Draft Watershed Plan–Environmental Impact Statement for Lower Bear River Watershed Project

Box Elder County, Utah

Prepared By
Lead Federal Agency:
U.S. Department of Agriculture
Natural Resources Conservation Service

In Cooperation With
Sponsoring Local Organization:
Bear River Water Conservancy District

Co-sponsoring Local Organizations
Bear River Canal Company, Bear River City,
Highland Ditch Company, Central Canal Company,
Tremonton City, Bear River Club Company,
Chesapeake Duck Club, and
Utah Division of Wildlife Resources

Cooperating Agencies:
U.S. Army Corps of Engineers
U.S. Department of the Interior, Bureau of Reclamation
U.S. Environmental Protection Agency

March 2026

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For Lower Bear River Watershed
Utah Congressional District 1
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AUTHORITY

The watershed study and Draft Watershed Plan (Plan) have been prepared under the authority of the Watershed Protection and Flood Prevention Act of 1954 (Public Law [PL] 83-566) as amended, and in accordance with the National Environmental Policy Act (NEPA) of 1969, PL 91-190, as amended (42 U.S.C. 4321 et seq.). The Plan would be implemented under the PL 83-566 authorized purposes of agricultural water management and watershed protection.

ABSTRACT

The Bear River Canal Company, Highland Ditch Company and Central Canal Company deliver irrigation water to thousands of acres of highly productive farmland in the Lower Bear River watershed. Current water delivery is inefficient and aging infrastructure systems are at risk of failure. Over the past 40 years, thirteen major canal failures have occurred in the Hammond and Main Canals caused by slope instability and water seepage from the canals. Growing suburban development in the communities of Tremonton and Bear River City is placing an increasing demand on limited water resources with inefficient delivery systems. Wetlands that provide important habitat for wildlife are managed by the Bear River Club Company, Chesapeake Duck Club, and Utah Department of Wildlife Resources in the Salt Creek WMA using levees along the Bear River and Salt Creek to control water levels in the wetlands. These levees are deteriorating and are at risk of failure. The local project Sponsor and Co-sponsors have chosen measures to address these deficiencies in the agricultural water delivery system to secure the agricultural water supply, improve the reliability and efficiency of water delivery, and develop secondary water systems for growing communities; and measures to protect the watershed by improving levees and reducing bank erosion and sediment delivery along the Lower Bear River and waterways that drain into the Great Salt Lake. The purposes of the Lower Bear River Watershed Project are agricultural water management and watershed protection within the Project Area for the shareholders in the Bear River Canal Company service area, and the larger Lower Bear River Watershed. Project installation cost is estimated to be $115,568,297, of which $89,263,430 will be paid from PL-566 funds and $26,304,867 from other funds.

COMMENTS AND INQUIRIES

Comments and inquiries must be received within 45 days of publication of the Notice of Availability (NOA) for the Draft Plan-EIS in the Federal Register (Regulations.gov). Submit comments and inquiries to: Derek Hamilton, Water Resource Coordinator, USDA, NRCS, Utah State Office, 125 S State Street #6416 Salt Lake City, UT, 84138; telephone: (802) 524-4560; or email: derek.hamilton@usda.gov.

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ANCESTRAL LAND ACKNOWLEDGMENT

NRCS, through the review of the National Park Service Native American Graves Protection and Repatriation Act Native American Consultation Database (NACD), the U.S. Department of Housing and Urban Development Tribal Directory Assessment Tool (TDAT), the Bureau of Indian Affairs (BIA) website, and the Utah Division of Indian Affairs (UDIA) website, and previous NEPA & National Historic Preservation Act (NHPA) consultations, identified six Federally Recognized Tribes. The Eastern Shoshone Tribe of the Wind River Reservation, Wyoming, the Shoshone-Bannock Tribes of the Fort Hall Reservation, the Ute Indian Tribe of the Uintah & Ouray Reservation, Utah, the Northwest Band of the Shoshone Nation, Skull Valley Band of Goshute, and the Confederated Tribes of the Goshute Reservation have ancestral land, traditional use, and/ or traditional cultural property claims within the project area and the immediate vicinities. Consultation with these six entities will continue throughout this plan's development; refer to Appendix A for that correspondence.

WATERSHED PLAN AGREEMENT
(TO BE INCLUDED IN FINAL PLAN–EIS)

Summary
Office of Management and Budget Fact Sheet

S-1 Title of Proposed Action

Draft Watershed Plan–Environmental Impact Statement (Plan-EIS) for the Lower Bear River Watershed Project

S-2 Watershed

Lower Bear River Watershed

S-3 County, State

Box Elder County, UT

S-4 Congressional District

Utah Congressional District 1

S-5 Prepared By

United States Department of Agriculture (USDA), Natural Resources Conservation Service (NRCS)

S-6 Authority

Public Law 83-566 Stat. 666 as amended (16 U.S.C. Section 10001 et. Seq.) 1954 (PL-566)

S-7 Sponsoring Local Organization and Co-sponsors

The Sponsor is Bear River Water Conservancy District (BRWCD), and the Co-sponsors are Bear River Canal Company (BRCC), Bear River City, Highland Ditch Company, Central Canal Company, Tremonton City, Bear River Club Company (Bear River Club), Chesapeake Duck Club (CDC), and Utah Division of Wildlife Resources (UDWiR).

S-8 Cooperating Agencies

On October 19, 2023, NRCS invited five agencies to become Cooperating Agencies for the Proposed Project. Three agencies formally accepted and two declined. A Memorandum of Understanding (MOU) between NRCS, U.S. Army Corps of Engineers (USACE), U.S. Department of the Interior, Bureau of Reclamation (Reclamation), and U.S. Environmental Protection Agency (EPA) was signed on November 30, 2024. The NRCS also informally invited the U.S. Department of the Interior, National Park Service (NPS) to be a cooperating agency in March 2025, but they also declined.

S-9 Federal Objective

Investments in this proposed action reflect national priorities, encourage economic development, and protect the environment by: (1) seeking to maximize sustainable economic development;

(2) seeking to avoid the unwise use of floodplains and flood-prone areas and minimizing adverse impacts and vulnerabilities in any case in which a floodplain or flood-prone area must be used; and (3) protecting and restoring the functions of natural systems and mitigating any unavoidable damage to natural systems.

S-10 Purpose and Need for Action

The purpose and need of the Lower Bear River Watershed Project (Proposed Project) are 1) to improve irrigation efficiency and water conservation and to maintain and enhance environmental conditions and beneficial water use in the form of instream flows for the shareholders in the BRCC service area, and the larger Lower Bear River Watershed, with the authorized purpose being *Agricultural Water Management (rural and agricultural water supply, irrigation, water conservation, and water quality improvement)*; and 2) to improve water quality, maintain and enhance wetlands and wildlife habitat, and reduce erosion and sedimentation into Salt Creek, with the authorized purpose being *Watershed Protection (reducing offsite floodwater, erosion, sediment, and agriculture-related pollutants)*.

S-11 Description of the Preferred Alternative

The Preferred Alternative (Hammond and West Main Canals Improvements Alternative) activities include: BRCC Irrigation System Delivery Improvements (including BRCC canyon and red siphon improvements, Highland Ditch and Central Canal Company piping, Bear River City pressure irrigation and piping); Tremonton pressure irrigation improvements, Bear River Club, CDC, and Salt Creek Waterfowl Management Area (WMA) levee and sediment basin improvements.

S-12 Resource Information

Table S-1 lists the relevant resource information for the Project Area.

Table S-1. Existing Resource Information

Resource	Description[1]
Latitude/Longitude (CenterPoint)	BRCC Canyon Improvements: 41° 48’ 50” N 112° 4’ 36” W BRCC Red Siphon Installation: 41° 36’ 53” N 112° 9’ 11” W Tremonton Pressure Irrigation: 41° 42’ 43” N 112° 9’ 13” W Tremonton Irrigation Storage: 41° 43’ 53” N 112° 12’ 21” W Bear River City Pressure Irrigation: 41° 37’ 20” N 112° 7’ 33” W Highland Ditch Piping: 41° 40’ 17” N 112° 7’ 38” W Central Canal Company Piping: 41° 39’ 42” N 112° 9’ 18” W Bear River Club Levee Improvements: 41° 28’ 53” N 112° 14’ 44” W CDC Levee Improvements: 41° 28’ 56” N 112° 9’ 30” W Salt Creek Waterfowl Management Area Levee Improvements and Sediment Removal: 41° 39’ 49” N 112° 14’ 42” W

Resource	Description[1]
Hydrologic Unit Code (HUC) Number and Name (Watershed Area)	HUC 160102040401 Blind Springs Canyon (25,294 acres) HUC 160102040306 Water Canyon-Malad River (6,215 acres) HUC 160102040402 Blind Springs (26,959 acres) HUC 160102040307 Outlet Malad River (37,550 acres) HUC 160102040501 Willow Creek-Bear River (39,423 acres) HUC 160102040403 Salt Creek Waterfowl Management Area (22,651 acres) HUC 160102040502 Jim May Canyon-Salt Creek (9,170 acres) HUC 160102040404 Sulphur Creek (9,631 acres) HUC 160102040504 Black Slough-Box Elder Creek (9,785 acres) HUC 160102040505 Bear River-Frontal Great Salt Lake (62,408 acres) Combined area: 249,087 acres
Climate[2]	Average high temperatures: 63.2°F Average low temperatures: 37.1°F
Topography	The elevation of the Project Area ranges from approximately 4,212 feet above mean sea level (AMSL) to 4,745 feet AMSL. The landscape throughout the Project Area is characteristic of Cold North American Desert habitat.
Annual Precipitation/ Annual Snowfall[2]	18.44 inches/ 29.8 inches
Land Uses	Open Water: 12,261 acres (4.9%) Developed Open Space: 4,196 acres (1.7%) Developed Low Intensity: 4,550 acres (1.8%) Developed Medium Intensity: 1,744 acres (<1%) Developed High Intensity: 552 acres (<1%) Barren Land: 5,459 acres (2.2%) Deciduous Forest: 3,853 acres (1.5%) Evergreen Forest: 4,565 acres (1.8%) Mixed Forest: 127 acres (<1%) Shrub/Scrub: 66,447 acres (26.7%) Grassland/Herbaceous: 23,182 acres (9.3%) Pasture/Hay: 5,590 acres (2.2%) Cultivated Crops: 94,168 acres (37.8%) Woody Wetlands: 1,613 acres (<1%) Emergent Herbaceous Wetlands: 20,780 acres (8.3%)
Land Ownership	Private 186,716 acres (75.0%) Local 26,433 acres (10.6%) State 21,900 acres (8.8%) Federal 14,038 acres (5.6%) *Bureau of Land Management (BLM): 339 acres (<1%)* *National Forest: 436 acres (<1%)* *National Wilderness Area: 11,084 acres (4.4%)* *National Wildlife Refuge: 2,179 acres (<1%)*
Population[3]	Tremonton City—9,894 people Bear River City—877 people Box Elder County—57,666 people

Resource	Description[1]	
Demographics[3,4]	Demographic	Box Elder County, Utah
	White alone	88.1%
	African American	0.3%
	Native American and Native Alaskan	0.9%
	Asian	0.8%
	Native Hawaiian and Other Pacific Islanders	0.2%
	Two or More Races	5.9%
	Hispanic or Latino	9.6%
	White alone, not Hispanic or Latino	90.4%
Farms Present[5]	1,248 farms (Box Elder County)	
Land in Farms[5]	1,176,650 acres (Box Elder County)	
Average Farm Size[5]	943 acres (Box Elder County)	

[1]Total numbers may not equal 100% or correspond exactly due to rounding and mapping variations.
[2]National Oceanic and Atmospheric Administration (NOAA) (NOAA 2024).
[3]Table P1, 2020 Decennial Census (U.S. Census Bureau (Census) 2020a)
[4]Table P9, 2020 Decennial Census (Census 2020b)
[5]NRCS 2022

S-13 Alternative Plans Considered

All reasonable alternatives were evaluated in this Draft Plan–EIS to determine the locally preferred, agency preferred, environmentally preferred, and economic efficient alternatives. While a standalone nonstructural alternative could not be formulated to address the watershed problems while meeting the Sponsor's and Co-sponsor's objectives and avoiding constraints, nonstructural measures to meter water were included in the action alternatives. The five alternatives considered in this Draft Plan–EIS include the No Action Alternative or Future without Federal Investment (FWOFI), and four action alternatives, of which two action alternatives were analyzed in detail (Alternatives 1 and 2), and two action alternatives (Alternatives 3 and 4) were analyzed and considered, but eliminated from detailed study based on multiple considerations regarding the Proposed Project objectives and constraints:

- Under the ***No Action Alternative (FWOFI)***, no major improvements would occur, and no federal action or funding would be provided. Water would continue to be distributed through the existing canal systems, and the Sponsor and Co-sponsors would continue operations, maintenance, and replacement (OM&R). Agricultural water management in the watershed would be at continued risk of supply disruption from infrastructure failures and inefficiencies caused by poorly lined canals. Additionally, rural water supplies would be strained by the increasing demand for water used for outdoor irrigation. The watershed's wetlands would also be at continued risk from levee failures. This alternative would incur an average annualized $8,418,000 in agriculture income and wetland damage.
- ***Siphons Installation (Alternative 1)*** would implement multiple measures, including:
  Agricultural Water Management Measures
    - **BRCC Irrigation System Delivery Improvements–Siphons Installation—**BRCC would abandon a large section of the Hammond Canal by installing two new siphons across the Bear River to divert water from the Hammond Canal to the West Main Canal and back and would install box culverts in three critical locations along the West Main Canal and a box culvert on the Hammond Canal from the second siphon downstream along the canyon hillside.

- **BRCC Irrigation System Delivery Improvements–Red Siphon Installation**—BRCC would replace the existing Red Flume with an approximately 450-foot siphon under the Malad River along the East Canal to reduce maintenance and improve agricultural water delivery.
- **BRCC Irrigation System Delivery Improvements–Bear River City Pressure Irrigation and Storage**—Bear River City proposes to develop a pressurized secondary irrigation system for residents of the city, including piping the existing transmission canal with non-pressurized pipe, building an equalization storage pond, installing a pumping station, and installing a pressurized pipe network to deliver the water to each resident.
- **BRCC Irrigation System Delivery Improvements–Highland Ditch Piping**—The Highland Ditch Company proposes to pipe the existing concrete lined and earthen sections of the Highland Ditch with a gravity piped system (unpressurized).
- **BRCC Irrigation System Delivery Improvements–Central Canal Company Piping**—The Central Canal Company proposes to pipe the concrete lined canal and earthen sections of the Central Canal with a gravity piped system to improve reliability and delivery to agricultural users.
- **Tremonton Pressure Irrigation Improvement and Irrigation Storage**—Tremonton City proposes to construct a new pressure irrigation distribution system including upgrading an existing pumping station, installing pipe, and developing two equalization storage ponds.

Watershed Protection Measures

- **Bear River Club Levee Improvements**—The Bear River Club proposes to improve 6,000 feet of the existing failing levee using riprap along the Bear River and improve approximately 6,736 feet of existing access road to the levee.
- **Chesapeake Duck Club Levee Improvements**—The Chesapeake Duck Club proposes to improve 8,700 feet of the existing levee using riprap along the Bear River.
- **Salt Creek Waterfowl Management Area (WMA) Levee Improvements**—The UDWiR plans to improve 11,000 feet of an existing levee separating a bypass channel from a 6,000-acre wetland area in the Salt Creek WMA using riprap.
- **Salt Creek WMA Sediment Basin Installation**—The UDWiR would construct a 200-acre-foot sediment basin (approximately 53 acres) designed to trap and intercept sediment before it impacts the Salt Creek wetlands.

- ***Hammond and West Main Canals Improvements (Alternative 2)*** would improve the Hammond and West Main Canals by installing box culvert at five key locations based on geotechnical study on the Hammond Canal, and constructing box culvert through the Camp Fife area and two other key locations on the West Main Canal through the Bear River canyon area instead of siphoning the water across the river to the West Main Canal as in the Siphons Installation Alternative. Other than the BRCC Irrigation System Delivery Improvements—Siphons Installation measure, this alternative includes all the measures in the Siphons Installation Alternative as listed below:

  Agricultural Water Management Measures

  - BRCC Irrigation System Delivery Improvements—Hammond and West Main Canals Improvements
  - BRCC Irrigation System Delivery Improvements—Red Siphon Installation

- BRCC Irrigation System Delivery Improvements—Bear River City Pressure Irrigation and Storage
- BRCC Irrigation System Delivery Improvements—Highland Ditch Piping
- BRCC Irrigation System Delivery Improvements—Central Canal Company Piping
- Tremonton Pressure Irrigation Improvements and Irrigation Storage

Watershed Protection Measures

- Bear River Club Levee Improvements
- CDC Levee Improvements
- Salt Creek WMA Levee Improvements
- Salt Creek WMA Sediment Basin Installation

This alternative ***(Alternative 2)*** was identified as the Preferred Alternative and the Future with Federal Investment (FWFI) Alternative.

- ***Siphons Installation with Soil Lifts (Alternative 3)*** is the same as the Siphons Installation Alternative (Alternative 1), except soil lifts would be installed instead of riprap to improve the levees for the Bear River Club, CDC, and Salt Creek WMA Levee Improvements measures.
- ***Hammond and West Main Canals Improvements with Soil Lifts (Alternative 4)*** is the same as the Hammond and West Main Canals Improvements Alternative (Alternative 2), except soil lifts would be installed instead of riprap to improve the levees for the Bear River Club, CDC, and Salt Creek WMA Levee Improvements measures.

S-14 Project Costs and Funding Source

A breakdown of the estimated project costs and funding source for the Preferred Alternative/Future with Federal Investment (FWFI) (Hammond and West Main Canals Improvement Alternative) is summarized in Table S-2.

Table S-2. National Watershed Program Manual Economic Table 2—Estimated Cost Distribution-Preferred Alternative, Lower Bear River Watershed, Utah (2025 dollars)

Works of Improvement	Item	Installation Cost[1]						Project Total Cost
		Public Law 83-566			Other Funds			
		Agriculture Water Management	Watershed Protection	Total	Agriculture Water Management	Watershed Protection	Total	
Lower Bear River Watershed Project	Construction	$65,331,140	$8,020,663	$73,351,803	$21,777,048	$4,318,819	$26,095,865	**$99,447,668**
	Engineering	$12,195,148	$1,727,528	$13,922,676	$0	$0	$0	**$13,922,676**
	Permitting	$0	$0	$0	$105,000	$60,000	$165,000	**$165,000**
	Administration	$1,742,166	$246,789	$1,988,955	$28,000	$16,000	$44,000	**$2,032,955**
Total		**$79,268,450**	**$9,994,980**	**$89,263,430**	**$21,910,048**	**$4,394,819**	**$26,304,867**	**$115,568,297**

[1]Price base: 2025 dollars. Totals may not sum due to rounding. Prepared October 2025.

S-15 Ecosystem Services Framework

An ecosystem services framework was used to evaluate benefits and costs for the Proposed Project. "Ecosystem services" is a broad term used to describe the multitude of benefits that nature provides to humans. The four-category ecosystem framework adopted in the Principles, Requirements & Guidelines (PR&G) includes the following ecosystem service types—regulating, provisioning, cultural, and supporting services. Table S-3 summarizes the project alternatives and associated ecosystem services.

Table S-3. Summary of Project Alternatives and Associated Ecosystem Services

Item	Alternative		
	FWOFI[1]	**Siphons Installation**	**FWFI Hammonds and West Main Canals Improvements**
Alternatives			
Locally Preferred			X
Nonstructural[2]		X	X
Economic Efficiency			X
Environmentally Preferred			X
Guiding Principles			
Healthy and Resilient Ecosystems		X	X
Sustainable Economic Development		X	X
Watershed Approach		X	X
Public Safety		X	X
Floodplains		X	X
National Economic Efficiency (*Annualized Average*)[3]			
Total Project Investment (Costs)	$0	$4,240,300	$4,226,700
Monetized Total Benefits	$0	$9,134,600	$9,134,600
Monetized Net Benefits	$0	$4,894,300	$4,907,900
Ecosystem Services Addressed and Tradeoffs Identified[3]			
Regulating Services (Annualized Average)			
Reduced farm income damage	$0	$3,375,300	$3,375,300
Reduced water treatment costs	$0	$623,200	$623,200
Reduced damage to wetlands	$0	$5,042,700	$5,042,700
Flood prevention (not economically quantified)	No change	Reduces flooding risk	Reduces flooding risk
Provisioning Services (Annualized Average)[3]			
Increased farm income	$0	$93,400	$93,400
Cultural Services (Not Economically Quantified)			
Recreation opportunities	No change	Increase	Increase

[1]No benefits are related to the FWOFI because the benefits of the Preferred Alternative are calculated as changes relative to the FWOFI, focusing only on the net improvements.

[2]Non-structural alternatives, if they exist, may be included in the final analysis (see Section 6c(2)(c) of PR&G [NRCS 2014a]). While a standalone nonstructural alternative could not be formulated to address the watershed problems while meeting the Sponsor's and Co-sponsor's objectives and avoiding constraints, nonstructural measures to meter water were included in the action alternatives.

[3]Note that all costs and benefits for the alternatives are compared to the Future Without Federal Investment (FWOFI). Benefits and costs were calculated over a 100-year period of evaluation using a discount rate of 3.25 percent. All values reported in 2025 dollars.

