protection • Avoid fragmenting or isolating riparian corridors or wetlands • Identify areas of ground disturbance • Contact USFWS immediately by telephone at (801) 975-3330 if any threatened or endangered species are found alive, dead, injured, or hibernating within the project area.
Biological Resources	Apply measures included in the USFWS *Utah Field Office Guidelines for Raptor Protection from Human and Land Use Disturbances*, such as the following: • Determine the presence of raptors or raptor habitat using existing data or surveys. • Evaluate potential impacts to species or populations. • Avoid habitat for raptors. • Avoid or minimize impacts to raptors and their habitat through seasonal restrictions, buffer distances, relocation of projects, or habitat mitigation. (Romin & Muck, 1999)

Resource Area	BMPs and Mitigation Measures
Biological Resources	To avoid impacts to migratory birds and raptors, the project area must be surveyed for nesting activity prior to required cutting of trees or shrubs in compliance with the MBTA and the Bald and Golden Eagle Protection Act.
Cultural Resources	Unless a project is covered under a programmatic agreement exemption, all other ground disturbing projects must consult with the SHPO/THPO under Section 106 of the NHPA. The absence of cultural property documentation in the area does not mean they do not exist, but rather may reflect the absence of any previous cultural resource inventory in the area. If during the course of any ground disturbance related to this project, cultural materials are inadvertently discovered, the project would be immediately stopped and the SHPO/THPO and Federal agency notified.
Cultural Resources	To avoid impacts to cultural resources from material borrow source, borrow material source would be reviewed and approved by SHPO/THPO prior to use.
Cultural Resources	Federal agencies would consult with the SHPO/THPO on activities for any project that has the potential to affect previously undisturbed areas or historic properties.
Hazardous Materials	All waste material associated with the project must be disposed of properly and not placed in identified floodway or wetland areas or in habitat for ESA listed species. No open burning would occur.
Hazardous Materials	Hazardous material resulting from demolition activities, including asbestos and lead paint would be disposed of in hazardous waste landfill.

Specific BMPs, including Federal agency consultation and permitting processes, may be required for compliance with Federal or State laws and regulations, and may further reduce any potential impacts.

Permits and conditions common to watershed resiliency projects are outlined in Table 29. Table 29 provides examples of typical processes; not all projects would adhere strictly to this list. Moreover, each project would require compliance with local laws, and additional processes may apply.

Table 29: Permits and Conditions by Resource Area

Resource Area	Permits	Conditions
Physical Resources, Water Resources	USACE Permit	The applicant is responsible for verifying and compliance with all permit requirements, including permit conditions, pre-construction notification requirements and regional conditions as provided by the USACE. The applicant is responsible for implementing, monitoring, and maintaining all BMPs and Pre-Construction Notification conditions of applicable Nation Wide Permits. To the extent possible, keep equipment and construction within previously disturbed area and ROW.
Transportation Facilities	None	Applicant shall, to the extent possible, follow best practices to minimize impacts to transportation facilities.
Safety and Occupational Health	None	For any "Asbestos Containing Material", lead-based paint and/or other hazardous materials found during remediation or repair activities, the applicant must comply with all Federal, State, and local abatement and disposal requirements. Applicants are responsible for ensuring contracted removal of hazardous debris also follows these guidelines.
Socioeconomic and Environmental Justice	None	Applicant shall, to the extent possible, follow best practices to minimize impacts to low income and minority populations.
Air Quality	None	Applicant shall follow best practices to minimize impacts to air quality. The contractor should keep all equipment in good working order to minimize air pollution.
Noise	None	Applicant shall, to the extent possible, follow best practices to minimize noise impacts.
Public Services and Utilities	None	Applicant shall, to the extent possible, follow best practices to minimize any impacts on public services and utilities.
Biological Resources	Consultation with USFWS would be necessary to assess permanent and temporary impacts.	Applicant shall, to the extent possible, follow best construction practices to minimize impacts to any species. Should any threatened or endangered species be discovered during construction work in the subject area shall be halted and the applicant should contact USFWS for further guidance. Applicant shall, to the extent possible, follow best construction practices to minimize impacts to any species. Should any threatened or endangered species be discovered during construction work in the subject area shall be halted and the applicant should contact USFWS for further guidance. The removal of swallow nests as they are built, but prior to egg laying, from the bridge structures that are to be removed; and/or netting of the affected bridge structures to prevent swallow nesting prior to the breeding season. To avoid impacts to migratory birds and raptors, the project area must be surveyed for nesting activity prior to required cutting of trees or shrubs in compliance with the MBTA and the Bald and Golden Eagle Protection Act. Contact the USFWS Utah Ecological Services Field Office for guidance if surveys identify birds or nests that may be affected by project activities. If active nests are observed in the project area, the guidelines outlined in Utah Field Office Guidelines for Raptor Protection from Human and Land Use Disturbances must be implemented. The guidelines are available online at: https://www.fws.gov/utahfieldoffice/Documents/MigBirds/Raptor%20Guidelines%20(v%20March%2020,%202002).pdf
Water Resources	The applicant must coordinate with USACE and UDEQ to obtain and comply with all appropriate permits.	The applicant is responsible for compliance with all permit requirements, including permit conditions, pre-construction notification requirements and regional conditions as provided by the USACE. This is to include any requirements per UDEQ 401 Water Quality Certification. To the extent possible, keep equipment and construction within previously disturbed area and ROW. Applicants must coordinate with local floodplain administrator to obtain and comply with the appropriate floodplain management permits. For any work completed within designated section of Wild and Scenic Rivers would confer with the regulatory agency overseeing that section.
Cultural Resources	None	Applicant shall, to the extent possible, follow best practices to minimize impacts to any cultural resources. Should any historic or archaeological materials be discovered during construction, all activities on the site would be halted immediately and the applicant should contact the SHPO for further guidance. If a project does not fall within an allowance, or a Programmatic Agreement does not exist with the SHPO, then the Federal agency would make a determination of effect under Section 106 of the NHPA and consult with the SHPO. Consultation with Native American Tribes would be initiated to develop appropriate mitigation.

Resource Area	Permits	Conditions
Hazardous Materials	UDEQ Division of Waste Management and Radiation Control permits.	Hazardous Materials must be appropriately separated and disposed of in an approved disposal site or landfill. Asphalt must be recycled as a blended base material or appropriately separated and disposed of in an approved disposal site or landfill in accordance with UDEQ Division of Waste Management and Radiation Control authorized waste management regulations. For any "Asbestos Containing Material," lead-based paint and/or other hazardous materials found during remediation or repair activities, the Applicant must comply with all Federal, State, and local abatement and disposal requirements. Applicants are responsible for ensuring contracted removal of hazardous debris also follows these guidelines.

SECTION 6 - SUMMARY OF IMPACTS

Table 30 summarizes the potential impacts of each alternative on the resource areas discussed in Section 4.

Table 30: Summary of Impacts

Resource Area	Alternative 1: No Action	Alternative 2: Watershed Resiliency Activities
Physical Resources	Less than significant impacts could result from Alternative 1. The potential exists for disaster events to pose safety threats, displace residents, altered drainage and flow rates, and loss in residential, commercial, agricultural, or recreational land use.	Less than significant impacts could result from Alternative 2. Hydrologic and hydraulic studies would be used to determine the effect of watershed resiliency activities on watershed function and characteristics. Land use, including agricultural and recreation use, would be maintained and potential threats to land use from disaster events would be reduced.
Transportation Facilities	Significant impacts due to increased travel times and traffic volumes are possible if future events continue damage to transportation facilities.	Short-term, less than significant impacts would be expected during construction as traffic delays and alternate routes may be required. Less than significant impacts are expected to the transportation volume, capacity, and time of transit.
Safety and Occupational Health	Less than significant impacts could result from Alternative 1. Residents, communities, and properties would remain susceptible to future flood events. Materials could be washed downstream impacting other structures. These materials may have the potential to cause both lead and asbestos exposure. A disaster event access would be restricted for emergency, police, and fire services causing the potential for significant delay creating a significant adverse safety affect to residents of Utah.	Less than significant impacts could result from Alternative 2. Communities are expected to benefit from the proposed action. Removal or redistribution of materials with painted surfaces or containing asbestos may be required and construction workers are required to follow OSHA regulations to provide appropriate asbestos abatement and avoid release of lead from paint. Where abandoned mines are present, measures would be taken to avoid disturbance of sites, mine materials, tailings, and waste rock. Construction workers and equipment operators are required to wear appropriate PPE and be properly trained for the work being performed. All solid or hazardous wastes that might be generated during the removal and redistribution must be removed and disposed of at a permitted facility or designated collection point.