S-16 Project Benefits

The planning policy used for this plan and environmental document—PR&G—states that Federal investments in water resources as a whole should strive to maximize public benefits, with appropriate consideration of costs. Multiple benefits would result from the implementation of the FWFI (Preferred Alternative).

In total, the Hammond and West Main Canals Improvements Alternative would create average annualized gross benefits of approximately $9,134,600 per year (Table S-4).

Table S-4. Economic Table 5a—Estimated Average Annualized Benefits and Reduced Damages by Increment, Lower Bear River Watershed Project, Utah (2025 dollars).

Onsite Benefit/Reduced Damage	Agricultural-Related[1]	Non-Agricultural-Related[1]
Reduced farm income damage	$3,375,300	$0
Reduced water treatment costs	$623,200	$0
Reduced damage to wetlands[2]	$5,042,700	$0
Increased farm income	$93,400	$0
Subtotal	$9,134,600	$0
Total Quantified Benefits PREFERRED Alternative	**$9,134,600**	

Notes: Totals may not sum due to rounding. Prepared October 2025.

[1]Price base: 2025 dollars amortized over 100 years at a discount rate of 3.25 percent.

[2]Wetland benefits in rural areas are included as agricultural-related per PL 83-566 and National Watershed Program Manual (NWPM) 506.0, Section 2, because these wetlands support agricultural production and rural community sustainability (NRCS 2015).

S-17 Net Economic Benefits

The estimated annual project economic benefits of the Preferred Alternative are summarized in Table S-5. In total, the Hammond and West Main Canals Improvement Alternative would generate average annualized benefits of $9,134,600 compared to average annualized costs of $4,226,700, for a benefit-cost ratio (BCR) of approximately 2.2.

Table S-5. National Watershed Program Manual Economic Table 6—Comparison of Average Annualized Costs and Reduced Damages and Benefits of the Preferred Alternative Lower Bear River Watershed, Utah (2025 dollars)

Works of Improvement	Agriculture-related[1]				Average Annualized Benefit Total[1]	Average Annualized Cost[1]	Benefit Cost Ratio
	Reduced Farm Income Damage	Reduced Water Treatment Costs	Reduced Damage to Wetlands[2]	Increased Farm Income			
Tremonton Pressure Irrigation Improvements and Storage	$0	$480,600	$0	$0	$480,600	$479,800	1.0
BRCC Irrigation System Delivery Improvements	$3,375,300	$142,600	$0	$93,400	$3,611,300	$3,212,600	1.1
Chesapeake Duck Club Levee Improvements	$0	$0	$177,900	$0	$177,900	$89,200	2.0
Bear River Club Levee Improvements	$0	$0	$864,800	$0	$864,800	$150,200	5.8
Salt Creek Waterfowl Management Area Levee Improvements and Sediment Removal	$0	$0	$4,000,000	$0	$4,000,000	$294,900	13.6
Total[1]	**$3,375,300**	**$623,200**	**$5,042,700**	**$93,400**	**$9,134,600**	**$4,226,700**	**2.2**

Notes: Totals may not sum due to rounding. Prepared: October 2025.

[1]Price base: 2025 dollars amortized over 100 years at a discount rate of 3.25 percent.

[2]Wetland benefits in rural areas are included as agricultural-related per PL 83-566 and NWPM 506.0, Section 2, because these wetlands support agricultural production and rural community sustainability (NRCS 2015).

S-18 Funding Schedule

The following table displays the funding schedule (Table S-6).

Table S-6. Funding Schedule

Budget Year	PL 83-566 Funds	Non-federal Funds*	Total
Budget Year +1	$23,785,162	$5,891,507	$29,676,669
Budget Year +2	$36,314,692	$11,252,045	$47,566,737
Budget Year +3	$29,163,576	$9,161,315	$38,324,891
Total	**$89,263,430**	**$26,304,867**	**$115,568,297**

Notes: Totals may not sum due to rounding.
*Permitting costs are proportionally distributed by each Construction Phase within non-federal funds.

S-19 Period of Analysis

The period of evaluation is 100 years, accounting for a 100-year project life, and not including the installation period.

S-20 Project Life

The life of the FWFI (Preferred Alternative) is estimated to be 100 years.

S-21 Discount Rate

Benefits and costs are discounted using the federal project discount rate of 3.25 percent for 2026.

S-22 Summary of Environmental Effects

Table S-7. lists the resources of concern, context and intensity, and the environmental effects associated with the FWFI (Preferred Alternative). Resources that would not be affected by the FWFI are not listed in this table.

Table S-7. Summary of Resource Concerns, Context and Intensity, and Environmental Effects

Resource of Concern	Context and Intensity	Summary of Environmental Effects for Future with Federal Investment (Preferred Alternative)
Ecosystem Services		
Regulating Services	The proposed activities would address rural and agricultural water supply, conservation, and quality, and reduce offsite floodwater, erosion, sediment, and agriculture-related pollutants, regulating water filtration, nutrient removal, sediment trapping, and pollutant breakdown function of wetlands.	BRCC Irrigation Delivery System Improvements reduce damage to farm income by $3,375,300. Reduces water treatment costs by $623,200. Reduces damage to wetlands by $5,042,700. Reduces flooding risk.
Provisioning Services	The proposed activities would provide rural and agricultural water	BRCC Irrigation Delivery System Improvements increase farm income by $93,400.
Cultural Services	The proposed activities would enhance recreation opportunities.	Protects recreation values associated with wetlands in the Project Area from the risk of levee failure reducing the expected annual damages and improving recreational opportunities.
Economics/Socioeconomics		
Economics/ Socioeconomics	The proposed activities would contribute to economic development.	Direct effects include the use of approximately $26,304,867 in local match funds to construct the Proposed Project. The FWFI would temporarily create approximately 100 jobs within the Project Area during construction. The FWFI would require an average annualized investment of $4,226,700, and provide $9,134,600 in annualized benefits, excluding other social effects, representing a benefit-cost ratio (BCR) of 2.2.

Resource of Concern	Context and Intensity	Summary of Environmental Effects for Future with Federal Investment (Preferred Alternative)
Air Quality and Climate		
Clean Air Act (CAA)/ National Ambient Air Quality Standards (NAAQS), Climate, and Greenhouse Gases (GHGs)	The proposed activities would not violate the CAA or NAAQS and would contribute to climate resilience.	Temporary negligible effects to air quality would occur during construction due to equipment operation and land disturbance, but these effects would be minimized through BMPs. New electric pumps would cause minor emissions increases in the long term, remaining well below state and federal $PM_{2.5}$ emission thresholds. The alternative would not violate the CAA or NAAQS. Fugitive dust and GHG emission increases associated with the FWFI would be minimized by implementation of applicable best management practices (BMPs). These emission rates would not increase in the Project Area over the long term. By improving agricultural water management, including conserving and improving water quality, the FWFI would make the watershed area and the irrigation systems more resilient to climate stress.
Soils and Geology		
Upland Erosion & Sedimentation	The proposed activities would decrease erosion and sedimentation and reduce the failure risks associated with seismic activity in the Project Area.	Under the FWFI, temporary, direct increases in erosion and sedimentation would occur in the Bear River, Malad River, and nearby downstream areas during construction, particularly during the rehabilitation of the Hammond East and West Main Canals, as well as the replacement of the BRCC Red Siphon. Additionally, temporary, direct increases in erosion and sedimentation would occur in the Bear River Migratory Bird Refuge and Salt Creek WMA during completion of the proposed levee improvements. As required by UDEQ, the Utah Pollutant Discharge Elimination System (UPDES) Program Large Construction General Permit (CGP) would be followed for proposed activities. Erosion control measures including BMPs and SWPPP would be applied to minimize effects.

Resource of Concern	Context and Intensity	Summary of Environmental Effects for Future with Federal Investment (Preferred Alternative)
		Long-term, the alternative would reduce canal seepage, thereby decreasing erosion and sedimentation, and indirectly benefiting slope stability in the Bear River Canyon, and would repair the levees and install a sediment basin indirectly improving wildlife habitats in the Bear River Migratory Bird Refuge, Salt Creek WMA, and the Great Salt Lake (GSL). By improving canal infrastructure in the steep canyon area and replacing aging infrastructure, the FWFI would reduce the failure risks associated with seismic activity.
Prime & Unique Farmland	The proposed activities would decrease erosion and sedimentation in the Project Area and would protect farmlands from flood damage in the long term.	The FWFI would temporarily affect approximately 13.0 acres during construction activities and permanently affect approximately 9.0 acres of prime and unique farmlands. Consistent with the Federal Farmland Protection Policy Act (FPPA), the project is designed to support agricultural productivity and does not convert the 9.0 acres to non-agricultural use. Alternative sites were considered for the equalization ponds, but the selected sites were determined to be the most suitable due to proximity to existing operations and minimal environmental impact. BMPs and a SWPPP would be implemented to minimize erosion, while the rehabilitation of canal systems would reduce flood damage to approximately 450 acres of prime and unique farmlands in the long term. The project enhances the long-term viability of agricultural operations and aligns with both federal and local farmland protection goals and complies with the FPPA.
Vegetation		
Special Status Plant Species, including Candidate, Endangered, and Threatened Plant Species	The proposed activities would contribute to improved water quality and quantity, benefiting vegetation in the Project Area.	Based on surveys, no suitable habitat was found within the Project Area for the Ute ladies'-tresses, and no effect would occur to this species. Conservation measures, such as minimizing vegetation removal and reseeding disturbed areas with native species, ensure no adverse effects to ULT.

Resource of Concern	Context and Intensity	Summary of Environmental Effects for Future with Federal Investment (Preferred Alternative)
Riparian Areas	The proposed activities would contribute to improved water quality and quantity, benefiting riparian vegetation in the Project Area.	The FWFI piping projects would contribute directly and indirectly to the loss of seepage induced riparian vegetation in the short and long term, including disturbance and removal during construction, and eventual loss of 35 acres of low quality, seepage induced riparian fringe after removal of hydrology from open canals sources when they are piped. No vegetation removal along the Bear River would occur.
Noxious Weeds & Invasive Plants	The proposed activities could increase the risk of spread, and introduction and establishment of invasive species, which are specifically prohibited by Executive Order (E.O.) 13112. Improved water control capabilities would allow better management of invasive species such as *Phragmites* (*Phragmites australis subsp. Australis*), helping to maintain and improve habitat diversity.	During construction, BMPs would be incorporated into contractor specifications to control and prevent the introduction and spread of any invasive plant species or noxious weeds during construction activities. In the long term, the FWFI activities would mitigate sedimentation within the Project Area and therefore decrease the potential for spread and establishment of invasive plant species. The proposed box culvert installations in the BRCC Canyon area and other improvements would decrease the likelihood of landslides and canal failures, events which potentially increase transport of sediment and invasive species. Improved water control and capabilities at the levees and the sediment basin at the Salt Creek WMA would allow better management of invasive species such as *Phragmites*, helping to maintain and improve habitat diversity.
Water Resources		
Surface & Ground Water Quality	Project activities may affect water quality	The FWFI would mitigate temporary effects on water quality during construction activities through a SWPPP and BMPs, such as erosion control and construction timing strategies. In the long term, enhanced canal infrastructure would further minimize pollutant runoff and sediment deposition, promoting improved overall surface water quality. Long-term water quality benefits resulting from levee improvements and the installation of

Resource of Concern	Context and Intensity	Summary of Environmental Effects for Future with Federal Investment (Preferred Alternative)
		a sediment basin include reduced sediment transport into waterways, improved wetland function, and improved aquatic habitat conditions, and the project would comply with the Utah Surface Water Quality Standards and the Clean Water Act (CWA).
Surface & Ground Water Quantity	Project activities may affect water quantity.	The FWFI would substantially enhance water conservation by reducing seepage and evaporative losses through over 17,300 feet of box culvert installations and over 61,970 feet of canal piping. The FWFI would result in infrastructure enhancements that would provide greater reliability and availability of water resources. A long-term improvement would occur in irrigation water delivery, increased water efficiency, and water storage. These improvements collectively contribute to achieving regional goals for sustainable water management, benefiting agricultural productivity, ecological health, and long-term water delivery efficiency and reliability.
Clean Water Act/ Waters of the U.S. (WOTUS)	Project activities may occur within and adjacent to potential jurisdictional waters.	The FWFI construction actions would temporarily affect WOTUS through sedimentation, and alterations to hydrology and channel morphology. Construction activities that involve dredging or filling in WOTUS would require Section 404 permitting from the USACE and Section 401 water quality certification from UDEQ, including one siphon installation, transitioning the existing irrigation infrastructure to a pressurized system, box culvert and pipeline installation, levee improvement, and sediment basin construction. Through these regulatory processes, any effects to WOTUS would be mitigated, ensuring compliance with the CWA. Long-term, this alternative would result in improvement of water quality and quantity, and wetland functions within the Bear River watershed.

Resource of Concern	Context and Intensity	Summary of Environmental Effects for Future with Federal Investment (Preferred Alternative)
Wetlands	The proposed activities may affect wetlands.	The FWFI would have direct effects to wetlands from temporary and permanent disturbances, these effects would be minimized through BMPs, including revegetation, noxious weed prevention, and erosion control. Construction activities such as siphon installation, canal piping and box culvert installation, levee improvements, and sediment basin construction would have direct effects to wetlands. Permanent long-term effects would also occur, primarily limited to infrastructure footprints, including a siphon installation, concrete structures, and levee armoring using riprap. Riprap would provide structural integrity, erosion protection, and accommodate environmental constraints such as ice flows, saline soils, and rodent pressures. Permanent effects would be limited to the footprint of these features. Final disturbance amounts would be refined during final design and permitting in coordination with USACE to ensure compliance with applicable regulatory requirements. Levee improvement would have a long-term beneficial effect to thousands of acres of wetlands adjacent to the GSL.
Regional Water Management Plan	The Utah State Water Plan prioritizes projects that preserve existing uses and rectify existing demands, needs, and shortages.	The FWFI would meaningfully support regional sustainability goals by enhancing water conservation, improving infrastructure reliability, and protecting ecological habitats.
Floodplain Management	The proposed activities may affect floodplains.	The FWFI would improve floodplain management through extensive infrastructure upgrades. Installation of concrete box culverts and riprap would stabilize canals and levees, reducing the flooding risk by preventing canal overtopping and infrastructure failures. Additionally, the FWFI would install one siphon beneath the Malad River, reducing above-ground structures within the 100-year floodplain and decreasing flood risks associated with structural impediments during flood events.

Resource of Concern	Context and Intensity	Summary of Environmental Effects for Future with Federal Investment (Preferred Alternative)
		The levee stabilization methods selected under this alternative would provide necessary structural integrity, effectively protecting agricultural areas, homes, and other infrastructure within the floodplain. Improving approximately 25,700 feet of levees along the Bear River would significantly reduce the risk of levee failure and enhance flood management and stability. The sediment basin proposed at Salt Creek WMA would reduce sediment deposition and enhance floodplain capacity. These actions would enhance floodplain functionality and protect substantial wetland habitats from inundation and sediment deposition.
Wildlife		
Fish & Wildlife Habitat	The proposed activities may affect fish and wildlife habitat.	The FWFI would temporarily increase ambient noise levels causing habitat disturbances and individual displacement during construction, but mitigation strategies such as seasonal construction timing, buffer zone maintenance, and habitat restoration efforts would help minimize adverse effects on wildlife. Long-term, installing box culverts and piping canals would permanently remove open water sources for wildlife and remove 35 acres of low-quality, seepage-induced riparian vegetation that wildlife, such as small mammals, waterfowl, and avian species, may use for forage, shelter, and stopover habitat. No sagebrush or crucial habitat would be removed that would affect the Columbian sharp-tailed grouse. mule deer, ring-necked pheasant, or turkey. Long-term benefits include improved water management, enhanced wetland ecosystems, and reduced risks of habitat loss due to erosion and infrastructure failures.

Resource of Concern	Context and Intensity	Summary of Environmental Effects for Future with Federal Investment (Preferred Alternative)
Special Status Animal Species, including Candidate, Threatened, and Endangered Animal Species	The proposed activities may affect federally listed and state sensitive species and habitat.	The FWFI would have no effect to two Endangered Species Act (ESA) listed species, the monarch butterfly and the Suckley's cuckoo bumble bee, and may affect, is not likely to adversely affect (MANLAA) one ESA-listed species, the yellow-billed cuckoo (YBCU). Although marginally suitable habitat for the YBCU may exist within the canyon section of the Lower Bear River, no potentially suitable habitat would be affected by project activities. Improvements to the Hammond and West Main Canals would not require construction or vegetation removal immediately on the banks of the Bear River or involve direct removal of vegetation within the delineated YBCU habitat patches. BMPs include measures to avoid construction during the YBCU's breeding and nesting season (June 30–August), which would limit noise disturbance within 0.5 miles of the Project Area. Long-term, project activities would benefit habitat through improved water management, enhanced wetland ecosystems, and reduced risks of habitat loss due to erosion and infrastructure failures.

Resource of Concern	Context and Intensity	Summary of Environmental Effects for Future with Federal Investment (Preferred Alternative)
Migratory Birds and Bald and Golden Eagles	The proposed activities may affect migratory birds, bald and golden eagles, raptors, and habitat in the Project Area.	The FWFI would have minor, temporary and short-term effects to migratory bird species in the Project Area from construction noise, vegetation removal along piped areas, and loss of open water sources and seepage induced wetlands. BMPs including pre-construction surveys and seasonal restrictions, would mitigate effects to avian species consistent with the Migratory Bird Treaty Act (MBTA) and the Bald and Golden Eagle Protection Act (BGEPA). Long-term, project activities would benefit habitat through improved water management, enhanced wetland ecosystems, and reduced risks of habitat loss due to erosion and infrastructure failures.

Resource of Concern	Context and Intensity	Summary of Environmental Effects for Future with Federal Investment (Preferred Alternative)
Human Environment		
Cultural and Historic Resources	The proposed activities have the potential to affect cultural and historic resources.	The FWFI would have an adverse effect on four canals and no adverse effect on the Union Pacific Railroad, the Bear River Club Dike, the Unnamed Levee, and the Old River Channel Canal sites. If construction activities uncover any materials of cultural or historic significance (i.e., bone fragments, pottery, stone tools, burial features, etc.), construction would halt, and procedures outlined in the NRCS Prototype Programmatic Agreement with the Utah SHPO would be followed (NRCS and SHPO 2025). Section 106 consultation was initiated on June 12, 2024 and is ongoing, and includes consultation with the Eastern Shoshone Tribe of the Wind River Reservation, Wyoming, the Shoshone-Bannock Tribes of the Fort Hall Reservation, the Ute Indian Tribe of the Uintah & Ouray Reservation, Utah, the Northwest Band of the Shoshone Nation, the Skull Valley Band of Goshute, and the Confederated Tribes of the Goshute Reservation. The NRCS State Conservationist, in consultation with the Utah State Historic Preservation Officer (SHPO), Tribes/Tribal Historic Preservation Officers (THPOs), cooperating agencies (USACE, EPA, and Reclamation), and consulting parties (USFWS, NPS, and UDWiR) determined that the project would have an Adverse Effect to Historic Properties (36 Code of Federal Regulations [CFR] 800.5(d)), and NRCS prepared a draft Memorandum of Agreement (MOA) to resolve the adverse effects.
Scientific Resources	The proposed activities have the potential to affect paleontological resources	The FWFI is not expected to uncover significant fossils based on a Utah Department of Natural Resources (UDNR) concurrence letter. Unless fossils are discovered during construction activities this alternative would have no direct or indirect effects because the quaternary and recent alluvial and lacustrine deposits in the area are unlikely to contain paleontological resources. If fossils are

Resource of Concern	Context and Intensity	Summary of Environmental Effects for Future with Federal Investment (Preferred Alternative)
		discovered during construction activities, work would be halted within 50 feet of the discovery and notification made to UDNR.
Public Health and Safety	The proposed activities may positively affect public health and safety by reducing flood risks and proving needed maintenance of aging infrastructure.	The FWFI would install box culverts in the canyon area to reduce water losses and help stabilize landslide prone soils. The FWFI would also replace open canals with piped systems to prevent flooding and eliminate open water hazards. These improvements would reduce the likelihood of landslides and improve safety. Given the history of major canal failures in the BRCC water system, which provides irrigation water to over 65,500 acres of agricultural land, as well as was to nearby cities and towns like Tremonton and Bear River City, and the dangers open canals pose to the public, the FWFI would provide major long-term beneficial improvements to public health and safety in the Project Area and the Watershed Area.
Hazardous Materials	The proposed activities could disturb existing hazardous material sites.	The FWFI has one hazardous materials site identified within 15 feet of project activities. This site is unlikely to be disturbed because activities are confined to the road right-of-way (ROW). Additionally, BMPs would be implemented to minimize potential effects including minimizing soil disturbance, and if hazardous materials are encountered, notifying UDEQ, and handling site material appropriately. No hazardous materials would be generated under the FWFI. Because the Proposed Project would comply with contract provisions regarding hazardous or solid waste and they would also develop and implement the Spill Prevention, Control, and Countermeasure (SPCC) Plan and the Storm Water Pollution Prevention Plan (SWPPP), handling of hazardous materials would comply with all applicable laws and regulations and would not cause health hazards or environmental concerns.

Resource of Concern	Context and Intensity	Summary of Environmental Effects for Future with Federal Investment (Preferred Alternative)
Transportation and Infrastructure	The proposed activities may affect transportation and infrastructure.	The FWFI would cause temporary, localized traffic delays during construction activities. The FWFI would provide long-term beneficial effects to transportation and infrastructure by reducing the risk of landslides, flood damage, and levee breach.
Noise	Proposed construction activities could cause temporary and long-term noise effects.	The FWFI would temporarily increase noise associated with construction equipment and vehicles during implementation. Noise mitigation measures would be implemented during construction to minimize temporary noise effects. Permanent noise effects would occur from the FWFI from the construction of a new pump station in Bear River City. This pump station would have a masonry control house to minimize noise. The long-term noise level increase from the pump station would be minor.
Visual Resources and Scenic Beauty	The proposed activities may affect visual resources within the Project Area.	The FWFI would temporarily affect visual quality and recreational activities due to the presence of construction equipment and crews and material stockpiles at staging areas throughout the Project Area, including adjacent to the Bear River Canyon, the Bear River Migratory Bird Refuge, and the Salt Creek WMA. However, implementation of BMPs would help minimize potential visual effects. In the long term, future canal overtopping and flooding, landslides in the canyon area, and levee degradation and sedimentation would be reduced, preserving the existing scenic beauty of cities, towns, and the canyon and wetland areas. After reclamation and vegetation establishment, the visual changes from the FWFI would be substantially unnoticeable and not measurably different from current conditions of the surrounding landscape and would not change the Visual Resource Management (VRM) classifications, nor would it change the visual characteristic of the landscape.

Resource of Concern	Context and Intensity	Summary of Environmental Effects for Future with Federal Investment (Preferred Alternative)
Recreation	The proposed activities may affect recreational opportunities.	The FWFI would cause temporary disruptions to some recreational activities during construction due to increased traffic, construction equipment, and noise. Some undesignated camping and hiking access or fishing areas may temporarily be closed during construction around the BRCC canals. These recreational opportunities would be expected to resume following completion of nearby construction activities. Long-term benefits include reducing landslide potential, creating a safer canyon area, and improving wetland habitats for better wildlife and bird viewing opportunities.
Special Land Designations		
Land Use	The proposed activities may affect land use within the Project Area. The Sponsor and Co-sponsors must coordinate proposed activities, and activities must be consistent with zoning ordinances and adhere to county land use requirements, including Box Elder's County Resource Management Plan (RMP).	The FWFI would permanently convert approximately 9.0 acres of prime and unique farmlands to water storage as a result of the new equalization ponds. This land use would still be consistent with local zoning as it would be used for secondary water management purposes. No work would take place within or over Water Source Protection Zone 2 within Tremonton City and no land use would change in this area. The FWFI would meet the goals of the Box Elder County RMP and the State RMP.
Natural Areas	The proposed activities may affect natural areas within the Project Area.	The FWFI would protect over 24,000 acres of wetlands by improving levees and reducing sedimentation. It would provide long-term benefits to water quality and wetland habitats, with minimal effects during construction. Overall, the project would positively affect designated natural areas, enhancing water management and reducing disruptions.

Resource of Concern	Context and Intensity	Summary of Environmental Effects for Future with Federal Investment (Preferred Alternative)
Ecologically Critical Areas	The proposed activities may have an indirect effect on ecologically critical areas.	The FWFI would have an indirect long-term benefit to the ecologically critical Great Salt Lake. Proposed levee improvements would help maintain the wetlands of the Great Salt Lake. Furthermore, reducing seepage in the irrigation system would contribute to an increased release of water from Cutler Dam into the Great Salt Lake. This measure would help mitigate the drying of the Great Salt Lake, which has lost approximately half of its historical volume.
Parklands, National Parks, Monuments, & Historic Sites	The proposed activities may affect historic trails within the Project Area.	Temporarily, the FWFI could indirectly affect the Salt Lake Cut-off of the California National Historic Trail (NHT) by changing the historic setting, scenery, natural resources, and recreation of the trail. These effects would be localized and would cease following construction and site restoration. No direct or permanent effects would occur to the Salt Lake Cut-off of the California NHT itself. Long-term, the FWFI would provide beneficial effects to the Salt Lake Cut-off of the California NHT. The piping and covering of post-migration period canals would enhance the historic setting and scenery of the Salt Lake Cut-off of the California NHT over time. Other benefits include enhanced recreational opportunities by reducing sedimentation and improving water quality in the surrounding wetland habitats and removing post-period canals.

Prepared: November 2025.

S-23 Major Conclusions

The FWFI—the Hammond and West Main Canals Improvement Alternative (Preferred Alternative/Alternative 2) is the most feasible, practical, economical, and environmentally preferrable alternative. This alternative is considered the Preferred Alternative.

S-24 Areas of Controversy and Issues to be Resolved

No known areas of controversy or issues exist for this project. During public scoping opportunities, eleven comments were received from the public. The primary comment categories included water management and flood concerns, the effect of infrastructure on climate change, and public land management. No areas of controversy or unresolved issues were raised during the scoping process.

S-25 Evidence of Unusual Congressional or Local Interest

No evidence of unusual congressional or local interest exists for the proposed Lower Bear River Watershed Project.

S-26 In Compliance

Is this report in compliance with executive orders, public laws, and other statutes governing the formulation of water resource projects? _X_ YES ____NO

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        - U.S. Department of the Interior, National Park Service (NPS) Coordination
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        - Utah Department of Natural Resources—Division of Wildlife Resources (UDWiR) Coordination
    - Advisory Council on Historic Preservation (ACHP) Coordination
    - Cultural Memorandum of Agreement (MOA)
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    - Cooperating Agency Memorandum of Understanding (MOU)
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- Technical Memoranda (TM)
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Appendices E2 and E3. Other Supporting Information

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Chapter 1 Watershed Planning Background

The United States Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS), with the Bear River Water Conservancy District (BRWCD) as the Sponsor and the Bear River Canal Company (BRCC), Bear River City, Highland Ditch Company, Central Canal Company, Tremonton City, Bear River Club Company (Bear River Club), Chesapeake Duck Club (CDC), and Utah Division of Wildlife Resources (UDWiR) as the Co-sponsors, propose to use federal funds to implement the Lower Bear River Watershed Project (Proposed Project). The planned components of the Proposed Project would be funded through the provisions of the Watershed and Flood Prevention Operations (WFPO) Program to address agricultural water management and watershed protection.

1.1 Study Authority

The NRCS prepared this Watershed Plan–Environmental Impact Statement (Plan–EIS) for the Proposed Project in accordance with the National Environmental Policy Act (NEPA), under the authority of the Watershed Protection and Flood Prevention Act (Public Law [PL] 83-566 [PL-566]) of 1954 (68 Statute 666 as amended; 16 United States [U.S.] Code [U.S.C.] Section 1001 et seq.).

1.2 Study Sponsor and Co-sponsors

The non-federal Sponsor for this study and project is BRWCD, and the Co-sponsors are BRCC, Bear River City, Highland Ditch Company, Central Canal Company, Tremonton City, Bear River Club, CDC, and UDWiR. BRWCD is a legally organized entity under Utah State law with the power of eminent domain and real property rights and the authority to levy taxes (Utah Code § 17B-2a-1004). The Sponsor has a robust relationship with the public they represent and encourages the public to participate in the watershed project planning process. The Sponsor and NRCS have drafted the Watershed Agreement, and the Co-sponsors have shown evidence of commitment for funding, installing, operating, and maintaining the Proposed Project.

1.3 Cooperating Agencies

The NRCS as the lead federal agency, in cooperation with the BRWCD as the project Sponsor, coordinated and consulted with many local, state, and Federal agencies, and Tribal governments for the preparation of this Plan-EIS. The U.S. Army Corps of Engineers (USACE), U.S. Department of the Interior, Bureau of Reclamation (Reclamation), and the U.S. Environmental Protection Agency (EPA) were formally offered and joined the project as cooperating agencies per the process described in the National Environmental Compliance Handbook (NECH) 610.61 (NRCS 2016). Three other agencies declined participation as cooperating agencies (U.S. Department of Agriculture [USDA], Forest Service [USFS]; U.S. Department of the Interior, Fish and Wildlife Service [USFWS]; and U.S. Department of the Interior, National Park Service [NPS]). See coordinating correspondence in Appendix A.

1.4 Planning Area

The Proposed Project is located in the vicinity of Fielding, Garland, Tremonton, Elwood, Bear River City, and unincorporated areas of Box Elder County, Utah.

1.4.1 Selected Watershed

The Lower Bear River Watershed is contained entirely within Box Elder County, Utah, and the watershed limits evaluated in this Plan are confined within the Great Basin Region, specifically within the Lower Bear-Malad (Hydrologic Unit Code [HUC] 16010204) Subbasin; and includes portions of ten subwatersheds (Table 1-1; U.S. Department of the Interior, Geological Survey [USGS] 2024).

Table 1-1. Subwatersheds in the Lower Bear River Watershed

Subwatershed	Hydrologic Unit Code (HUC)	Total Size (acres)
Blind Springs Canyon	160102040401	25,294
Water Canyon-Malad River	160102040306	6,215
Blind Spring	160102040402	26,959
Outlet Malad River	160102040307	37,550
Willow Creek-Bear River	160102040501	39,423
Salt Creek Waterfowl Management Area	160102040403	22,651
Jim May Canyon-Salt Creek	160102040502	9,170
Sulphur Creek	160102040404	9,631
Black Slough-Box Elder Creek	160102040504	9,785
Bear River-Frontal Great Salt Lake	160102040505	62,408
Total	**-**	**249,087**

The Lower Bear River Watershed encompasses 249,087 acres and contains the limits of the Project Area described below. The watershed boundary associated with this Plan-EIS is shown in Figure 1-1 (also see Watershed Map [Map 1] in Appendix B). The Lower Bear River Watershed includes an area from the Cutler Reservoir to the Great Salt Lake (GSL).

The locations of potential proposed management measures by Sponsor or Co-sponsors and purpose are shown in Figure 1-2.

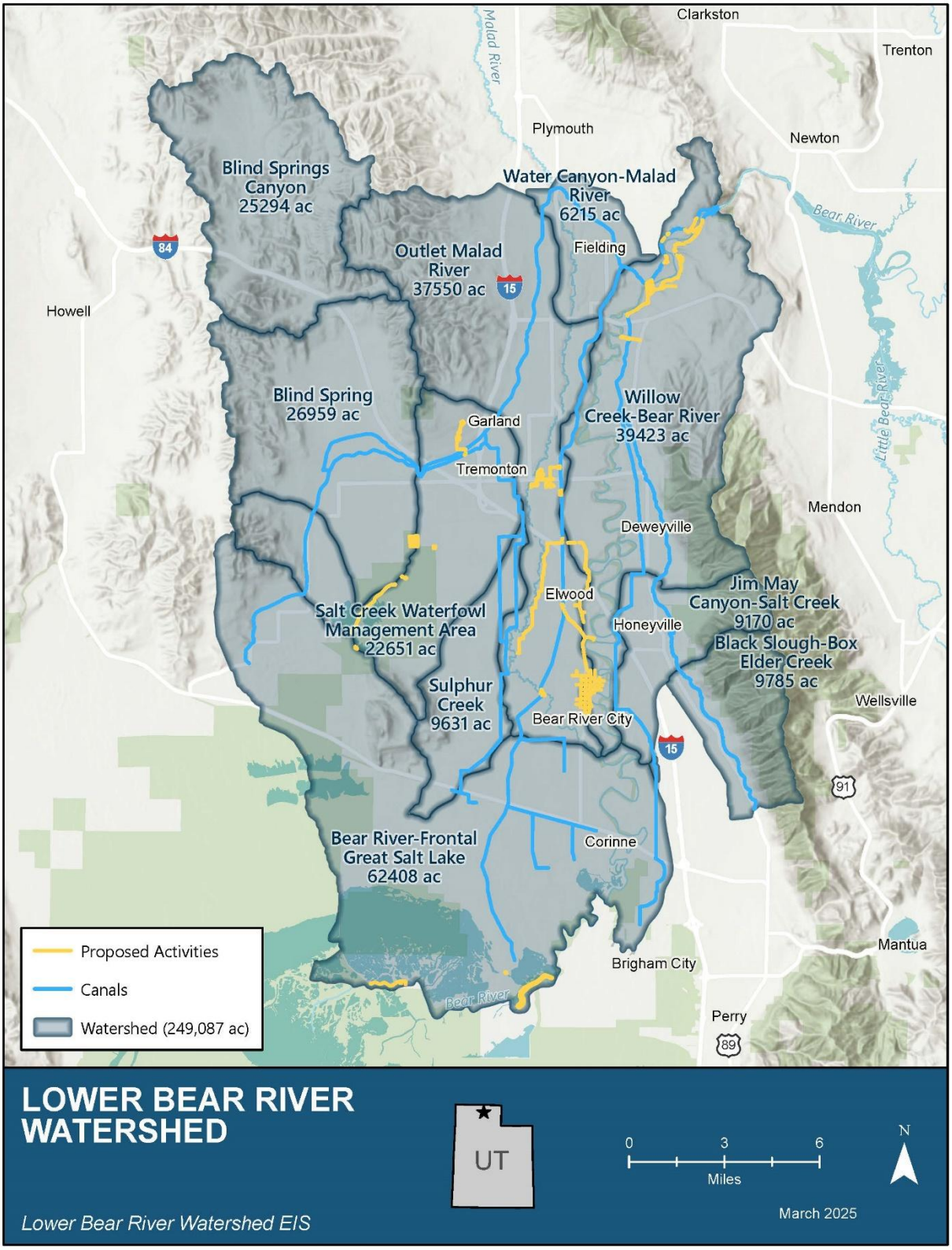

Figure 1-1. Lower Bear River Watershed Map

Figure 1-2. Lower Bear River Watershed Project Map

1.4.2 Project Area

The Project Area is the portion of the Lower Bear River Watershed that encompasses the approximately 634 acres of area necessary for the implementation of potential measures to address the watershed problems, including staging areas and construction access. The Project Area is contained within the following Township, Range, and Sections of the Salt Lake Meridian:

Township 12N, Range 4W:	Sections 14, 21, 22, 23, 26, 28, and 35
Township 11N, Range 4W:	Section 2, 25, 26, and 35
Township 10N, Range 4W:	Section 2
Township 9N, Range 4W:	Sections 25 and 36
Township 12N, Range 3W:	Section 32
Township 11N, Range 3W:	Sections 2, 5, 11, 14, 18, 19, 23, 24, 25, 26, 34, 35, and 36
Township 10N, Range 3W:	Sections 1, 3, 11, 12, and 13
Township 9N, Range 3W:	Sections 26, 27, 30, and 34
Township 13N, Range 2W:	Sections 27, 33, and 34
Township 12N, Range 2W:	Sections 4, 5, 8, and 9
Township 10N, Range 2W:	Section 7

Elevation in the Project Area ranges from 4,212 feet to 4,745 feet AMSL.

Within the Project Area, the BRCC is the primary supplier of irrigation water. The BRCC's service area includes the cities and towns of Tremonton, Elwood, Fielding, Riverside, Garland, Thatcher, Penrose, Deweyville, Honeyville, Collinston, Bear River, Corinne, and unincorporated areas of Box Elder County.

According to the USGS, most project measures in the Project Area are situated within portions of the Sagebrush Basins and Slopes (13c), Wetlands (13g), and Malad and Cache Valleys (13i) ecoregions, which are all part of the Central Basin and Range (13) ecoregion, characterized by valleys, slopes, and alluvial fans located at higher elevations on mountain slopes, while the Bear River Club and CDC improvements are located within the Wetlands (13g) ecoregion, which typically contains level ground, rushes, reed grasses, and open water (Woods et al. 2001). Soils in the Wetlands ecoregion are typically poorly or very poorly drained and are often salty (Woods et al. 2001). The majority of the Project Area is located within the Malad and Cache Valleys (13i), which typically contains wide terraces, narrow floodplains, and alluvial fans, as well as mountain fed perennial streams and canals, and has a cooler, shorter growing season than other ecoregions in the area (Woods et al. 2001). This ecoregion is extensively farmed and more densely populated than other ecoregions in the area. The area has an average annual high temperature of 63.2º F and an average low temperature of 37.1º F (NOAA 2024).

Generally, the Proposed Project would take place within a mixed agricultural, industrial, commercial, and residential area with previously disturbed areas. The Interstate Highway 15 (I-15) is a central transportation corridor and feature within the Bear River Valley. The landscape

throughout the valley is heavily modified by human activities, including agriculture, urbanization, and industrial activities (EPA 2024).

1.4.3 Area of Potential Effect

In accordance with 36 Code of Federal Regulations (CFR) 800.16(d), and Utah Code Section 9-8-404, the Area of Potential Effect (APE) for cultural resources is defined as, "the geographic area or areas within which undertaking may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist."

The NRCS was designated the lead federal agency for Section 106, including delineation of the APE. As detailed in the cooperating agency MOU, pursuant to 50 CFR Part 402.07 and 36 CFR 800.2(a)(2), and through additional documentation for EPA, NPS, USFWS, and UDWiR (Appendix A), the NRCS is serving as the agency official who shall act on behalf of the USACE, Reclamation, EPA, NPS, USFWS, and UDWiR fulfilling their collective responsibilities for compliance with Section 106 of the NHPA.

Per 36 CFR 800.4, the NRCS, in consultation with the Utah State Historic Preservation Officer (SHPO), cooperating agencies (USACE, Reclamation, and EPA), other consulting parties (NPS, USFWS, and UDWiR), and applicable Tribes, determined the direct and indirect APE to be 634.1 acres of land, comprising 148.1 acres of state waterfowl management area (WMA) managed by the UDWiR, 8.3 acres of federal wildlife refuge managed by the USFWS, and 477.7 acres of privately owned land. The APE includes all proposed ground disturbance, staging areas, and access roads. The APE may decrease in size as project planning continues. No new borrow sources would be required. See details in Section 3.3.7.1 Cultural and Historic Properties and Section 7.1.1 Section 106 Consultation.

The NRCS has determined that no potential for direct or indirect visual effects to cultural resources would occur from the Proposed Project, and a visual APE is not applicable for this undertaking. In general, potential visual effects could arise from converting earthen and concrete-lined canals to pipes where historic trees are present along the banks of the canals. However, the setting of the Proposed Project is agricultural in nature with sparse farmsteads and a lack of mature trees along the canals whose health would decline due to loss of water seepage from the earthen canals.

Therefore, no visual APE was established because the Project Area contains few mature trees and the visual setting is not expected to change as a result of the proposed activities. The undertaking does not introduce new visual elements that could affect the setting, feeling, or association of any historic properties. Temporary atmospheric (e.g., dust, emissions) and auditory (e.g., construction noise) effects were also considered. These effects would be temporary, minor, and not of a scale or duration likely to alter the character or use of any historic properties. Therefore, they were not included in the APE. The potential for other indirect effects (such as vibration, changes in land use, or access) was also reviewed. No such effects were identified that would extend the APE beyond the direct footprint of the project.

For this undertaking, the cultural resources' survey transects were spaced 50 feet apart and the ground was visually inspected to an approximate distance of 25 feet on both sides of each transect in the APE. In total, 634.1 acres were inventoried, including 386.8 acres of intensive level survey, 0.5 acres of reconnaissance level survey, and 246.8 acres of literature review

(Class I) surveys only that were excluded from intensive surveys due to access issues, dense vegetation, standing water, and surface conditions, such as paving or new construction.

For areas of the APE that only Class I surveys were conducted, the likelihood of encountering historic properties is extremely low, and per 36 CFR 800.4.b.1, NRCS and the consulting parties agreed that the level of effort (Class I, II, or III) meets "the reasonable and good faith effort to carry out appropriate identification efforts." If previously unidentified cultural resources are encountered during construction, the project would follow the procedures in the NRCS Prototype Programmatic Agreement with the Utah SHPO (NRCS and SHPO 2025). The APE is depicted in the Cultural Resources Report (*redacted*) in Appendix E1 and is consistent with the proposed activities footprint in Figure 1-2.

1.5 Planning Process and Scope

The Project Area has a rich history serving farmers and residents of Box Elder County through the BRCC starting after 1890. A large portion of the watershed's irrigated agricultural land is served by the BRCC, which owns and operates 150 miles of canals that distribute and deliver irrigation water across approximately 65,500 acres of highly productive farmland servicing Bear River City, Corinne, Deweyville, Elwood, Fielding, Garland, Honeyville, Tremonton, and unincorporated areas in Box Elder County. BRCC's earthen canals are aging, and some canals are located on steep hillsides. Multiple breaches have occurred within the Hammond Canal over the years and are becoming increasingly more significant each time. Large water losses throughout the two main canals—West Main and Hammond—have caused the hillsides to slough and have altered the condition and integrity of the delivery system. The BRCC identified the need to avoid future canal failures as crucial and their top priority in their 2019 Master Plan, but these efforts required extensive capital (J-U-B ENGINEERS, Inc. [J-U-B] 2019). In March 2022, the BRWCD in concert with the BRCC began planning in the Lower Bear Watershed through the WFPO Program to address these problems and identify other problems and potential improvements to better serve users within the watershed.

This Plan-EIS addresses agricultural water delivery deficiencies, limited water supplies and storage, and erosion, sedimentation, and agriculture-related pollution especially important in the maintenance and enhancement of wetlands in the watershed.