Resource Area	Alternative 1: No Action	Alternative 2: Watershed Resiliency Activities
Socioeconomic and Environmental Justice	There is no requirement for compliance with EO 12898, *Environmental Justice*. Alternative 1 has potential to result in less than significant impacts to the socioeconomics of a community if buildings and critical infrastructural elements such as utilities are damaged in future events.	During the construction period this alternative may provide some less than significant, short- term impacts to the local economy. There may be effects to populations during construction due to road detours. Efforts would be made during any construction to minimize short-term disruption to the local transportation system. Low income and minority populations may benefit during the construction process through the provision of construction jobs and multiplier effects of expenditures in the local economy. Any impacts to low income or minority populations are expected to be short- term and less than significant.
Air Quality	Affected areas will remain in existing conditions. Vehicle emissions would remain the same. Impacts would be less than significant.	Activities could involve the use of heavy construction equipment. During construction, there may be temporary increases in equipment exhaust emissions and fugitive dust. However, the temporary increase in equipment exhaust is expected to be less than significant as long as the equipment is well maintained and idling is minimized. Measures must be taken to minimize fugitive dust emissions created during construction activities. Impacts from fugitive dust are anticipated to be short-term and less than significant.
Noise	There would be no effect on noise levels in the project area. Noise levels would remain as they are currently and noise impacts would be less than significant.	Noise from construction activities may have short-term but less than significant impacts on persons who live near the construction area. Noise levels could be minimized through the use of Best Management Practices. Noise levels of construction equipment (70 to 72 dBA) at the distance in which noise receptors would likely be located (>200 feet/60 meters) would be less than significant.
Visual Resources	No impacts would occur from Federal actions to visual resources. Less than significant impacts could occur from future flooding events.	Less than significant impacts could occur from applying Alternative 2. Visual resources could be damaged or lost during construction activities; however, the resources would be restored over the long-term. Future flood events could be prevented or reduced by Alternative 2, protecting visual resources.