1.5.1 Stepwise Planning Process

For the Plan-EIS, the NRCS, the Sponsor and Co-sponsors, in coordination with the public, Tribes, and other agencies, followed a stepwise but iterative planning approach that identified and refined problems and opportunities, study scope, management measures, and alternatives; evaluated alternatives; and selected a recommended plan. This document presents that process and findings.

This Plan, as with all watershed project plans, is the product of three inter-related planning and evaluation processes, each with its own specific goals and requirements: 1) NRCS planning process; 2) Principles, Requirements, and Guidelines (PR&G) for Federal Investments in Water Resources; and 3) evaluation of alternatives and effects under NEPA. The process also incorporates the Clean Water Act (CWA), Endangered Species Act (ESA), and National Historic Preservation Act (NHPA) requirements, among others.

The NRCS planning process consists of nine steps to develop and implement plans that protect, conserve, and enhance natural resources from a social and economic perspective (see NRCS planning policy, including National Planning Procedures and NECHs [NRCS 2016 and NRCS 2021]). PR&G watershed planning is an eight-step process analogous to that of the NRCS which ensures that formulation, evaluation, and implementation of agency activities incorporate the Federal Objective, Guiding Principles, and General Requirements within the context of an ecosystem services framework. Ecosystem services analysis is an analysis approach which traces the pathways of natural ecosystem processes to the benefits they grant to society in monetary and non-monetary terms. NEPA evaluation ensures that potential Federal actions consider reasonable alternatives, fairly evaluate the effect of those alternatives upon the human environment, and comply with applicable local, State, and Federal regulations.

Watershed planning, NEPA, and CWA permitting all require that the NRCS follows the Section 106 process as outlined in the NHPA of 1966 and 36 CFR 800. The Section 106 process requires early consultation with the SHPO, THPOs and Federally Recognized Tribes in the determination of the APE, identification of historic properties, assessment of effects, and mitigation of adverse effects. This process is separate from NEPA but informs the effects analysis.

This Plan-EIS follows NRCS procedures and formatting requirements outlined in the National Watershed Program Manual (NWPM) Part 501 (NRCS 2015) and the National Watershed Program Handbook (NWPH) Part 601 (NRCS 2014). These requirements provide a framework to ensure compliance with NEPA, and the Plan-EIS complies with 7 CFR Part 650.[1] The plan also adheres to the Principles and Requirements for Federal Investments in Water Resources (P&R) (CEQ 2013), relying primarily on the NRCS's intended use of the Guidance for Conducting Analyses Under the PR&G for Water and Land Related Resources Implementation Studies and Federal Water Resource Investments. This guidance is described in USDA Departmental Manual (DM) 9500-13 (USDA 2017a), Departmental Regulation (DR) 9500-13 (USDA 2017b), and the corresponding Interagency Guidelines (CEQ 2014), collectively referred to as the PR&G. Additionally, the plan aligns with PL 83-566, Executive Orders (E.O.), and the CFR. Updated NWPM guidance has been applied where appropriate (NRCS 2024).

1.5.2 Ecosystem Services Framework

NRCS and the Sponsor and Co-sponsors worked within an Ecosystem Services Framework throughout the preliminary investigation and planning process. “Ecosystem services” is a broad term used to describe the benefits humanity receives from ecosystems as a byproduct of their functioning. The four-category ecosystem framework adopted in the PR&G, and used in this report, is shown in Table 1-2.

[1] The NRCS is aware that on January 20, 2025, President Donald J. Trump signed Executive Order (E.O.) 14154, *Unleashing American Energy* in which Section 5(b) of E.O. 14154 directs the Council on Environmental Quality (CEQ) to provide guidance on implementing NEPA and to withdraw its NEPA implementing regulations. On February 19, 2025, CEQ issued guidance encouraging agencies to continue ongoing NEPA reviews and to consider voluntarily relying on the former CEQ regulations. On July 3, 2025, USDA revised and consolidated its department-wide NEPA procedures at 7 C.F.R. part 1b. CEQ subsequently withdrew its NEPA implementing regulations at 40 C.F.R. parts 1500–1508, effective January 8, 2026. Consistent with CEQ guidance and NRCS national policy, the NRCS Utah State Office is voluntarily relying on the former CEQ regulations, as appropriate, in completing this ongoing NEPA review.

Table 1-2. Ecosystem Services Framework used to Evaluate Benefits and Costs

Service Type	Examples
Regulating	The regulation of air, climate, natural hazards, water quality, pests, and disease
Provisioning	The supply of food, fuel, fiber, water, timber, and genetic resources
Cultural	Services that enhance cultural values, like aesthetics, recreation, tourism, and spiritual or religious values
Supporting	Nutrient cycling, soil formation, and primary production

Source: USDA 2017a.

NRCS and the Sponsor and Co-sponsors approached ecosystem services initially from a qualitative perspective to identify the types of services present in the watershed, and then specifically to identify those that could interact with (affect or be affected by) the project measures and those that could interact with potential management measures to address problems with the laterals. The public, Tribes, and other agencies were invited to identify and refine ecosystem services concerns during scoping and at other points of participation in the planning process.

1.5.3 Period of Analysis

Effects of the alternatives were evaluated over a 100-year evaluation period, not including the installation period. This evaluation period is equal to the length of time over which the works of improvement are expected to have significant beneficial effects. Benefits are expected to begin accruing the year after the works of improvement are installed and continue to accrue until the end of the 100-year evaluation period.

1.5.4 Project Scope

The scope of the project refers to (1) specific watershed program requirements which limit the application of funding based on characteristics of the study area and project and (2) the specific issues considered throughout the NEPA analyses of the project.

PL 83-566 projects are bounded in scope by the size of the watershed area, characteristics of the benefitted area, and size of potential measures considered. For this type of project, NRCS policy defines a watershed area as the areas that comprises all land and water within the confines of a drainage and follows hydrologic boundaries. Watershed projects implemented for the purpose of flood prevention are limited to a drainage area of 250,000 acres. All PL 83-566 projects must provide at least 20 percent of benefits directly related to agriculture, including rural communities with populations less than 50,000 people. Structural measures considered under this program are similarly restricted in capacity—no single structure can provide more than 12,500 acre-feet (ac-ft) of floodwater detention capacity and no more than 25,000 ac-ft of total capacity.

The Lower Bear River Watershed Plan is in compliance with each of these requirements: 1) the total watershed size is approximately 249,087 acres; 2) the Project Area is situated in a rural and agricultural area and greater than 20 percent of the benefits are agriculture related, including the rural communities of Tremonton and Bear River City with populations less than 50,000 people (see Benefited Areas Map in Appendix B); and 3) the project does not consider any structural measures exceeding 12,500-acre feet of individual capacity or 25,000 ac-ft of combined capacity.

NRCS, the Sponsor, and the Co-sponsors conducted internal scoping to evaluate the relevance of required resource considerations described in the NWPH Part 606.19. Ecosystem services and resources that could be affected by or could affect measures to address the watershed problems were deemed relevant to the project. NRCS and the Sponsor and Co-sponsors then conducted external scoping as described in the following section.

1.5.5 External Scoping

Tribes, federal, state, and local agencies and representatives, as well as area non-governmental organizations, received an invitation to the scoping phase of the Proposed Project. An agency scoping meeting was held virtually on November 1, 2023, and a public scoping meeting was held in person on November 9, 2023, at the Box Elder County Fairgrounds Museum Building. The meetings provided opportunities for the public, the Sponsor, Co-sponsors, Tribes, and agencies to express any specific concerns and their relevance to the Proposed Project. On June 14, 2024, the Notice of Intent (NOI) to prepare an EIS for the Lower Bear River Watershed Plan was published in the Federal Register (FR 2024).

Eleven comments were received for the Watershed Plan during the scoping period (June 14, 2024 through July 14, 2024). The primary comment categories included water management and flood concerns, the effect of infrastructure on climate change, and public land management. The Scoping Report for the Lower Bear River Watershed Plan-EIS (Scoping Report), in Appendix A, provides a summary of the scoping process and includes all comments received during the scoping period. The Scoping Report includes the detailed scoping process, including letters, meetings, and comments from the public, stakeholders, agencies, and Tribes, including the Section 106 initiation letters for the Tribes. Comments, including the names and addresses of those who commented, are considered part of the public record on this proposal.

In response to public and agency input, the NRCS, the Sponsor and Co-sponsors developed the alternatives in this Plan-EIS (see Chapter 4) and analyzed the potential effects of the alternatives on the economic, natural resources, and social environment (Chapter 5). See Chapter 7 for a detailed description of the public and agency scoping process, including consultation.

1.6 Related Projects and Studies

Ongoing, recently completed, or planned projects that could potentially contribute interactive effects with the Plan-EIS are described in Section 5.3.9. No connected actions were identified during the preparation of the Plan-EIS.

1.7 Document Organization

This Watershed Plan-DEIS has been organized into the following chapters:

- **Summary**: Office of Management and Budget Fact Sheet—This chapter presents a summary of the entire document and the Proposed Project.
- **Chapter 1**: **Watershed Planning Background**—This chapter describes the authority, identifies the Sponsor, Co-sponsors, and cooperating agencies, and describes the planning area, the planning process, related projects pertaining to the Proposed Project, and the project scope.
- **Chapter 2: Purpose and Need of the Project**—This chapter describes the purpose and need for the Proposed Project, and identifies the problems, opportunities, objectives, and constraints.
- **Chapter 3: Affected Environment**—This chapter describes the affected environment of the Proposed Project, including the relevant ecosystem services and resource concerns, and provides an inventory of ecosystem services and existing resources.
- **Chapter 4: Alternatives**—This chapter describes the rationale of the Draft Plan–EIS formulation for the development and comparison of alternatives and describes the alternatives including those eliminated from detailed study. More detail on the Preferred Alternative—the Hammond and West Main Canals Improvement Alternative—is included in Chapter 6.
- **Chapter 5: Environmental Consequences–Evaluation of Alternatives**—This chapter evaluates and compares alternatives in detail based on their performance against planning criteria, ecosystems services, and environmental effects.
- **Chapter 6: Preferred Alternative**—This chapter describes the Preferred Alternative—the Hammond and West Main Canals Improvement Alternative—for the Proposed Project and presents the economic evaluation.
- **Chapter 7: Consultation, Coordination, and Public Participation—**This chapter summarizes steps taken to involve Tribes, agencies, and the public in development of the Proposed Project, and includes the distribution list.
- **Chapter 8: References**—This chapter lists the references used in support of the information presented in this document.
- **Chapter 9: List of Preparers and Reviewers—**This chapter contains a list of the document preparers and reviewers, their respective agency or company, and their associated qualifications.
- **Chapter 10: Acronyms, Abbreviations, and Short Forms**—This chapter defines the acronyms, abbreviations, and short forms used in this plan.
- **Appendices**—This section provides supporting documentation for the information presented in the report. Refer to the Table of Contents for appendices' content.

Chapter 2 Purpose and Need for the Project

2.1 Purpose

The purpose of the Lower Bear River Watershed Project (Proposed Project) is: 1) to improve irrigation efficiency and water conservation and to maintain and enhance environmental conditions and beneficial water use in the form of instream flows for the shareholders in the BRCC service area, and the larger Lower Bear River Watershed, with the authorized purpose being *Agricultural Water Management (rural and agricultural water supply, irrigation, water conservation, and water quality improvement)*; and 2) to improve water quality, maintain and enhance wetlands and wildlife habitat, and reduce erosion and sedimentation into Salt Creek, with the authorized purpose being *Watershed Protection (reducing offsite floodwater, erosion, sediment, and agriculture-related pollutants)*.

This Plan–EIS consists of two sets of objectives: the Federal Objective, which every NRCS planning study on water resource investments shares; and the project objectives, which are developed on a per-project basis and are detailed below.

2.1.1 Federal Objective

The Federal Objective is the fundamental goal of Federal investments in water resources and is the same for every watershed plan in accordance with Section 2031 of the Water Resources Development Act of 2007. The Federal Objective specifies that Federal water resource investments shall reflect national priorities, encourage economic development, and protect the environment by:

- Seeking to maximize sustainable economic development.
- Seeking to avoid the unwise use of floodplains and flood-prone areas and minimize adverse effects and vulnerabilities in any case in which a floodplain or flood-prone area may be used; and
- Protecting and restoring the functions of natural systems and mitigating any unavoidable damage to natural systems.

Given the many competing demands for limited Federal resources, Federal investments in water resources as a whole should strive to maximize public benefits, with appropriate consideration of costs. Public benefits encompass environmental, economic, and social goals, include monetary and non-monetary effects, and allow for the consideration of both quantified and unquantified measures.

2.1.2 Project Objectives

Project objectives were developed to address the problems and realize opportunities in the watershed. In coordination with the public, federally recognized Tribes, agencies, and other stakeholders, NRCS and the Sponsor and Co-sponsors established the following objectives for the Proposed Project:

- **Objective 1:** Improve reliability and efficiency of agricultural water by decreasing water losses associated with seepage and evaporation, and spillage from the aging canal system.

- **Objective 2:** Improve reliability and efficiency of agricultural water by addressing deteriorating infrastructure and replacement needs, and improving capability of irrigation within the BRCC, Bear River City, Highland Ditch Irrigation Ditch, Central Canal Company, and Tremonton City service areas.
- **Objective 3:** Address agricultural water management deficiencies by reducing the potential for failure of the Hammond Main and West canals in the canyon area.
- **Objective 4:** Address agricultural water management deficiencies by improving secondary water irrigation efficiency to reduce culinary water supply strains in Tremonton City and Bear River City.
- **Objective 5:** Protect the watershed by reducing erosion and sedimentation to conserve water quantity, water quality, and wetlands (fish and wildlife habitat).
- **Objective 6:** Protect the watershed by improving water quality for critical wildlife habitat near the GSL by reducing sediment delivery into Salt Creek.

2.1.3 Constraints and Considerations

Constraints represent likely insurmountable physical or administrative restrictions pertinent to the formulation of alternative plans. Considerations are other obstacles that could affect costs, societal acceptability, or legal issues that should be noted and accounted for when examining and evaluating potential alternative plans. For this Plan–EIS, the project constraint is:

- **Constraint 1:** Ensure levee infrastructure meets requirements to be armored against ice flows, high spring runoff flows, and potential debris; strong enough to withstand the weight from the equipment that will be navigating it; and constructed of materials to mitigate rodent damage.

2.2 Need

The project is needed to improve the reliability of the two major canals, Hammond Main and West Main, which deliver water to over 65,500 acres of highly productive agricultural lands and residential water users. These major canals are located along steep hillsides that have historically been unstable, causing periodic interruptions and delays in the delivery of water. A significant failure along one of these canals can result in major economic losses in the form of lost crops and create negative environmental and recreational effects, like the Hammond Main canal failure in 2020. The Highland Ditch Company and Central Canal Company need improvements to address issues and concerns with aging distribution systems for their irrigation waters. Actions are needed to improve reliability and efficiency of agricultural water delivery and reduce operating costs.

In the communities of Tremonton and Bear River City, growing suburban development is placing an increasing demand on municipal water resources. Presently, both communities serve rural irrigation demand through their municipal water systems, but there is not enough drinking water to meet the existing and future demand. The Utah Division of Water Resources has established a regional municipal and industrial (M&I) water conservation goal of 249 gallons per capita per day (GPCD) for the Bear River region by 2030, an 18 percent reduction from the 2015 baseline of 304 GPCD. Reducing potable water use for outdoor irrigation through the development of a secondary water system would directly support the region's ability to meet this goal (UDWR 2019). Actions are needed to improve efficiencies in water delivery for agricultural

production and to provide more water to reduce strains on existing culinary water supplies. These actions would also provide more water for critical wildlife habitat areas. Improving efficiencies in the day-to-day delivery and application of the irrigation water through canal lining or piping, pressurization of water for secondary use, and additional storage would allow for sustainability and reliability within the watershed. Pressurized irrigation systems would serve rural irrigation needs, thereby reducing demand on municipal water systems and reducing their operating costs.

The Proposed Project is needed to protect the watershed by improving levees, maintaining and enhancing wetlands and wildlife habitat and reducing bank erosion and sediment delivery along the lower Bear River and waterways that drain into the GSL. This intersection is characterized by extensive wetlands that serve as critical habitats for millions of migratory birds and other ecologically important species. Wetlands adjacent to the Bear River Migratory Bird Refuge that are managed by Bear River Club, CDC, and Utah Department of Wildlife Resources in the Salt Creek Waterfowl Management Area (WMA) rely on carefully regulated water levels to promote the growth of native vegetation and sustain biodiversity. Managers of waterfowl habitat need to periodically remove sediment from key water holding areas at Salt Creek WMA. Efficient water delivery and management in these areas is critical to support the wetlands and wildlife habitats, which in turn supports wildlife recreation. Actions are needed to address deteriorating levees and associated bank erosion that threatens failure of the levee and loss of water management, agricultural water, and thousands of acres of high-quality wetland habitat.

Watershed planning is authorized under the Watershed Protection and Flood Prevention Act of 1954 (PL 83-566), as amended, and the Flood Control Act of 1944 (PL 78-534). This watershed plan is Sponsored by the BRWCD.

The following sections provide further detail on the purpose and need for the project by outlining the problems and opportunities of the project which—combined with the objectives, and constraints—bound the formulation of alternatives.

2.2.1 Problems

2.2.1.1 Improve Agricultural Water Management

Deficiencies in the Agricultural Water Delivery System

Within the watershed, aging and weakened irrigation infrastructure are subject to the risk of failures that would cut off farmland from irrigation water, thereby increasing repair costs and reducing farm incomes as a result of damage to crops that cannot be irrigated.

BRCC delivers water to many users throughout Box Elder County. This delivery system includes canals, ditches, and systems directly operated by BRCC, and other entities that operate systems that deliver BRCC water, such as Bear River City, Highland Ditch, Central Canal Company, and Tremonton. These entities must work together to provide agricultural producers with the water that they need. Without BRCC, the smaller entities would not be able to receive the water that they deliver. Without the smaller entities, BRCC would not be able to deliver the water to the end user. This relationship is necessary for delivery, but it is also necessary for maintaining the water rights. If BRCC is unable to deliver the water to the end user through the smaller entities, they may be unable to demonstrate that the water is being put to beneficial use. This situation could potentially lead to the forfeiture of their water rights.

BRCC Hammond and West Main Canals

BRCC delivers irrigation water to over 65,500 acres of highly productive farmland. The BRCC currently uses two open canals, the 4.8-mile West Main Canal and the 5.5-mile Hammond Canal, to convey water from Cutler Reservoir to the canal system that carries water throughout the Lower Bear River Valley (Figure 2-1). The beginnings of the canals are located on steep canyon walls above the Bear River. These mostly earthen canals are aging, and large water losses throughout the two main canals have caused the hillsides to slough off and have altered the condition and integrity of the delivery system.

Figure 2-1. Hammond and West Main Canals Sandwiching the Bear River looking at Camp Fife

Multiple breaches have occurred along the canals over the years and are becoming increasingly more significant each time. Since 1980, the canals have breached 18 times due to slope instability and movement and water seepage, with 15 failures occurring on the Hammond Canal and three occurring on the West Main Canal (Figure 2-2). Of the 18 failures, BRCC estimates that thirteen have been major canal failures, causing loss of water delivery during the entire season, loss of revenue, and potential loss of life (Terracon 2024; J-U-B 2019). A major failure is classified by the canal company based on the duration, severity, and cost to repair. The failures generally occur in the spring and last about a month, on average. The average repair costs are approximately $268,250 with a historic high cost of more than $2.8 million (see Benefit-cost Analysis in Appendix E1 for more details). There is a need to address the future reliability of the water supply with a focus on these canals on the steep hillsides.

Figure 2-2. Hammond Canal Breach in 2020 Showing Erosion to the Bear River

BRCC Red Flume

The BRCC Red Flume was originally built in the late 1800s or early 1900s and reconstructed in the 1950s. The existing BRCC Red Flume infrastructure is comprised of a riveted steel structure spanning 300 feet over the Malad River with concrete transition structures (Figure 2-3). It transports water in the East Canal. The existing flume is deteriorating and nearing the end of its useful life. It is also difficult to operate and maintain by BRCC. As the bridge continues to age, greater protection from the environmental exposure is required as rusting undermines its structural integrity. In 2020, J-U-B assessed the condition of the flume and determined that without significant repairs, the flume would fail sometime in the next five to 10 years (J-U-B 2020).

In addition to the condition of the flume itself, the flume is also at risk of being catastrophically damaged by seismic activity in the watershed. The Lower Bear River Watershed is located along the Wasatch Fault, a major fault zone responsible for much of the seismic activity in the area (UGS 2025). This fault system is considered one of the most active in the United States, and the region is at a higher risk for significant earthquakes compared to many other parts of the country. A USGS report assessed the probability of a large earthquake occurring within the next 30, 50, and 100 years, and determined that the likelihood of a 6.0 magnitude or larger earthquake occurring in northern Utah in the next 50 years is 19 percent (Benefit-cost Analysis in Appendix E1). The Wasatch Front has already experienced several significant earthquakes such as the 1934 Cache Valley earthquake (6.6 magnitude) and the 2020 Salt Lake Valley earthquake (5.7 magnitude). Even a series of recent small earthquakes (3.7 and 4.4 magnitude) in April 2025 centered in Heber City, Utah was felt in Box Elder County. Based on earthquake data over the

past 25 years, Box Elder County experiences an average of 276 earthquakes every year (Allquakes 2025).

Given its current structural state, a major earthquake along the Wasatch Fault would cause extensive damage to the Red Flume. Considering the poor structural condition of the infrastructure and the seismic risks of the area, the annual probability of failure ranges from a low of 10 percent to a high of 20 percent. The Red Flume provides water to over 10,000 acres of irrigated crops, in the BRCC service area. The flume's failure would lead to a considerable effect on the watershed's agricultural producers, namely hay, wheat, and corn crops since their source of supply would be disrupted for an indefinite amount of time. Crop loss begins after only 1 week of irrigation disruptions. As shown in Table 6 of the Benefit-cost Analysis, at 4 weeks hay crop loss is 25%, wheat crop loss is 30%, and corn crop loss is 100% (Benefit-cost Analysis in Appendix E1). If the average irrigation water disruption after a canal breach or flume failure is 4 weeks or more, this disruption can cause significant impacts on agricultural production.

The flume's declining condition has caused a drop in operational efficiency and escalated maintenance expenses, while the bridge is now also vulnerable to seismic failure. There is a need to reduce maintenance and improve agricultural water delivery at this site.

Figure 2-3. Existing Condition of Red Flume (J-U-B 2020)

BRCC and Red Flume Agricultural Crop Losses

The significant cost of canal breaches and flume failures are the damages that disruptions in water supplies have on agriculture. The Hammond Canal has an annual failure probability of 0.35 times a year, the West Main Canal has an annual failure probability of 0.07 times a year, and the Red Flume has an annual failure probability of 0.04 times a year (BBC 2025). A canal breach or flume failure during the spring would have serious consequences for the production of irrigation dependent crops in the BRCC service area, such as hay, wheat, and corn. The Hammond Canal's annual failure probability equates to $1,682,489 in expected crop loss while

the West Main Canal's annual failure rate results in $1,509,212 in expected crop loss. The Red Flume annual failure probability means its expected annual crop loss is $183,582 (BBC 2025).

Spring is a critical period for these crops, which require steady moisture for proper germination and early growth. The lack of water during this time could result in moisture stress, making the crops more susceptible to pests, diseases, and environmental stresses like frost. Inadequate irrigation during critical growth stages could also reduce the quality of the crops, particularly for hay, which needs to be cut at the right stage for optimal nutritional value. Ultimately, the disruption would lead to lower yields, poorer-quality harvests, and significant economic losses for farmers, as the reduced production in irrigated crops would affect both feed and food supplies. Any disruption of irrigation water can affect the yields of hay, wheat, and corn, as discussed above for the Red Flume. The average irrigation water disruption after a canal breach or flume failure is 4 weeks, and hay crop loss is 25%, wheat crop loss is 30%, and corn crop loss is 100% at 4 weeks (BBC 2025). Hay is the most resilient to water disruptions, while wheat and corn suffer increasing losses as the disruption lengthens, with corn being particularly vulnerable even to short-term water shortages (See Benefit-cost Analysis in Appendix E1).

Highland Ditch and Central Canal

Both the Highland Ditch and Central Canal companies face annual operation and maintenance (O&M) costs from operating their deteriorated concrete-lined canals due to the need for frequent repairs, such as patching cracks, resealing joints, and addressing water loss through leaks.

The Highland Ditch Company receives and distributes irrigation water to approximately 3,000 acres of cropland in an existing concrete lined ditch. The Highland Ditch was cemented in 1961 making the cement over 60 years old and it is deteriorating (Figure 2-4). The ditch condition is decreasing efficiency of delivery and allowing excess water loss, losing water from leakage and evaporation. Some of the farmland is being converted to business and residential uses. The ditch is also used for flood control. There is a need to improve the reliability of water delivery to agriculture users and businesses and reduce water losses, reduce O&M costs, reduce flooding of homes, and improve safety.

Figure 2-4. Highland Ditch Existing Conditions (see TM-001 in Appendix E1)

The Central Canal Company delivers irrigation water to 1,400 acres of cropland. The canal receives water from the BRCC East Main Canal. The water is delivered to users through a concrete lined ditch, two sections of concrete pipe, and earthen ditch. The existing canal is 24,600 feet and its concrete liner, which was installed in 1978, is approaching the end of its usable life and requires extensive maintenance. The canal drains to the Malad River at the end of the system. There is a need to improve the reliability and delivery of water to agricultural users and reduce water loss.

Limited Water Supplies and Storage

Bear River Canal Company

The BRCC General Manager states that, generally, BRCC has ample water and rarely faces shortages. However, at Cutler Dam, the canal company has a flow limit which becomes restrictive for 1 to 2.5 weeks in late June through early July when demand exceeds supply. During this critical period, shareholders receive less water, especially at the ends of canals, leading to stunted crops and reduced yields (Trevor Nielson, personal communication, May 15, 2025). BRCC expects that piping or box culvert work would reduce seepage and evaporation and extend the supply. Combined with other liner improvements, these types of actions could significantly reduce or eliminate delivery shortfalls.

Bear River City and Tremonton City

Bear River City and Tremonton City are growing and have limited water supplies. Irrigated agricultural lands are being converted into residential homes. Secondary water is currently delivered through a pressurized irrigation system or concrete lined canals. City officials report

that the existing culinary water systems do not have sufficient capacity for future growth. As agricultural lands are converted to homes, the cities acquire more irrigation water shares. These water shares can be put to good use through pressure irrigation systems.

Bear River City residents and the surrounding cropland currently receive irrigation water from a concrete lined canal. This canal originates at a diversion from one of BRCC's main canals named the East Main Canal, where it diverts 24 cubic feet per second (cfs). The existing delivery canal is in poor condition. Sections of the Bear River City canal are at risk of failure due to the concrete liner being cracked and broken allowing for seepage (Figure 2-5) (TM-001 in Appendix E1).

The canal needs to be repaired or replaced to re-establish the safety and security of agricultural water delivery. Bear River City does not currently provide its residents with pressurized secondary water for irrigation use, and no storage exists to equalize pressure. Pressurization and storage equalization would decrease the demand on the culinary water system, allowing the culinary water supplies to serve further into the future. Currently, the number of homes able to be serviced on the existing municipal water line is at the maximum capacity.

Figure 2-5. Bear River City Delivery Channel Existing Conditions (TM-001)

Tremonton City currently offers its residents access to secondary water for outdoor use through a pressurized irrigation network that they have been constructing in phases. This resource decreases demand on the City's culinary water system. Culinary water is treated potable water designed for human consumption while secondary water is untreated (non-potable) water used for irrigation.

The pressure irrigation systems receive water from a collection of pumping stations that pump water from the Bear River Canal system. These pumping stations are accompanied by equalization storage facilities to reduce the peak drawdown on the canals. To meet the current water demands, Tremonton needs to expand the pressure irrigation networks and build additional equalization storage facilities to meet higher peak uses outside of the capacity of the existing canal system. New equalization storage facilities would protect the downstream users on the canal and increase reliability of water for all users. The city also needs to provide secondary water to new housing developments to minimize the demand on the limited supply of the culinary water system.

2.2.1.2 Protect the Watershed

Currently, the watershed experiences erosion, sedimentation, and agriculture-related pollution that prevent watershed managers from effectively maintaining and enhancing wetlands and wildlife habitat, as well as managing agriculture-related sedimentation. Multiple levees in the watershed are failing, and improvements such as bank stabilization and sediment management are needed to reduce erosion, sedimentation, and agriculture-related pollution especially important in the maintenance and enhancement of wetlands.

Levee Failure

The Bear River Club, the CDC, and the Salt Creek WMA use levees to maintain thousands of acres of wetland habitat. However, these levees are deteriorating from bank erosion and general failure which is preventing these Co-sponsors from isolating and controlling water flows and levels to provide habitat, reduce invasive species propagation, and control sediment deposition in these important habitat areas.

The wetlands in the Lower Bear River watershed, including the Bear River Club, CDC, and Salt Creek WMA, provide vital ecological and recreational benefits. The Bear River Club and the CDC are private waterfowl hunting clubs that offer access to wetlands attracting a wide variety of migratory waterfowl. Both clubs combine a commitment to wildlife conservation with a comfortable environment for hunters. The Salt Creek WMA is a protected wetland, designed to provide critical habitat for migratory waterfowl. It offers a mix of ponds, marshes, and upland habitats that attract a wide variety of avian species.

These wetlands are crucial habitats for migratory birds, especially along the Pacific and Central flyways, and support numerous species such as waterfowl, shorebirds, and other wildlife. The GSL ecosystem is one of the most unique and important wetland areas in the Western Hemisphere and is recognized by agencies, organizations—including Ducks Unlimited, a leading organization dedicated to wetland and waterfowl conservation in the Project Area—and others as a continental priority area for migratory birds. Actions are needed to protect the watershed and improve the habitat for the breeding, growth, and development of wildlife, especially eagles and migratory birds.

The north side of the GSL is an important area for wildlife and recreation. The Salt Creek WMA, Bear River Migratory Bird Refuge, and Willard Bay State Park are either in or adjacent to the Project Area. All provide habitat for wildlife and recreational opportunities for people. Twenty-six migratory bird and avian species that may occur in the Project Area are protected under the Migratory Bird Treaty Act (MBTA) and the Bald and Golden Eagle Protection Act (BGEPA), as discussed in Section 3.3.6.3 (USFWS 2025a). The areas adjacent to the Bear River, the Malad

River, and Salt Creek provide important habitats for these species and could be damaged if the levees fail. If levees fail, the sediment would likely cause detrimental downstream effects to the Bear River Delta of the GSL.

According to the Bear River Club, CDC, and Ducks Unlimited staff, if the levees failed, wetland managers would be prevented from maintaining water levels, which is crucial for preventing the spread of invasive species. In wetlands, stable water levels help control the growth of invasive species like cattails and *Phragmites*, which thrive in stagnant, low-water conditions. *Phragmites* (specifically the non-native subspecies, *Phragmites australis ssp. australis*) is considered a noxious weed. This invasive variety is highly aggressive and can outcompete native vegetation, significantly altering ecosystems. It forms dense mats of roots that can change water systems and destroy habitats. By carefully managing water levels, wetland managers can prevent these aggressive species from dominating, thereby preserving the diversity of native vegetation that supports wildlife, including waterfowl and other wetland-dependent species.

The region has experienced extreme drought and the GSL has fallen to its lowest water level in 170 years. (BRWCD 2022, Ducks Unlimited letter). Changes that lead to the spread of invasive species or fluctuating water levels can significantly reduce the ecological value of wetlands. Waterfowl relies on stable, healthy habitats with diverse plant life that provides food and shelter. Besides allowing for invasive species to expand, unstable water levels can create mudflats or dry patches, making it harder for birds to find open water while also limiting the growth of submerged plants that attract waterfowl. As these wetlands become less suitable for waterfowl, hunting and wildlife viewing opportunities also decrease. Effective water management is essential to preserving their ecological and recreational value while providing more reliable and efficient water delivery for agriculture.

Bear River Club Levee

The Bear River Club uses a 6,000-foot levee along the Bear River to maintain 14,000 acres of wetland habitat (Figure 2-6). This levee is narrowing due to erosion from river fluctuations and motorized boat waves. This narrowing has surpassed the point of being able to mobilize necessary maintenance equipment on the levee, making it difficult or impossible to complete repairs. The continued narrowing and inability to repair the levee suggests that a failure is probable and imminent. Operators of the Club suggest that it is common to lose a foot or more of width in the vulnerable areas each year, indicating that a failure would be possible in the next five to ten years.

A breach or failure of the levee would result in draining thousands of acres of managed wetlands north of the levee. The wetland habitat provides important resources for tens of thousands of waterfowl, shorebirds, and many other species of waterbirds. The project site is adjacent to the Bear River Migratory Bird Refuge and serves as a critical link between habitat on the refuge and adjacent lands. There is a need for Bear River Club to provide protection to the wetland habitat and improve access for operations and maintenance (O&M).

A failure of the levees securing the wetlands would disrupt the delicate balance of water levels and habitat conditions, creating conditions that favor the growth of invasive species, including cattails and *Phragmite*s, which thrive in disturbed or stagnant environments. Currently, over 1000 acres of extensive cattail and *Phragmites* have established in the marsh west of the Bypass canal and more acres would establish if water levels are not controlled. Controlling water levels would reduce cattail and *Phragmites* expansion.

Figure 2-6. Bear River Levee Bank Instability near the Bear River Migratory Bird Refuge (Ducks Unlimited Photo Taken on June 28, 2024)

CDC Levee

The CDC's levee along the Bear River, crucial for controlling water levels within 4,000 acres of wetland habitat, is deteriorating due to similar erosion factors. Located on a sharp bend of the Bear River, this area experiences severe erosion. The CDC uses the levee for control of water levels within their Main Marsh and other managed wetland units, and the levee links habitat between the Bear River Migratory Bird Refuge and adjacent private wetlands.

Bank erosion threatens failure of the levee and loss of water management, agricultural water, and high-quality wetland habitat on thousands of acres that provide important habitat for tens of thousands of waterfowl, shorebirds, and many other bird species. Stabilization is required to protect wetlands and improve accessibility for O&M.

Currently, over 150 acres of extensive cattail and *Phragmites* have established in the wetlands, and more acres would establish if water levels are not controlled. Controlling water levels would reduce cattail and *Phragmites* expansion.

Salt Creek Waterfowl Management Area (WMA) Levee

The levee serving the Salt Creek WMA has already failed with holes in the west levee of the bypass channel and the site is under pressure from invasive species, including *Phragmites*. The levee was originally intended to separate Salt Creek from the surrounding wetlands. The levee does not accomplish this task in its current state because of multiple washed-out sections of the levee.

The approximately 6,000-acre Salt Creek WMA is managed by the UDWiR, and they use the Salt Creek Bypass channel during peak runoff and flood events as the infrastructure for the main wetland complex lacks the capacity to handle these highwater events. However, during periods of high water in the Bypass Channel, isolation of flows from adjacent wetlands to the west is not possible which prevents effective drainage of these wetlands. The result has been the

development of extensive stands of cattail in the wetlands, reducing habitat diversity and important foraging habitat for waterfowl and many other species of waterbirds. Currently, over 1000 acres of extensive cattail and *Phragmites* have established in the marsh west of the Bypass canal and more acres would establish if water levels are not controlled. Controlling water levels would reduce cattail and *Phragmites* expansion.

There is a need to improve wetland habitat by more effective and increased water control capabilities. There is a need to allow water from the west drainages to stay on the west side of the Bypass canal and facilitate a large open water pond (Rest Pond) that has struggled to hold water year-round over the past several years.

Sediment Loading from Nearby Agricultural Fields and Other Drainages

Salt Creek Waterfowl Management Area (WMA) Sediment Loads

Salt Creek WMA receives substantial sediment loads from Salt Creek from nearby agricultural fields and other drainages (Figure 2-7). This sediment reduces water flows and distribution of water throughout the WMA, making it more difficult to control water levels within managed wetlands and provide quality habitat for wetland dependent wildlife. Excessive sedimentation also decreases water quality and increases the potential for establishment and expansion by invasive weed species. Additionally, the lower wetland areas fill with sediment every 3 to 5 years and require dredging. The dredging disrupts the wetland habitat, and the excess of sediment causes poor water quality and wildlife habitat conditions in the wetlands. Excess sedimentation can cause both water quality and wildlife/wetland habitat concerns, including reduced levels of dissolved oxygen for aquatic life, increased water temperature via reduced water flow, and an increased potential for harmful bacterial and algae blooms. Additionally, sediment can transport nutrients and pathogens (such as *E. coli*) into the water system, which can degrade water quality and reduce its potential beneficial uses for wildlife and recreation.

As development increases upstream and around the WMA, the expansion of impermeable surfaces could potentially increase flow velocities in Salt Creek. While impermeable areas do not directly contribute sediment, the resulting higher velocity runoff can erode and mobilize sediment from adjacent pervious surfaces, drainage ditches, and streambanks. This process can ultimately increase the total sediment load delivered to the WMA despite localized reductions in on-site sediment sources. Many new developments require stormwater detention infrastructure to reduce the peak and timing of a spike in the water flow.

Figure 2-7. Salt Creek Waterfowl Management Area

Currently there is a need to dredge the entire length of the Salt Creek channel in the WMA when sediment loads affect water flow. The main channel that runs through Salt Creek has required dredging approximately every 9 to 10 years to maintain flow and manage sediment accumulation, with documented dredging events occurring in 2011 and 2020. In 2020, the cost for dredging this channel was just over $120,000. In the past, the cost for this work was mitigated substantially by using the dredged material to restore nearby islands within the marsh that had eroded away. However, this option is a very expensive and difficult task. It requires specialized equipment and skilled operators. Also, dredging is expected to become more costly because of the need to transport the material over a considerable distance. Combined with the general growth in expense for any construction activity, dredging is less and less feasible for the UDWiR each year. Dredging activities are also very disruptive to the wetland. A need exists to capture sediment in an efficient and controlled manner that provides for easy access to and removal of captured sediment.

2.2.2 Opportunities

Opportunities represent goals to be achieved by the Proposed Project ancillary to its authorized purpose. The following opportunities may be realized while addressing the problems associated with agricultural water management and watershed protection.

- Opportunity 1: Reduce potential for flooding from high intensity runoff events and aging infrastructure and enhance community resilience to flooding through the implementation of project measures, including preventing flooding by piping the Highland Ditch. Though flood prevention benefits would result from many of the proposed measures, the benefit-cost analysis did not result in positive benefits for flood prevention.

- Opportunity 2: Minimize chemical treatment by eliminating aquatic weeds in the canals.
- Opportunity 3: Improve recreational opportunities associated with hunting and wildlife viewing near wetlands.

Chapter 3 Affected Environment: Current and Future Conditions

The Affected Environment section provides the baseline for NEPA evaluation (current conditions) and planning evaluations (both current and future conditions). The section describes the current ecosystem service flows and physical, biological, ecological, economic, and social environment for the watershed as well as projected future conditions to the extent possible based on reasonably foreseeable trends and actions within the watershed. This section provides the context for the formulation of alternatives (Chapter 4) and for the determination of tradeoffs among ecosystem services and effects to the environment (Chapter 5) that will ultimately lead to the selection of a plan (Chapter 6). Ecosystem services and resource concerns that may affect or be affected by measures to address the problems, whether directly or indirectly, are identified and discussed in this chapter.

3.1 Relevant Categories of Concern

3.1.1 Relevant Ecosystem Services

The following five Guiding Principles identify required planning criteria to accomplish the Federal Objective and were used to guide the identification, formulation, and evaluation of measures: 1) healthy and resilient ecosystems, 2) sustainable economic development, 3) floodplains, 4) public safety, and 5) watershed approach (NRCS NB 190-25-8 [NRCS 2025a]). A summary of ecosystem services and their relevance to the Proposed Project is provided in Table 3-1. Irrelevant ecosystem services categories have been eliminated from detailed analysis. Relevant ecosystem services are discussed in Section 3.2.

Table 3-1. Ecosystem Services Scoping Summary

Ecosystem Services	Relevant to Proposed Action		Rationale
	Yes	No	
Regulating Services			
Water Quality	X		Project addresses agricultural and rural water and water filtration, nutrient removal, sediment trapping, and pollutant breakdown function of wetlands.
Flood and Disease Control	X		Project does not directly address flood prevention; however proposed actions may result in changes to flooding.
Climate Stabilization		X	Project does not directly address climate stabilization.
Crop Pollination		X	Not applicable to this project.
Provisioning Services			
Food	X		Provides irrigation water supply for agricultural production.
Fiber		X	Not applicable to this project; no fiber production is present.
Water	X		Increases available irrigation water.
Timber		X	Not applicable to this project.
Biomass		X	Not applicable to this project.

Ecosystem Services	Relevant to Proposed Action		Rationale
	Yes	No	
Cultural Services			
Recreational Experiences	X		Project enhances recreational opportunities. Activities are proposed that indirectly provide recreational opportunities related to wetland habitats.
Spiritual		X	Not applicable to this project. No spiritual values were expressed by stakeholders or Tribes during scoping.
Aesthetic Viewsheds		X	Not applicable to this project.
Tribal Values		X	During scoping, no Tribes responded nor were Tribal resource issues expressed. Communication and consultation with Tribes will continue throughout the planning process.
Supporting Services			
Nutrient Cycling		X	Not applicable to this project.
Soil Formation		X	Not applicable to this project.
Primary Production		X	Not applicable to this project.

3.1.2 Relevant Resource Concerns

A summary of resource concerns developed during the scoping process and their relevance to the Proposed Project is provided in Table 3-2. Resource categories for which implementation of the Proposed Project is deemed to result in no effects or negligible effects have been eliminated from detailed analysis in accordance with 7 CFR Part 650 and Section 501.35(B) of the NWPM (NRCS 2015). These include the following resource categories: Energy, Sole Source Aquifer, Essential Fish Habitat (EFH), Invasive Animal Species, Civil Rights, Forest Resources, Wild & Scenic Rivers, Coastal Zone Management Areas, Coral Reefs, and Other Concerns.

Table 3-2. Resource Concerns and Issues based on Problems, Opportunities, Objectives, and Constraints

Resource	Relevant to the Proposed Action?		Concerns and Issues: Problems, Opportunities, Objectives, and Constraints, and Rationale (Context and Intensity)
	Yes	No	
Economics			
Economics/Socioeconomics	X		Proposed Project measures would require the use of local match funds and would improve agricultural water management and watershed protection.