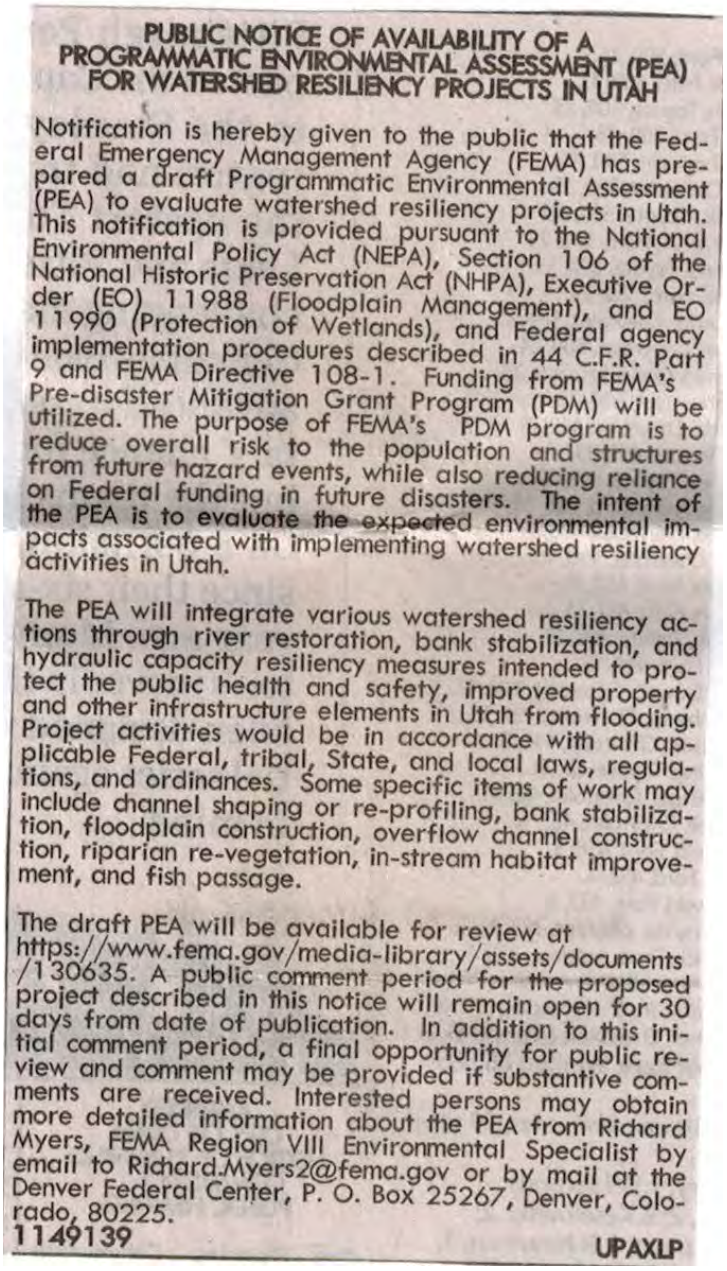
Resource Area	Alternative 1: No Action	Alternative 2: Watershed Resiliency Activities
Public Services and Utilities	Significant impacts could occur under this alternative. The potential to affect public services and utilities will exist in future disaster events. Fire, emergency, law enforcement, and school services would be delayed as a result of continued inaccessibility of the route due to closed roads or bridges.	During construction, delays in fire, emergency, law enforcement, and school services may continue, but these would be short-term and less than significant. Once completed, public services would be restored to pre-disaster levels. Utilities that cross or run along the watershed could be temporarily interrupted, but this would be a short-term and less than significant. No long-term impacts would occur under this alternative.
Water Resources	No work would occur in water, thus there would be no direct impact to water resources due to the proposed action. However, less than significant impacts from large flood events could occur if water resiliency activities were not implemented. Flooding could result in damage or loss of floodplains and wetlands.	Excavation, redistribution, and fill materials may be necessary for the proposed project thus impacting waters of the U.S. Discharge into surface water may provide a temporary alteration of surface water quality including but not limited to temperature, dissolved oxygen or turbidity; however, no impacts would be expected to drinking water quality. Wetlands and floodplains could be damaged or removed during project application, which could result in reduced water storage or absorption at least over the short-term. Less than significant impacts could continue until the project could be completed and proper mitigation applied to restore wetlands and floodplains. Water quality may be adversely affected through the transmission of sediment, debris, oils, and hazardous substances into surface waters. During construction, agencies would mitigate these impacts by requiring the applicant to apply BMPs to reduce impacts on wetlands and waterways.

Resource Area	Alternative 1: No Action	Alternative 2: Watershed Resiliency Activities
Biological Resources	No Federal action would occur; therefore, no direct impacts would occur to biological resources. Present day conditions would remain, which could result in future flooding events, leading to less than significant damage or loss of vegetation and habitat.	The actions may have the potential to affect sensitive biological resources, wetlands, or waterways due to watershed resiliency activities. Prior to project approval, a review of the potential for species and critical habitat occurrence in the project area would be conducted. The proposed action could require the distribution or removal of hazards, materials, vegetation, and possibly structures from the waterway. Embankment work and in- water work could occur. Permits for this work would be required. Damage or loss of vegetation and habitat could occur during watershed resiliency activities; however, mitigation measures and BMPs would prevent or reduce the occurrence of these impacts. Watershed resiliency activities have the potential to affect federally listed species and their habitat. In order to avoid and minimize potential impacts applicants should implement conservation measures provided by USFWS and in Section 5 of this PEA.