Resource	Relevant to the Proposed Action?		Concerns and Issues: Problems, Opportunities, Objectives, and Constraints, and Rationale (Context and Intensity)
	Yes	No	
Air Quality and Climate			
Clean Air Act (CAA)/ National Ambient Air Quality Standards (NAAQS)	X		Proposed activities could affect air quality protected by the CAA and Utah Department of Environmental Quality—Air Quality Division (UDEQ-AQD).
Climate Resiliency and Greenhouse Gases (GHG)	X		Proposed activities could cause temporary increases in localized emissions during construction.
Energy			
Energy		X	The Lower Bear River Watershed has the potential for wind and geothermal energy production, as well as an existing hydropower plant (PacifiCorp at Cutler Reservoir) in proximity, however, the Proposed Project does not propose any activities that would develop wind, geothermal, or hydropower energy nor does it preclude these activities from occurring (Utah Office of Energy Development and Utah Geological Survey 2025). Therefore, energy was eliminated from detailed analysis.
Soils and Geology			
Upland Erosion & Sedimentation	X		Soil disturbance from project activities may contribute to erosion and sedimentation.
Prime & Unique Farmland	X		Project activities have the potential to affect protected farmland of local importance, farmland of statewide importance, and prime farmland if irrigated. Lands classified as Farmlands of Statewide Importance and Prime Farmland if Irrigated are present in the Project Area (NRCS 2025b; see the Custom Soil Resource Report in Appendix B of the Aquatic Resources Report in Appendix E1 of this document).
Vegetation			
Special Status Plant Species including Candidate, Endangered, and Threatened Plant Species	X		Proposed activities could affect one special status plant species protected under the ESA—the Ute ladies'-tresses (USFWS 2025a).

Resource	Relevant to the Proposed Action?		Concerns and Issues: Problems, Opportunities, Objectives, and Constraints, and Rationale (Context and Intensity)
	Yes	No	
Riparian Areas	X		The Bear River and Malad River are perennial riverine features, and riparian areas may be present. Proposed activities could affect riparian areas. Seepage induced riparian vegetation grows along canals in some areas. See Aquatic Resources Delineation (ARD) maps in Appendix E1.
Noxious Weeds & Invasive Plant Species	X		Proposed activities could increase the risk of spread, and introduction and establishment of invasive species, which are specifically prohibited by E.O. 13112. Noxious weeds currently exist within the Project Area (Biological Assessment [BA] in Appendix E1).
Water Resources			
Surface & Ground Water Quality	X		The Proposed Project would conserve water and improve water quality, would reduce water seepage which dissolves salts in the soils and eventually carries salts to the Bear River and the GSL, and would reduce damages to wetlands which provide water filtration, nutrient removal, sediment trapping, and pollutant breakdown functions, thereby improving the watershed health of the Lower Bear River Watershed.
Surface & Ground Water Quantity	X		The Proposed Project would conserve water quantity through improved irrigation water management, thereby conserving water in the Lower Bear River Watershed and the GSL.
Clean Water Act & Waters of the U.S. (WOTUS)	X		Project activities occur within and adjacent to potential jurisdictional waters and proposed activities could affect WOTUS.
Wetlands	X		Proposed activities could directly affect wetlands during construction activities, indirectly cause the minimal loss of seepage-induced wetlands, but also preserve the function of thousands of acres of wetlands.

Resource	Relevant to the Proposed Action?		Concerns and Issues: Problems, Opportunities, Objectives, and Constraints, and Rationale (Context and Intensity)
	Yes	No	
Regional Water Management Plan	X		The proposed activities are designed to support Regional Water Management Plans, specifically, the Utah Department of Natural Resources Division of Water Resources *Water Resources Plan* for the Bear River Basin (UDNR-UDWR 2021). The Plan prioritizes conservation, storage, distribution, and use of water to meet Utah's growing population and water demand.
Floodplain Management	X		The proposed activities may affect floodplains protected under E.O. 11988 (Federal Emergency Management Agency [FEMA] Flood Insurance Rate Map [FIRM] panels in Appendix C).
Sole Source Aquifer		X	Sole source aquifers are those that supply at least 50% of the drinking water for their area and have no viable alternative sources if they become contaminated. No sole source aquifers are in or near the Project Area, according to the EPA's Sole Source Aquifer Interactive mapping database (EPA 2025a). No effects to any sole source aquifers would occur from the Proposed Project, and this resource was eliminated from detailed analysis.
Wildlife			
Wildlife & Wildlife Habitat	X		Wildlife may use open canals proposed for box culvert and piping installation as water sources and associated seepage-induced riparian vegetation along the edges of some canal areas as habitat (BA in Appendix E1).
Special Status Animal Species, including Candidate, Threatened, and Endangered Animal Species	X		Habitat for the yellow-billed cuckoo may occur within the Project Area along the Bear River, and habitat for the monarch butterfly and the Suckley's cuckoo bumble bee could occur in the Project Area (Refer to BA in Appendix E1; USFWS 2025a).
Essential Fish Habitat (EFH)		X	Utah does not contain any designated EFH as defined in the Magnuson-Stevens Act (NOAA 2025), and this resource was eliminated from detailed analysis.

Resource	Relevant to the Proposed Action?		Concerns and Issues: Problems, Opportunities, Objectives, and Constraints, and Rationale (Context and Intensity)
	Yes	No	
Invasive Animal Species		X	The primary invasive animal species in Utah are *Dreissenid spp.* mussels, such as quagga mussel, zebra mussel, and dark falsemussel. Because these species do not occur in Box Elder County (Box Elder County 2017), and no potential for introduction of invasive animal species exists because of the Proposed Project, this resource was eliminated from detailed analysis.
Migratory Bird and Bald and Golden Eagles	X		Bald and Golden Eagles are known to winter in the planning area. Habitat for 17 migratory birds may be present in the Project Area (BA in Appendix E1).
Human Environment			
Cultural & Historic Resources	X		The project activities have the potential to affect cultural and historic resources (Cultural Resources Report in Appendix E1).
Scientific Resources	X		Paleontological localities have previously been found in Lake Bonneville lacustrine deposits in the watershed (paleontological consultation in Appendix A).
Civil Rights		X	Full and fair participation by potentially affected communities would occur throughout the analysis process; and project benefits would be available to all individuals within and surrounding the Project Area consistent with Title VI of the Civil Rights Act, and this resource was eliminated from detailed analysis.
Public Health & Safety	X		Open canals may present safety concerns; and debris and sediment that enters the canals can cause canals to back up, overtop, and flood surrounding areas. Landslide dangers in the Hammond Canal area also presents safety concerns. Likewise, failure of the levees could present safety concerns. See TM-001 and TM-002 in Appendix E1.
Hazardous Materials	X		Hazardous materials associated with construction (fuel, oil, etc.) would be present in the Project Area. A preliminary search identified one hazardous site near the project measures (Hazardous Materials Map in Appendix C).

Resource	Relevant to the Proposed Action?		Concerns and Issues: Problems, Opportunities, Objectives, and Constraints, and Rationale (Context and Intensity)
	Yes	No	
Transportation & Infrastructure	X		The proposed activities are designed to improve existing irrigation infrastructure in the Bear River Valley, as well as existing levees in the Bear River Migratory Bird Refuge and Salt Creek Wildlife Area.
Noise	X		Temporary elevated noise levels would occur within the Project Area due to construction equipment and activities. The pump stations would increase noise levels.
Visual Resources and Scenic Beauty	X		Temporary visual effects from construction equipment and materials would occur within the Project Area during construction. Permanent visual effects related to the piping of canals, construction of aboveground detention basins, and levee reconstructions would also occur.
Recreation	X		Recreation facilities and opportunities within the Project Area or watershed include the Salt Creek WMA, the Bear River Club, the CDC, and the Bear River Migratory Bird Refuge, and bird and wildlife watching, fishing, camping/picnicking, and hunting (Box Elder County 2021). Proposed activities may affect water resources and wetlands that provide recreational opportunities within the Project Area.
Special Land Designations			
Land Use	X		The closest Water Source Protection area, called Water Source Protection Zone 2, is located approximately 0.28 miles north of the staging area for the Tremonton Irrigation Storage component of the Proposed Project, within Tremonton City (Jones and Associates Consulting Engineers 2016). No effects to water source protection areas would occur from the Proposed Project. Land use is governed by Box Elder County, Bear River City, Tremonton City, and Elwood Town. In general, land use classifications and zoning regulations are designed to protect agricultural land uses and protect the rural character of the land.

Resource	Relevant to the Proposed Action?		Concerns and Issues: Problems, Opportunities, Objectives, and Constraints, and Rationale (Context and Intensity)
	Yes	No	
Natural Areas	X		Portions of the Salt Creek WMA are located within the Project Area. The Bear River Migratory Bird Refuge is located adjacent to the Project Area as the Bear River Club and CDC levees maintain wetlands that serve as a critical link between the refuge and adjacent wetland habitat, and the Proposed Project is designed to improve these areas.
Ecologically Critical Areas	X		Ecologically Critical areas, also known as critical habitat, are geographic areas that contain essential habitat features. Although no critical habitats are located within the Project Area (NOAA 2023; USFWS 2025b), the southern portion of the Project Area is located in the wetlands of the Great Salt Lake, specifically in Box Elder County, Utah, near Brigham City and Corinne. This area lies at the northern reaches of the Great Salt Lake and is one of the most ecologically significant wetland complexes in the western United States.
Forest Resources		X	According to the USFS, there are no forest resources located within or adjacent to the Project Area (USFS 2025). The closest forest resource is the Wellsville Mountain Wilderness, located approximately 6 miles east of the Project Area (Utah AGRC 2020). No effects to any forest resources would occur from the Proposed Project, and this resource was eliminated from detailed analysis.

Resource	Relevant to the Proposed Action?		Concerns and Issues: Problems, Opportunities, Objectives, and Constraints, and Rationale (Context and Intensity)
	Yes	No	
Parklands, National Parks, Monuments, & Historic Sites	X		No National or State Parks are located within the Project Area (National Park Service [NPS] 2025c; UDNR 2025) and no National Monuments or Historical Sites are located within or adjacent to the Project Area (NPS 2025a), and the Proposed Project would not affect any National or State Parks or National Monument, or Historical Sites. However, the Salt Lake Cut-Off of the California National Historic Trail (NHT) intersects the Project Area in multiple places (NPS 2025b). However, no evidence of the trail exists on the ground and no official visitation sites occur within the Project Area. Coordination with the NPS is ongoing.
Wild & Scenic Rivers		X	No wild or scenic rivers are located within or adjacent to the Project Area, according to the National Wild and Scenic Rivers System Map (NPS 2025c), and no "outstandingly remarkable" river segments are in or near the Project Area according to the Nationwide Rivers Inventory System Map (NPS 2025d), and this resource was eliminated from detailed analysis.
Coastal Zone Plans; Coral Reefs		X	No coastal zones or coral reefs occur within or near the Project Area and no Coastal Zone Management Areas or Plans are applicable to the Proposed Project, therefore, no effects to coastal zones or coral reefs would occur from the Proposed Project. The project is consistent with PL 101-508 (Coastal Zone Management Act), and this resource was eliminated from detailed analysis.
Other Concerns Identified by Sponsor, Co-Sponsor, Agencies, and the Public			
Other Concerns Identified by Sponsor, Co-sponsor, Agencies, and the Public		X	No other concerns were raised by the Sponsor, Co-Sponsors, agencies, public, or Tribes.

3.2 Inventory of Ecosystem Services

Table 3-3 describes the relevant ecosystem services present in the Project Area. The ecosystem services are related to the project purpose and need, as well as related to resources in the Project

Area, and fall within the five guiding principles described in Section 3.1.1. Because ecosystem services are place-based and a matter of public perception, the selection of services for consideration and inclusion in the analysis was context-specific, with consideration of the magnitude of effect, reversibility and irretrievability of the decision and resources, local importance, and regulatory thresholds. In the comparison of alternatives, ecosystem service benefits were quantified to the extent possible using metrics representative of both the expected change in of the respective service flow and its societal effect.

Table 3-3. Ecosystem Services to Be Considered in the Lower Bear River Watershed Plan

Ecosystem Services	Rationale and Description	Evaluation Metric
Regulating Services		
Water Quality & Quantity	Project addresses agricultural and rural water	Reduced farm income damage Reduced water treatment costs
Water Quality & Quantity	Project addresses water filtration, nutrient removal, sediment trapping, and pollutant breakdown function of wetlands	Reduced damage to wetlands
Flood Control	Project does not directly address flood prevention; however proposed actions may result in changes to flooding.	Flood prevention
Provisioning Services		
Food	Project provides irrigation water supply for agricultural production	Increased farm income
Water	Project increases available irrigation water	Increased farm income
Cultural Services		
Recreation Experience	Project enhances recreational opportunities	Recreation values associated with wetlands and protection from the risk of levee failure, reducing the expected annual damages and increasing recreational opportunities

3.3 Inventory of Existing Resources and Conditions

The purpose of this section is to describe the resources that could be affected by the proposed alternatives. The purpose of describing the affected environment is to define the context in which the effects could occur. The environmental analysis process has been conducted in compliance with applicable federal, state, and local regulations.

The Project Area is identified in the project maps contained in Appendix B. The Proposed Project measures are within Box Elder County. Table 3-4 summarizes the physical setting within the Project Area.

Table 3-4. Physical Environment Summary of the Project Area

Physical Setting Information		Information Source
Location		
The Proposed Project is located in the vicinity of Fielding, Garland, Tremonton, Elwood, Bear River City, and unincorporated areas of Box Elder County, Utah.		
Topography		
Agricultural Water Management and Watershed Protection Increments	The elevation of the Project Area ranges from approximately 4,212 feet AMSL to 4,745 feet AMSL. The landscape throughout the Project Area is characteristic of Cold North American Desert habitat.	USGS topographic maps (USGS 2024)
Geology		
Agricultural Water Management and Watershed Protection Increments	Geologic units in the Bear River Valley range from Precambrian to Permian and from Lower Cretaceous to Holocene. Valley fill within the Bear River Valley and up into the northern Malad Valley includes fine grain layers of clay and marl deposited by the Pleistocene age Lake Bonneville and Culter Dam Lake with coarse grained interlacustrine alluvium and lacustrine deposits below.	Hurlow 2016
Soil Characteristics		
Soil Type	The Proposed Project is comprised primarily of Kidman fine sandy loam (15.4%), rough broken land (11.7%), and Fielding silt loam (11.3%).	Web Soil Survey (NRCS 2025b)
Description	The soils of the Project Area are dominated by loam soils present in either lake terraces or lake plains with some soils presenting in alluvial fans or floodplains with low to moderate erosion hazards.	
Land Information		
Land Ownership	Private 186,716 acres (75.0%) Local 26,433 acres (10.6%) State 21,900 acres (8.8%) Federal 14,038 acres (5.6%) *Bureau of Land Management (BLM): 339 acres (<1%)* *National Forest: 436 acres (<1%)* *National Wilderness Area: 11,084 acres (4.4%)* *National Wildlife Refuge: 2,179 acres (<1%)*	Map 3 in Appendix C

Physical Setting Information		Information Source
Land Use	Open Water: 12,261 acres (4.9%) Developed Open Space: 4,196 acres (1.7%) Developed Low Intensity: 4,550 acres (1.8%) Developed Medium Intensity: 1,744 acres (<1%) Developed High Intensity: 552 acres (<1%) Barren Land: 5,459 acres (2.2%) Deciduous Forest: 3,853 acres (1.5%) Evergreen Forest: 4,565 acres (1.8%) Mixed Forest: 127 acres (<1%) Shrub/Scrub: 66,447 acres (26.7%) Grassland/Herbaceous: 23,182 acres (9.3%) Pasture/Hay: 5,590 acres (2.2%) Cultivated Crops: 94,168 acres (37.8%) Woody Wetlands: 1,613 acres (<1%) Emergent Herbaceous Wetlands: 20,780 acres (8.3%)	USDA County Profiles (NRCS 2022)

3.3.1 Economics/Socioeconomics

3.3.1.1 Economics

Resource Issue & Indicator: The BCR is the indicator used to describe whether the proposed activities produce benefits in excess of costs. The BCR does not indicate which project is the most efficient, however. Net monetized benefits indicate which project is more efficient when comparing multiple alternatives.

Agriculture is an important economic activity in the Project Area. However, multiple breaches within the Hammond and West Main Canal have occurred over the years and have become increasingly more significant each time. The BRCC history of canal failures and repair costs average $268,250 per year, and current agricultural-related average annualized damages of $8,418,000 occur in the watershed (See Benefit-cost Analysis in Appendix E1).

3.3.1.2 Socioeconomics

Resource Issue & Indicator: The proposed activities are designed to improve watershed functioning, thereby enhancing certain aspects of the watershed's economy. Indicators to describe socioeconomics effects are the number of jobs created by proposed activities, and whether the benefits exceed the costs, as displayed by the BCR.

The project activities are situated within portions of Tremonton City and Bear River City of Box Elder County, Utah. The following sections describe the current socioeconomic conditions of communities within the Project Area and Box Elder County, as compared to the State of Utah; the current demographics, employment, income, and poverty are represented.

Population Demographics

Population and demographic information estimated for Tremonton City, Bear River City, Box Elder County, and the State of Utah are described in Table 3-5. Percentages for gender, age and

sex in Tremonton City and Bear River City are similar and consistent with Box Elder County and Utah.

Table 3-5. Demographic Profile Comparison for 2020

Total Population		9,894	100	877	100	57,666	100	3,271,616	100
Gender[1]	Female	4,867	44.7	410	47.5	29,158	48.8	1,685,987	49.3
	Male	6,019	55.3	453	52.5	30,567	51.2	1,731,747	50.7
Age[1]	Under 18	3,555	32.7	215	24.9	18,468	30.9	933,905	27.3
	18 & Over	7,331	67.3	648	75.1	41,257	69.1	2,483,829	72.7
Race[2]	White	8,375	84.6	823	93.8	50,784	88.1	2,573,413	78.7
	Black or African American	27	0.3	2	0.2	178	0.3	40,058	1.2
	American Indian or Alaskan Native	104	1.1	12	1.4	516	0.9	41,644	1.3
	Asian	137	1.4	3	0.3	455	0.8	80,438	2.5
	Native Hawaiian or Other Pacific Islander	23	0.2	0	0.0	103	0.2	36,930	1.1
	Two or More Races	606	6.1	11	1.3	3,399	5.9	279,013	8.5
	Other	622	6.3	26	3.0	2,231	3.9	220,120	6.7
Ethnicity[3]	Latino/ Hispanic	1,335	13.5	44	5.0	5,537	9.6	492,912	15.1
	Not Latino/ Hispanic	8,559	86.5	833	95.0	52,129	90.4	2,778,704	84.9

Note: Totals may not equal 100 due to rounding
[1]Table S0101, 2023 American Community Survey (ACS) 5-Year Estimate (Census 2023a)
[2]Table P1, 2020 Decennial Census (Census 2020a)
[3]Table P9, 2020 Decennial Census (Census 2020b)

According to the Census estimates, since 2010, Tremonton City has grown by approximately 29.4% and Bear River City by 2.8%. Past, current, and future population estimates for Tremonton City, Bear River City, Box Elder County, the State of Utah, and the United States are summarized in Table 3-6.

Table 3-6. Past, Current, and Future Population

Population Year	Tremonton City	Bear River City	Box Elder County	Utah	United States
Total Population 1990	4,317[1]	700[1]	36,509[2]	1,728,227[2]	248,709,873[3]
Total Population[4] 2000	5,592	750	42,745	2,233,169	281,421,906
Total Population 2010[5]	7,647	853	49,975	2,763,885	308,745,538
Total Population 2020[6]	9,894	877	57,666	3,271,616	331,449,281
Projected Population 2040	Unknown	Unknown	57,886[7]	4,440,560[7]	355,309,062[8]
Projected Population 2060	Unknown	Unknown	75,494[7]	5,450,598[7]	364,297,256[8]

[1]Population History (Biggest U.S. Cities 2025)
[2]Utah Economic Data Viewer (Department of Workforce Services 2025)
[3]Table 1, General Population Characteristics (Census 1990)
[4]Table DP1, 2000 Decennial Census (Census 2000)
[5]Table P1, 2010 Decennial Census (Census 2010)
[6]Table P1, 2020 Decennial Census (Census 2020a)
[7]Kem (Kem 2022)
[8]Census 2023 National Population Projections (Census 2023b)

Employment, Income, and Poverty

The 2019–2023 American Community Survey (ACS) 5-year estimates for employment and income status in Tremonton City, Bear River City, Box Elder County, and the State of Utah are provided in Table 3-7.

Table 3-7. Employment and Income Status

Characteristics	Tremonton City	Bear River City	Box Elder County	Utah
Population 16 years and older[1]	7,622	678	43,160	2,555,927
Civilian labor force[1]	5,568	462	28,391	1,802,071
Employed[1]	5,285	451	27,480	1,745,005
Unemployed[1]	283	11	911	57,066
Percent unemployed	5.1%	2.4%	3.2%	3.2%
Median household income[2]	72,028	87,917	77,865	93,421
Mean household income[3]	91,619	103,226	94,546	117,752
Families below poverty level[4]	8.7%	4.2%	6.2%	6.0%

[1]Table S1701, 2023 American Community Survey (ACS) 5-Year Estimates (Census 2023c)
[2]Table S1903, 2023 American Community Survey (ACS) 5-Year Estimates (Census 2023d)
[3]Table S1902, 2023 American Community Survey (ACS) 5-Year Estimates (Census 2023e)
[4]Table S1702, 2023 American Community Survey (ACS) 5-Year Estimates (Census 2023f)

Within the Project Area, 8.7% of families in Tremonton City are below poverty line compared to approximately 6% for Box Elder County and Utah (see Table 3-7; Census 2023f). Within the Project Area, 8.7% of families in Tremonton city and 4.2% of families in Bear River City are below the poverty line.

Agricultural Statistics

Box Elder County has a history of agriculture. According to the USDA National Agricultural Statistics Service (NASS), as of 2022, sales from farms in Box Elder County included $93 million for crops and over $102 million for livestock, poultry, and other products (NRCS 2022). Table 3-8 provides an overview of the agricultural census for Box Elder County.

Table 3-8. Box Elder County Agricultural Census

Resource	Description
Number of Farms	1,248
Active Farmland (acres)	1,176,650
Irrigated Acres	85,487 (7%)
Average Farm Size (acres)	943
Farmland Use (acres)	Cropland: 239,338 Pastureland: 877,967 Woodland: 25,726 Other: 33,619
Farmland Productivity	Pastureland (74.6%) Cropland (20.3%)
Primary Crops (acres)	Forage (hay/haylage): 61,440 Wheat (grain use): 36,780 Safflower: 7,905 Corn (grain use): 7,120 Corn (silage/greenchop): 4,782
Percent of State Agricultural Sales (%)	8%

Source: NRCS 2022

3.3.2 Air Quality and Climate

The following sections provide information on the CAA and climate. Additional information on air quality and climate resources can be found in Appendix E1, including a $PM_{2.5}$ emissions calculation memo and the project BMPs.

3.3.2.1 Clean Air Act/National Ambient Air Quality Standards

Resource Issue & Indicator: The indicators to describe whether proposed activities affect air quality protected by the CAA are the measures taken to protect air quality and the ability to meet NAAQS.

Pursuant to requirements of the CAA (42 U.S.C. 7401 et seq), the EPA has established health-based NAAQS for six pollutants considered harmful to public health and the environment, known as criteria pollutants. These include carbon monoxide (CO), nitrogen dioxide (NO^2), ozone (O^3), particulate matter (PM), sulfur dioxide (SO^2), and lead (Pb).

Monitoring for criteria pollutants in Utah is delegated to the Utah Division of Air Quality (UDAQ). UDAQ has a network of ambient air monitoring stations throughout Utah that are used to monitor air quality. The nearest air quality monitoring stations are located approximately 11.5 miles north of Tremonton at the Nucor Steel Plant in Plymouth, UT and approximately 17.5 miles southeast of Tremonton in Brigham City, UT. Neither station was actively monitored during the 2020 monitoring period (the most recent monitoring period available). The closest active monitoring station during the 2020 monitoring period is located in Smithfield, more than 20 miles to the east of the Project Area (UDAQ 2021). The Smithfield monitoring station monitors several air quality constituents, including NO_2, O_3, PM_{10}, $PM_{2.5}$, and meteorological events.

The entire Project Area is located within the Salt Lake $PM_{2.5}$ Nonattainment Area, which covers Salt Lake and Davis counties, as well as portions of Box Elder, Weber, and Tooele counties (UDAQ 2025). $PM_{2.5}$ can come from several sources, including the burning of gasoline, natural gas, coal, oil, and other fuels, as well as mining and construction activities, and from the plowing or burning of agricultural fields (UDAQ 2021).

Other contributing factors to $PM_{2.5}$ in the Project Area include the proximity of the Proposed Project to the Great Salt Lake. Due to long term drought and a decreasing water supply, the GSL has retreated, exposing over 800 square miles of lakebed. The lakebed contains arsenic and other toxic metals, which are exposed as the lake continues to dry up, creating toxic dust (University of Utah 2025). This toxic dust contributes to both $PM_{2.5}$ and PM_{10} levels. The Bear River is the largest tributary of the GSL; thus, the water conserved in the Bear River would indirectly benefit the GSL.

$PM_{2.5}$ is the main source of haze that reduces visibility in the Salt Lake Valley $PM_{2.5}$ Nonattainment Area. $PM_{2.5}$ can also be formed as a reaction of other pollutants in the air, including SO_2, nitrogen oxides (NOx), volatile organic compounds (VOCs), and ammonia (NH_3), which are considered to be precursors to $PM_{2.5}$. According to the 2020 Triennial Report, the majority of Utah's $PM_{2.5}$ comes from these reactions.

The Salt Lake $PM_{2.5}$ Nonattainment Area was designated by the EPA on December 14, 2009. Following some clarifications of the CAA, the State of Utah developed and submitted a Moderate State Implementation Plan (SIP) to the EPA for approval in 2014, which demonstrated that it would be impracticable for the area to meet its attainment goals by the EPA deadline of December 31, 2015. Following this determination and a subsequent failure to meet the EPA's 24-hours standard by the 2015 deadline, the EPA determined that the Salt Lake Nonattainment Area would be reclassified from moderate to serious in May 2017 and required a new SIP to be developed to demonstrate attainment by a deadline of December 31, 2019. A classification of a serious nonattainment area means the area has more stringent SIP requirements, including:

- Evaluation and adoption of control measures for direct $PM_{2.5}$ emissions and its precursors—UDAQ is required to evaluate direct $PM_{2.5}$ emissions, as well as the four $PM_{2.5}$ precursors: SO_2, NOx, VOCs, and NH_3; and evaluate appropriate emission controls for these emission sources.
- Application of Best Available Control Technology (BACT)—Serious Area SIPs require implementation of control strategies that meet BACT rather than the Reasonably Available Control Technology (RACT) required for Moderate Area SIPs. Currently,

BACT controls are required on area and mobile sources in addition to major point sources.

To combat the dangerous health effects of $PM_{2.5}$, the State of Utah developed the Serious Area $PM_{2.5}$ SIP in 2017. The SIP demonstrates not only attainment of the EPA's $PM_{2.5}$ standard by the 2019 deadline but also continued compliance of the standard through 2035 with an intermediate check-in to be completed in 2026 (UDAQ 2024). The Salt Lake $PM_{2.5}$ Nonattainment Area is currently in its first 10-year maintenance phase, which is one step in a lengthy process to move from nonattainment to attainment. In November 2020, the EPA proposed that the Salt Lake $PM_{2.5}$ Nonattainment Area be reclassified to attainment. However, adverse comments were received and the EPA and UDAQ are still working to address those comments. As such, the Salt Lake $PM_{2.5}$ Nonattainment Area continues to be classified as nonattainment.

Currently, only point sources that emit more than 70 tons per year (tpy) of $PM_{2.5}$ or any precursor are required to use BACT. There are 18 known point sources within the Salt Lake $PM_{2.5}$ Nonattainment Area, including 4 within a 20-mile radius of the mid-point of the Proposed Project (UDAQ 2024). None of the point sources are within the footprint of the Proposed Project. Additionally, BACT controls are required on all area and mobile sources of $PM_{2.5}$ and their precursors. Mobile sources include both motor vehicles and non-road engines. It is unknown how many area and mobile sources currently exist within a 20-mile radius of the Proposed Project.

Under Title R307 of the Utah Administrative Code (UAC), emission inventories must be undertaken to further characterize air quality throughout Utah. Emissions inventories are conducted every three years, during which UDAQ collects information about the types and quantities of compounds released by all emissions sources in the State. Sources of air emissions are categorized as point sources (large stationary industrial or commercial facilities), area sources (smaller stationary sources that are assessed as a group), or mobile sources (personal or commercial vehicles as well as non-road engines). The 2017 triennial emissions inventory is the most recent state-wide inventory available (UDAQ 2021). The data are used by UDAQ to review trends over time and manage the state-wide air quality program. Total annual emissions for CO, NOx, PM (including both PM_{10} and $PM_{2.5}$), SO_2, total VOCs, and NH_3 for Box Elder County are shown in Table 3-9.

Table 3-9. 2017 Emissions Inventory (tons/year) for Box Elder County, Utah

CO	NOx	PM10	$PM_{2.5}$	SO2	VOC
29,756.51	4,893.39	9,151,.64	2,202.54	181.12	40,317.99

Source: UDAQ 2021

40 CFR Part 93 Subpart B of the CAA includes the General Conformity Regulations, which require federal agencies to ensure the emissions caused by federally funded activities would not interfere with a State or Tribe's ability to attain and maintain NAAQS standards. Additionally, federally funded activities must be consistent with any applicable SIPs, Tribal Implementation Plans, or Federal Implementation Plans (EPA 2025b). As discussed in the $PM_{2.5}$ Emissions Memo in Appendix E1, the General Conformity Regulations are applicable to the Proposed Project, thus it must comply with the regulations.

3.3.2.2 Climate and Greenhouse Gases

Resource Issue & Indicator: The indicators to describe the proposed activities' effects to climate resiliency and GHGs are the proposed activities' contributions to resiliency to climate stress and changes in GHGs.

Currently, local agricultural producers have little flexibility or resilience to withstand future climate fluctuations with the current seepage and evaporative water losses, preventing producers from obtaining full crop yields, particularly relevant during dry years.

Gases that trap heat in the atmosphere are called GHG, and include carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), and fluorinated gases, such as hydrofluorocarbons (HFC), perfluorocarbons (PFC), and sulfur hexafluoride (SF_6). These GHGs are introduced into the atmosphere by various sources, including electricity production, private and commercial transportation, oil and gas production, commercial and residential practices, and agriculture. Data regarding GHGs, regulations, and emissions sources are published annually by the EPA in its annual Greenhouse Gas Emissions and Sinks (EPA 2024).

GHGs are introduced into the atmosphere by a variety of sources including energy production, private and commercial transportation, industrial practices, commercial and residential practices, and agricultural practices. The Center for Climate Strategies (CCS) prepared a report for the UDEQ to present GHG emissions inventory and forecast for 1990 through 2020 (CCS 2007). The purpose of the report was to provide a comprehensive understanding of Utah's current and future GHG emissions as a baseline for informing policy. The three principal sources of GHGs outlined in the report resulted from electricity use (37%); transportation (25%); and the residential, commercial, and industrial fossil fuel combustion (18%) (CCS, 2007). According to EPA's GHG emissions database, there were 68 Large Facilities reporting in Utah in 2023, of which 5 are located in Box Elder County (EPA 2023), including 3 of the point sources subject to BACT requirements discussed above.

3.3.3 Soils and Geology

The Analysis Area for soils and geology is located in the Bear River Valley, a north-south-trending, narrow valley bordered on the east side by the Wellsville Mountains, a narrow subset of the nearby Rocky Mountains. The Malad River runs north-south through the valley while the Bear River runs east-southeast through the valley. Both rivers empty to the GSL, which lies on the west side of the valley. The Bear River Valley ranges in elevation from approximately 4,745 feet near the northern end to approximately 4,212 feet where the valley meets the Bear River Migratory Bird Refuge at the south end (Topographic-Map 2025). Elevations for the nearby Wellsville Mountains vary but Box Elder Peak, located on the east side of the valley, is over 9,000 feet AMSL (Topographic-Map 2025).

Geologic units in the Bear River Valley range from Precambrian to Permian and from Lower Cretaceous to Holocene (Hurlow 2016). Valley fill within the Bear River Valley and up into the northern Malad Valley includes fine grain layers of clay and marl deposited by the Pleistocene age Lake Bonneville and Culter Dam Lake with coarse grained interlacustrine alluvium and lacustrine deposits below (Hurlow 2016). The Bear River Valley basin fill is eroded in places, but studies indicate it ranges from approximately 1,400 feet to more than 6,500 feet thick while bedrock exposures in the Wellsville Mountains indicate the rock layers are approximately 11,000 to 17,000 feet thick (Hurlow 2016).

According to the Geologic Hazard Review conducted by Terracon in 2024, the Collinston Section of the Wasatch Fault Zone crosses through the Analysis Area within the existing alignment of both the BRCC Hammond and West Main Canals (see Terracon 2024 in TM-01). The Wasatch Fault is an active geologic fault line that runs in a generally north-south line from southern Idaho to Central Utah. As discussed in Section 2.2.1, a long history of seismic activity exists in and adjacent to the Analysis Area. The Wasatch Fault system is considered one of the most active in the U.S, and the region is at a higher risk for significant earthquakes compared to many other parts of the country. A USGS report determined that the likelihood of a 6.0 magnitude or larger earthquake occurring in northern Utah in the next 50 years is 19 percent (BBC 2025) and the area has already experienced several significant earthquakes. Based on earthquake data over the past 25 years, Box Elder County experiences an average of 276 earthquakes every year (Allquakes 2025). Seismic risks for Bear River canyon include ground surface faulting, liquefaction, induced settlement, horizontal movement, and slope instability (Terracon 2024).

Soils information presented in this section is summarized from the NRCS Web Soil Survey Data for the Analysis Area (Table 3-10; NRCS 2025b; in the ARD appendix in Appendix E1 of this report). The soils listed in Table 3-10 are the dominant soil type present in the Analysis Area, having a total land area represented of at least 2% of the total Analysis Area. A complete listing of all soil types present in the Analysis Area is included in Appendix E1. Soils within the Analysis Area are comprised primarily of Kidman fine sandy loam (15.4%), rough broken land (11.7%), and Fielding silt loam (11.3%) (Table 3-10). The soils of the Analysis Area are dominated by loam soils present in either lake terraces or lake plains with some soils presenting in alluvial fans or floodplains with low to moderate erosion hazards. More than half the soils are considered potential prime and unique farmland. As discussed in Section 1.4.2, the Analysis Area is typically characterized by valleys, slopes, and alluvial fans located at higher elevations on mountain slopes (Woods et al. 2001). The Bear River Club, CDC, and Salt Creek WMA improvements typically contain level ground, rushes, reed grasses, and open water; and the remainder of the project components typically contains wide terraces, narrow floodplains, and alluvial fans, as well as mountain fed perennial streams and canals (Woods et al. 2001).

Approximately 1.2 million acres of land in Box Elder County is used for agriculture; the principal crops are hay/haylage, corn, and wheat, as well as greenchop and silage. Box Elder County also contains numerous cattle, hogs, sheep, and chicken operations (Table 3-8; USDA 2017c).

Table 3-10. Soil Classification Summary

Map Unit Name (Map Unit Symbol)	Percent of Analysis Area (%)	Landform	Slope (%)	Erosion Hazard Rating	Hydric Rating	Prime/Unique Farmland
Fielding silt loam, warm (Fe)	10.1	Valleys	0-3	Slight	0	Prime farmland if irrigated
Greenson silt loam (Gr)	2.4	Lake terraces and lake plains	0-1	Slight	4	Farmland of statewide importance
Honeyville silty clay loam (Ho)	2.1	Lake terraces and lake plains	0-1	Slight	0	Farmland of statewide importance
Kapod stony loam (KaE)	2.1	Lake terraces	6-20	Moderate	0	Not prime farmland
Kearns silt loam (KeB)	2.0	Lake terraces and fan remnants	1-3	Slight	0	Prime farmland if irrigated
Kearns silt loam (KeC)	2.8	Lake terraces and fan remnants	3-6	Moderate	0	Prime farmland if irrigated
Kidman fine sandy loam (KIA)	15.4	Lake terraces	0-2	Slight	0	Prime farmland if irrigated
Kidman loam (KmB)	2.6	Lake terraces	1-6	Moderate	0	Prime farmland if irrigated
Parleys loam (PbA)	3.4	Lake terraces and alluvial fans	0-3	Slight	0	Prime farmland if irrigated
Pintailake-Eimarsh-Playas complex (PEP)	7.0	Lake plains	0-1	Slight	90	Not prime farmland
Beariver silty clay loam (PT)	4.9	Flood plains	0-2	Slight	15	Not prime farmland
Red Rock silt loam (ReB)	3.5	Lake terraces and alluvial fans	1-6	Moderate	0	Prime farmland if irrigated
Rough broken land (Rv)	11.7	Escarpments and drainageways	-	Not rated	10	Not prime farmland
Stokes silt loam (Sw)	6.0	Lake plains and lake terraces	0-1	Slight	5	Not prime farmland
Timpanogos loam (TmA)	4.8	Alluvial fans and lake terraces	0-3	Slight	0	Prime farmland if irrigated
Timpanogos silt loam (ToB)	2.5	Alluvial fans and lake terraces	1-6	Moderate	0	Prime farmland if irrigated
Water	4.0	Water bodies	-	Not rated	0	Not prime farmland

3.3.3.1 Upland Erosion and Sedimentation

Resource Issue & Indicator: The indicators to describe the project activities' effects to erosion and sedimentation are the project design measures' ability to minimize or eliminate sediment in the temporary and long term, consistent with the UDEQ.

The erosion potential within the Analysis Area is generally low, as the topography within the Analysis Area is relatively flat with approximately 175 feet of elevational difference between the Bear River components on the east side of the Bear River Valley to the levee components on the west side of the valley. The canyon area where the Hammond and West Main Canals traverse contain the most slope. Within the Analysis Area, the Erosion Hazard Rating (EHR), which specifies the degree of hazard of soil loss from unsurfaced roads and trails, is generally slight (74.2% of Analysis Area), which indicates erosion is unlikely, to moderate (7.7% of Analysis Area), indicating that some erosion may occur and that simple erosion-control measures may be necessary, and severe (0.5% of Analysis Area) indicating that erosion would likely occur and that erosion-control measures are necessary (NRCS 2025b). See Table 3-11 for a summary of the EHR in the Analysis Area.

Table 3-11. Erosion Hazard Rating Summary Table

Rating	Acres in Analysis Area	Percent of Analysis Area (%)
Slight	489.4	74.2
Moderate	50.5	7.7
Severe	3.0	0.5
Not rated	116.3	17.6
Totals	**659.4**	**100.0**

Despite the generally slight EHR of the Analysis Area, flooding resulting from high intensity runoff events and aging infrastructure have caused localized erosion and sedimentation. Specifically on the steep canyon slopes of the Bear River, the existing infrastructure is threatened by slope stability and movement issues caused by canal overtopping due to high intensity storms and water seepage from aging infrastructure. Vertical or near vertical slopes occur within the Bear River canyon, where the BRCC Hammond and West Main canals are located. Since 1980, the canals have breached 18 times due to slope instability and movement and water seepage, with 15 failures occurring on the Hammond Canal and three occurring on the West Main Canal (Figure 2-2). The BRCC canals, including the Hammond Canal, deliver water that supports 65,500 acres of agricultural land in the watershed. Additionally, grazing and pasturelands have areas of bare and eroded land, and are subject to weathering.

Additional sedimentation problems are associated with the wetlands of the Lower Bear River Watershed, primarily around the Salt Creek WMA. This area receives substantial sediment loads from Salt Creek from nearby agricultural fields and other drainages. The sediment reduces water flows and distribution throughout the WMA, making it more difficult to control water levels within managed wetlands and provide quality habitat for wetland-dependent wildlife.

Excessive sedimentation also decreases water quality and increases the potential for the establishment and expansion of invasive weed species. As development increases upstream and around the WMA, the expansion of impermeable surfaces would likely increase flow velocities in Salt Creek, which can mobilize sediment from adjacent pervious areas and drainage features, resulting in a larger volume of sediment reaching the Analysis Area.

As part of any construction project, UDEQ requires a Utah Pollutant Discharge Elimination System (UPDES) Program Large Construction General Permit (CGP) administered under the National Pollution Discharge Elimination System (NPDES) for construction activities that disturb more than one acre of land.

3.3.3.2 Prime & Unique Farmland

Resource Issue & Indicator: The indicators to describe the prime and unique farmland effects are construction acres that expand the footprint of the canals into protected farmlands, and compliance with the Federal Farmland Protection Policy Act (FPPA).

The FPPA requires federal agencies to "minimize the extent to which federal programs contribute to the unnecessary and irreversible conversion of farmland to nonagricultural uses, and to assure that federal programs are administered in a manner that, to the extent practicable, will be compatible with state, unit of local government, and private programs and policies to protect farmland" (NRCS 1981). Farmland for the FPPA includes prime farmland, unique farmland, and land of statewide or local importance. Farmlands of statewide importance are defined as "Land that is of statewide importance for the production of food, feed, fiber, forage, and oilseed crops. It has the soil quality, growing season, and moisture supply needed to economically produce sustained yields of crops when treated and managed… Farmland of statewide importance is land that is available for farming, but could currently be cropland, pastureland, rangeland, forestland, or other land, but not urban built-up land or water" (NRCS 1981).

The NRCS Web Soil Survey was used to identify soils and farmland designations within the Analysis Area. As shown in Table 3-10, above, and summarized in Table 3-12 below, a large portion of the soils in the Analysis Area are considered potentially agriculturally significant. The NRCS classified 8.1% of the Analysis Area as "farmland of statewide importance" and 52.0% as "prime farmland if irrigated" (NRCS 2025b).

Table 3-12. Farmland Classification for the Analysis Area Summary Table

Rating	Acres in Analysis Area	Percent of Analysis Area (%)
Farmland of statewide importance	60.3	8.1
Prime farmland if irrigated	390.3	52.0
Not prime farmland	300.6	39.9
Totals	**751.2**	**100.0**

As shown on Table 3-13, the majority of the Proposed Project components would disturb lands classified as prime and unique farmlands. However, many of the Proposed Project components are existing and the lands have already been disturbed and are not being used for active farmland. As such, the FPPA would not apply to these lands despite the Soil Survey designation of Farmlands of Statewide Importance or Prime Farmland if irrigated.