Resource Area	Alternative 1: No Action	Alternative 2: Watershed Resiliency Activities
Cultural Resources	Less than significant impacts to historic resources could occur from cultural resources being vulnerable to future flood events.	Given that archaeological sites and historic properties are present throughout Utah, less than significant impacts to archaeological sites and historic properties could occur as a result of watershed resiliency activities. Redistribution of alluvium or other watershed elements may have exposed areas of high archaeological sensitivity. Physical change could affect unique cultural values. In addition, watershed resiliency activities have the potential to effect existing TCPs within and adjacent to a watershed resiliency project location. BMPs, as defined through consultation with the appropriate resource agency, could help avoid or minimize the potential impacts mitigation measures. Any agencies that have entered into Programmatic Agreements with the Utah SHPO/THPO would determine if a project meets programmatic allowances outlined in that agreement. If so, Federal agencies would consider the project to be in compliance with Section 106 of NHPA and no further review would occur. If a project type does not fall within the provisions of an existing Programmatic Agreement, then Federal agencies would make a determination of effect in accordance with NHPA Section 106 and initiate consultation with the SHPO. Additional archaeological surveys of locations that involve ground disturbing activities or architectural surveys of projects impacting built environments may be required depending on consultation with the SHPO and/or THPO.
Hazardous Materials	The No Action Alternative would not disturb any hazardous materials or create any potential hazard to human health. There would be no changes to or increases in hazardous material levels in the project area. However, under the No Action Alternative, there could be less than significant impacts from the potential for future flood events. If a hazardous waste site were involved in a flood event, the materials could contaminate flood waters and pose hazards and risks to the community.	Alternative 2 would not disturb known hazardous materials or create any potential hazard to human health, with likely less than significant impacts. If hazardous constituents are encountered during the proposed construction of watershed resiliency projects, appropriate measures for the proper assessment, remediation and management of the contamination would be initiated in accordance with applicable Federal, State, and local regulations. Federal agencies would ensure appropriate measures are taken to prevent, minimize, and control the spill of hazardous materials.

SECTION 7 - PUBLIC INVOLVEMENT

The Notice of Availability of the Draft PEA for Watershed Resiliency Projects in Utah was published in the *Salt Lake Tribune* on April 25, 2017 (Figure 21) and *The Spectrum* on April 26, 2017 (Figure 22). No comments were received during the 30-day comment period.



PUBLIC NOTICE OF AVAILABILITY OF A PROGRAMMATIC ENVIRONMENTAL ASSESSMENT (PEA) FOR WATERSHED RESILIENCY PROJECTS IN UTAH

Notification is hereby given to the public that the Federal Emergency Management Agency (FEMA) has prepared a draft Programmatic Environmental Assessment (PEA) to evaluate watershed resiliency projects in Utah. This notification is provided pursuant to the National Environmental Policy Act (NEPA), Section 106 of the National Historic Preservation Act (NHPA), Executive Order (EO) 11988 (Floodplain Management), and EO 11990 (Protection of Wetlands), and Federal agency implementation procedures described in 44 C.F.R. Part 9 and FEMA Directive 108-1. Funding from FEMA's Pre-disaster Mitigation Grant Program (PDM) will be utilized. The purpose of FEMA's PDM program is to reduce overall risk to the population and structures from future hazard events, while also reducing reliance on Federal funding in future disasters. The intent of the PEA is to evaluate the expected environmental impacts associated with implementing watershed resiliency activities in Utah.

The PEA will integrate various watershed resiliency actions through river restoration, bank stabilization, and hydraulic capacity resiliency measures intended to protect the public health and safety, improved property and other infrastructure elements in Utah from flooding. Project activities would be in accordance with all applicable Federal, tribal, State, and local laws, regulations, and ordinances. Some specific items of work may include channel shaping or re-profiling, bank stabilization, floodplain construction, overflow channel construction, riparian re-vegetation, in-stream habitat improvement, and fish passage.

The draft PEA will be available for review at https://www.fema.gov/media-library/assets/documents/130635. A public comment period for the proposed project described in this notice will remain open for 30 days from date of publication. In addition to this initial comment period, a final opportunity for public review and comment may be provided if substantive comments are received. Interested persons may obtain more detailed information about the PEA from Richard Myers, FEMA Region VIII Environmental Specialist by email to Richard.Myers2@fema.gov or by mail at the Denver Federal Center, P. O. Box 25267, Denver, Colorado, 80225.

1149139 UPAXLP

Figure 21: Public Notice of Availability Published in the Salt Lake Tribune

Notices

PUBLIC NOTICE OF AVAILABILITY OF A PROGRAMMATIC ENVIRONMENTAL ASSESSMENT (PEA) FOR WATERSHED RESILIENCY PROJECTS IN UTAH

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Notices

received. Interested persons may obtain more detailed information about the PEA from Richard Myers, FEMA Region VIII Environmental Specialist by email to Richard.Myers2@fema.gov or by mail at the Denver Federal Center, P. O. Box 25267, Denver, Colorado, 80225.

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UPAXLP

Figure 22: Public Notice of Availability Published in The Spectrum

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