The Tremonton Pressure Irrigation project components would be newly installed. The irrigation system itself would be located within a residential area that is not currently being used as agricultural lands. However, both proposed equalization ponds would be located on agricultural lands classified as Prime Farmland if irrigated. Likewise, the Bear River City Pressure Irrigation components would include a new equalization storage pond that would be located on agricultural lands classified as Prime Farmland if irrigated.

The Salt Creek WMA Levee Improvements and sediment removal component would use staging areas located on lands classified as Farmlands of Statewide Importance. These lands are currently undeveloped and are used primarily as agricultural land and therefore meet the criteria for Farmland of Statewide Importance under the FPPA.

Table 3-13. Farmland Classification by Project Component

Rating	Farmland of Statewide Importance	Prime Farmland if Irrigated	Not Prime Farmland
Agricultural Water Management			
BRCC Canyon improvements	X	X	X
BRCC Red Siphon			X
Tremonton Pressure Irrigation Improvements		X	X
Tremonton Irrigation Storage	X	X	X
Bear River City Pressure Irrigation	X	X	X
Highland Ditch Piping	X	X	
Central Canal Company Piping	X	X	X
Watershed Protection			
Bear River Club Levee Improvements			X
CDC Levee Improvements			X
Salt Creek Waterfowl Management Area Levee Improvements and Sediment Removal	X (staging areas only)		X
Total Analysis Area	**60.3**	**390.3**	**300.6**

3.3.4 Vegetation

Surveys to assess habitat conditions within the Analysis Area were conducted on August 13 and August 27-28, 2024. During these site visits, dominant plant species were identified throughout the Analysis Area. Dominant plant species identified during the survey are listed in Table 3-14.

Table 3-14. Plant Species Recorded within the Analysis Area

Common Name	Scientific Name	BRCC Canyon Area	Tremonton/ Bear River City Areas	Bear River Club and CDC Areas	Salt Creek WMA Area
alkali mallow	*Malvella leporsa*			X	X
annual seablite	*Suaeda maritima*			X	X
beardless wildrye	*Leymus triticoides*			X	X
big sagebrush	*Artemisia tridentata*	X			X
bittersweet nightshade	*Solanum dulcamara*	X			
black mustard	*Brassica nigra*		X		
box elder	*Acer negundo*	X	X		
broadleaf cattail	*Typha latifolia*	X	X	X	X
Canada thistle	*Cirsium arvense*		X		
cheatgrass	*Bromus tectorum*	X	X		
clasping pepperweed	*Lepidium perfoliatum*		X		
climbing nightshade	*Solanum dulcamara*	X			
common ground cherry	*Physalis longifolia*		X		
common rush	*Juncus effusus*			X	X

Common Name	Scientific Name	BRCC Canyon Area	Tremonton/ Bear River City Areas	Bear River Club and CDC Areas	Salt Creek WMA Area
creeping knotweed	*Polygonum aviculare*		X		X
creeping saltbrush	*Atriplex prostrata*			X	X
crested wheatgrass	*Agropyron cristatum*	X	X		
curlycup gumweed	*Grindelia squarrosa*	X	X		
dyers woad	*Isatis tinctoria*	X			
Eastern cottonwood	*Populus deltoides*	X	X		
field bindweed	*Convolvulus arvensis*	X	X		
greasewood	*Sarcobatus vermiculatus*			X	X
inland saltgrass	*Distichlis spicata*			X	X
iodinebush	*Allenrolfea occidentalis*			X	X
Kentucky bluegrass	*Poa pratensis*			X	X
kochia	*Bassia scoparia*		X		
narrowleaf willow	*Salix exigua*	X			
Phragmites	*Phragmites australis*	X		X	X
prickly lettuce	*Lactuca serriola*		X		
rabbitbrush	*Ericameria nauseosa*	X	X		
reed canarygrass	*Phalaris arundinacea*	X	X		
Russian olive	*Elaeagnus angustifolia*	X	X		
showy milkweed	*Asclepias speciosa*	X	X		
softstem bulrush	*Schoenoplectus tabernaemontani*	X		X	X
squirreltail grass	*Elymus elymoides*		X		
sweet yellow clover	*Melilotus officinalis*		X		
teasel	*Dipsacus fullonum*	X	X		
Utah pickleweed	*Salicornia utahensis*			X	X
western goldenrod	*Euthamia occidentalis*	X			
western wheatgrass	*Pascopyrum smithii*	X		X	X

3.3.4.1 Special Status Plant Species

Resource Issue & Indicator: The indicators to describe effects to special status plant species protected under the ESA are the effects to suitable habitat.

To identify special status plant species within the Analysis Area, an official species list was obtained from the USFWS Information for Planning and Consultation (IPaC) database on February 20, 2024, and updated on January 15, 2025 (USFWS 2025a; see BA in Appendix E1). One ESA listed plant species has the potential to exist within the Analysis Area: Ute ladies'-tresses (ULT; *Spiranthes diluvialis*).

No suitable habitat was identified and no ULTs were observed within the action area during surveys within the accepted flowering period, in August 2024. Many of the canals within the action area are lined with concrete and do not provide the substrate needed for ULTs to successfully establish. Areas of canals that are earthen have a high level of vegetative competition for light and resources, and contain a muddy, clay substrate that dries completely outside of the irrigation season (April–October). Additionally, active use of herbicide along sections of the canal and ditches reduces habitat suitability for ULTs.

Dense vegetative competition is also present along the edges of the Lower Bear River. No gravel or sand bars were observed where ULTs may establish. Within the Salt Creek WMA area and the Bear River Club and CDC areas, the soil is very saline and would be incompatible for ULTs. These areas are also inundated with water, as they are primarily cattail dominated wetlands. Additionally, dense vegetative competition is also present along the Bear River where it enters the Salt Creek WMA. Outside of the Lower Bear River, canal areas, and the WMA and duck and hunting club locations, all other areas within the Action Area are upland, where ULTs would not be able to establish.

3.3.4.2 Riparian Areas

Resource Issue & Indicator: The indicators to describe effects to riparian areas are the acres potentially affected by proposed actions. Riparian area vegetation is described as riparian fringe or seepage induced fringe. The analysis also considers the actions taken to protect riparian areas and ensures the Analysis Area is more resilient to a changing climate, consistent with the UDWR Central Region Wetlands Conservation Strategy.

Across the Analysis Area, where canals are not concrete, canals are densely vegetated with seepage-induced fringe, which is dominated by tall grasses and reeds. Approximately 35 acres of low-quality, seepage induced riparian fringe grows along the edges of canals in the Analysis Area. Riparian fringe in these areas is limited to understory species. The Bear River and the Malad River contain more layered and complex riparian fringe that includes shrub and tree species.

Approximately seven miles of the Lower Bear River is included in the Analysis Area. The river in this location contains a corridor of riparian fringe, ranging from approximately 150 to 500 feet in width, and totaling an estimated 300 acres of riparian fringe. This fringe includes mature cottonwoods and Russian olive trees and a dense understory. This habitat is not contiguous; fragmentation of the natural habitat along the Lower Bear River has occurred as result of conversion to agriculture. Agricultural activities and human activities are high in this area. The Analysis Area intersects the Bear River where the Elwood Highland Ditch outlets at W 6900 N and at N 4500 W. Approximately 2.1 acres of riparian fringe occurs along the ditch and the river where they intersect near W 6900 N and approximately 2 acres of riparian fringe occurs along the length of the ditch and the river where they intersect at the end of N 4500 W.

The Malad River is crossed by the East Canal at the location of the flume replacement. Approximately 1.8 acres of riparian fringe fall within the footprint of the Analysis Area that overlaps with the Malad River and the East Canal. The Central Canal Company Canal outlets into the Malad River. At the outlet, low growing wetland species and grasses vegetate the riparian area.

3.3.4.3 Noxious Weeds and Invasive Plants

Resource Issue & Indicator: The indicators to describe the risk of introduction, establishment, and spread of invasive plant species, also known as noxious weed, are the measures taken to prevent the introduction or spread of invasive species to ensure consistency with E.O. 13112 and the Utah Noxious Weed Act.

E.O. 13112 states that a federal agency shall “not authorize, fund, or carry out actions that it believes are likely to cause or promote the introduction or spread of invasive species.” Noxious

weeds and invasive plants are non-native species whose introduction does or is likely to cause economic or environmental harm or harm to human health.

Three species listed on Utah's Noxious Weed List were observed in the Analysis Area: Russian olive (Class 4), Canada thistle (Class 3), and dyer's woad (Class 2) (UWCA 2025).

Though not listed on Utah's Noxious Weed List, *Phragmites* (specifically the non-native subspecies, *Phragmites australis ssp. australis*) is considered an invasive species especially in the delicate ecosystem of the wetlands, and *Phragmites* infestations are actively managed within the Bear River Club, CDC, and Salt Creek WMA areas. This invasive variety is highly aggressive and can outcompete native vegetation, significantly altering ecosystems. It forms dense mats of roots that can change water systems and destroy habitats.

3.3.5 Water Resources

The Proposed Project occurs in Box Elder County, Utah, and is within the Great Basin Region. The proposed activities are located in the Bear River, Outlet Little Bear River, and Newton Creek-Bear River 10-digit watersheds, covering parts of ten 12-digit subwatersheds (Figure 1-1): HUC 160102040401-Blind Springs Canyon, HUC 160102040306, Water Canyon-Malad River, HUC 160102040402–Blind Springs, HUC 160102040307 Outlet Malad River, HUC 160102040501 Willow Creek-Bear River, HUC 160102040403 Salt Creek WMA, HUC 160102040502 Jim May Canyon-Salt Creek, HUC 160102040404 Sulphur Creek, HUC 160102040504 Black Slough-Box Elder Creek, and HUC 160102040505 Bear River-Frontal GSL.

At 350-miles long, Bear River is the largest tributary of the GSL. The Bear River drains a mountainous area northeast of the Snake River Plain. The Bear River flows through northeastern Utah, southwestern Wyoming, southeastern Idaho and back into northern Utah.

Within the Analysis Area, there are five freshwater emergent wetlands, one freshwater palustrine wetland, and 82 linear water features present including the Bear River, Malad River, Salt Creek, one lake, six streams, 14 canals, and 55 ditches. Collectively, 41.9 acres of wetlands and 77.2 acres (174,022 feet) of linear features were mapped within the Analysis Area.

The following sections provide information on water quality and quantity, the CWA, wetlands, the Regional Water Management Plan, and floodplain management. Additional information on water resources can be found in Appendix E1, including an ARD, an Agricultural Water Technical Memo, a Watershed Protection Technical Memo, and BMPs.

3.3.5.1 Surface and Ground Water Quality and Quantity

Resource Issue & Indicator: The indicator to describe effects to surface and groundwater quality include reductions in canal seepage, sedimentation rates, and pollutant loads and the ability of the alternatives to comply with the Utah Surface Water Quality Standards and the CWA as amended (CWA; 33 U.S.C. 1251 et seq.) and the indicator for water quantity is the miles of box culvert and piping installation contributing to water conservation from reduced seepage and evaporation.

Water Quality

The UDEQ describes the state's water quality standards for all classified waters of the state in Utah Administrative Code (UAC) R317-2, designed to protect and improve water quality for

beneficial uses (i.e., drinking water, fish and aquatic life, wildlife, agricultural, industrial, and recreational uses). Bear River and tributaries' water use designation are classified as Class 2B (protected for infrequent primary contact recreation), Class 3A (protected for cold water aquatic life), Class3D (protected for waterfowl, including the necessary aquatic organisms in their food chain), and Class 4 (protected for agricultural uses). Seepage loss can contribute to water quality degradation through increased sedimentation and nutrient transport.

Water Quantity

Utah Division of Water Resources has established a regional municipal and industrial (M&I) water conservation goal of 249 GPCD for the Bear River region by 2030, an 18 percent reduction from the 2015 baseline of 304 GPCD. Reducing potable water use for outdoor irrigation through the development of a secondary water system would directly support the region's ability to meet this goal (UDWR 2019).

The BRCC currently uses two open canals, the Hammond Canal and the Main Canal, to convey water from Cutler Reservoir to the canal system that carries water throughout the Lower Bear River Valley in Box Elder County. The Hammond Canal conveys 200 cfs while the Main Canal transports 750 cfs. The BRCC canal system is mostly earthen channels with a few short sections that are piped or are lined with concrete or rubber liners. The beginnings of the canals are located on steep canyon walls above the Bear River. Starting at the outlets at Cutler Reservoir, the sections located on the steep canyon slope are approximately 5.5 miles and 4.8 miles long for the Hammond Canal and Main Canal, respectively. The first, approximately one mile of each of these two canals is owned and operated by PacifiCorp.

Both canals in the canyon area are at risk of failure because of the steep canyon slopes along the Bear River. This threat is heightened by slope instability and movement, and water seepage from the canals. The Hammond Canal is in particularly poor condition and has had a recent land slide failure in the past few years that disrupted normal water deliveries to farmers for an extended period of time. In fact, over 13 significant canal breaches have occurred in the past 40 years. Terracon documented past hillside failures in the canyon area (Terracon 2024). Most of the documented failures have occurred on the southeast side of the canyon along the Hammond Canal. Major repairs and improvements are needed to improve the future reliability of the canals.

Currently, the passage of water along unlined sections of the Hammond and Main Canals experiences water loss either due to evaporation or seepage. Litke and Appel (1989) estimated conveyance losses from evaporation or use by phreatophytes and seepage to the ground-water table from unlined canals would be around 23 percent. This water loss rate in canals was confirmed in a water loss study on a similar project in Wyoming for the Eden Valley Irrigation & Drainage District canals (J-U-B 2022). Based on these estimations, approximately 219 cfs of the average annual diversion of 950 cfs could be lost to evaporation and seepage in the sections of unlined canals.

At present, the Red Flume bridge continues to age, thus requiring greater protection from the environmental exposure as rusting undermines its structural integrity. Furthermore, the flume's declining condition has caused a drop in operational efficiency and escalated maintenance expenses, while the bridge is now also vulnerable to seismic failure.

The Analysis Area loses water to lateral seepage, which marginally contributes to groundwater recharge. The project is designed to address seepage loss.

3.3.5.2 Clean Water Act and Waters of the U.S.

Resource Issue & Indicator: The indicators to describe the effects to the CWA and WOTUS are the acres of jurisdictional waters potentially affected and the measures to ensure jurisdictional consistency, and compliance with applicable permitting requirements for WOTUS.

The CWA establishes the framework for regulating discharges of pollutants into the WOTUS, which can include wetlands, and regulating quality standards for surface waters (EPA 2022). An ARD was conducted in August 2024 by J-U-B staff using the routine delineation methodology on 743.3 acres in the Analysis Area. The ARD identified several WOTUS resources within the Analysis Area, as shown on Table 3-15. Approximately 41.9 acres of wetland features and 77.2 acres of lineal features, a total of 119.1 acres, were delineated as jurisdictional WOTUS. The ARD, in Appendix E1, includes methodology, photos and details of the identified water and wetland resources. Findings concluded that all features have a surface water connection with either the Bear River, Malad River, or the GSL, all of which are known WOTUS.

Based on the overlap between disturbance activities and the extent of wetland resource, a nationwide permit from USACE may be necessary to authorize effects associated with implementation of any action alternative.

Table 3-15. Water Resources within the Analysis Area

Feature	Resource Size (acres)	Resource Size (feet)
Wetlands		
Freshwater Emergent Wetlands	41.7	N/A
Unconsolidated Wetlands	0.2	N/A
Wetland Sub-total	*41.9*	*N/A*
Linear Features (acres)		
Bear River	20.9	17013.4
Hammond Main Canal	13.5	24959.8
Highline Canal	0.0	116.2
Malad River	0.05	128.0
Salt Creek	6.8	2760.7
West Canal	0.1	344.1
West Side Canal	6.1	7064.3
Lake 1	0.1	160.8
Streams 1-5	8.6	20701.3
Canals 1-10	17.9	66203.8
Ditches 1-55	3.1	34569.4
Linear Feature Sub-total	*77.2*	*174,022.8*
Grand Total	**119.1**	**174,022.8**

3.3.5.3 Wetlands

Resource Issue & Indicator: The indicators to describe if discharge from activities associated with this project may affect seepage-induced wetlands during construction activities and could cause a decrease in wetland functionality and losses to WOTUS are the acres of jurisdictional wetlands potentially affected by proposed actions and the measures to protect wetlands directly affected by construction activities, to minimize the destruction, loss, or degradation of wetlands,

and to preserve and enhance the natural and beneficial values of wetlands, as required in E.O. 11990.

The CWA provides the foundation for regulating the discharge of dredged or fill material into WOTUS, which may include wetlands, as well as establishing water quality standards for surface waters (EPA 2022).

The ARD was completed by J.U.B. Engineers in August of 2024, identified approximately 41.9 acres of wetland features and 77.2 acres of linear features delineated as WOTUS within the Analysis Area, as shown in Table 3-15. The ARD, in Appendix E1, includes methodology, photos and details of the identified wetlands.

Wetlands play a significant role in affecting water quality in the Bear River. These wetlands help with water filtration, nutrient removal, sediment trapping, and pollutant breakdown. These functions are crucial for maintaining and enhancing water quality within the watershed.

The Bear River Club, the CDC, and the Salt Creek WMA use levees to maintain over 24,000 acres of wetlands and wildlife habitat. These levees are currently deteriorating from bank erosion and general failure is limiting water level control to provide habitat, to reduce invasive species propagation, and control sediment deposition in these important wetlands.

3.3.5.4 Regional Water Management Plan

Resource Issue & Indicator: The indicator to describe effects to regional water management plans is the method in which the proposed activities support the priorities of the Utah State Water Plan.

The coordinated Utah state water planning process goes back to 1963, first outlined within the report titled "Developing a State Water Plan—Utah's Water Resources, Problems, and Needs—A Challenge," which consists of an overall statewide framework plan and plans for the state's 11 river basins, including the Bear River Basin, in which the Lower Bear River Watershed is located. The UDNR-UDWR 2021 Water Resources Plan focuses on projects for the conservation, storage, distribution, and use of water to meet Utah's growing population and water demand (UDWR 2021). Additional regional water planning efforts include the Bear River Watershed Council (BRWC 2023), and the Great Salt Lake Basin Integrated Plan (UDWR 2025), both administered by the UDWR.

3.3.5.5 Floodplain Management

Resource Issue & Indicator: The indicator to describe effects to floodplain management is the capability of the alternatives to meet the E.O. 11988 by not adversely affecting floodplains.

The FEMA FIRM maps indicate that several portions of the Analysis Area are within 100-year floodplains, situated close to both the Bear and Malad Rivers and various wetland areas. The Analysis Area predominantly overlaps with Zone A (No base flood elevations determined) and Zone AE (Base flood elevations determined) affiliated areas. Existing flood inundation maps for the 100-year floodplain are in Appendix C. See FIRM Map Number 49003C1370D, 49003C1350D, 49003C2250D, 49003C2250D, 49003C1805D, 49003C1365D, 49003C1355D, 49003C1785D, 49003C1360D, 49003C0975D and 49003C1390D (FEMA FIRM Panels in Appendix C).

3.3.6 Wildlife

The following sections provide information on wildlife and wildlife habitat, special status animal species, and migratory birds and eagles. Additional information on wildlife resources can be found in the Biological Evaluation and BMPs documents for the project in Appendix E1.

3.3.6.1 Wildlife and Wildlife Habitat

Resource Issue & Indicator: The indicators to describe effects to wildlife and wildlife habitat are available habitat and water within or around the Analysis Area. The indicators to determine the degree of effects are the qualitative changes to habitat affected by project activities for these species.

Wildlife habitat found in the Analysis Area according to the UDWiR central database include year-long crucial habitat for the Columbian sharp-tailed grouse, year-long and winter crucial habitat for the mule deer, year-long substantial habitat for the ring-necked pheasant, and year-long habitat for the turkey. The Analysis Area also falls within a mule deer migration corridor and the Pacific Flyway, one of four waterfowl migratory flyways in North America (UDWiR 2024). Table 3-16 shows the Utah state protected species with potential to occur within 2 miles of the Analysis Area.

Table 3-16. Utah State Protected Species with Potential to Occur within Two Miles of the Analysis Area

Species	Status[1]	Radius
Birds		
American Bittern (*Botaurus lentiginosus*)	SGCN / None	0.5 and 2 miles
American White Pelican (*Pelecanus erythrorhynchos*)	SGCN / None	0.5 and 2 miles
Burrowing Owl (*Athene cunicularia*)	SGCN / None	0.5 and 2 miles
Caspian Tern (*Hydroprogne caspia*)	SGCN / None	0.5 and 2 miles
Peregrine Falcon (*Falco peregrinus*)	SGCN / None	0.5 and 2 miles
White-faced Ibis (*Plegadis chihi*)	SGCN / None	2 miles
Amphibians		
Northern Leopard Frog (*Lithobates pipiens*)	SGCN / None	0.5 and 2 miles
Insects		
Monarch Butterfly (*Danaus plexippus*)	None / Proposed Threatened	0.5 miles
Mollusks		
Bear Lake Springsnail (*Pyrgulopsis pilsbryana*)	SGCN / None	2 miles
Coarse Rams-horn (*Planorbella binneyi*)	SGCN / None	0.5 and 2 miles
Deseret Mountainsnail (*Oreohelix peripherica*)	SGCN / None	0.5 and 2 miles
Green River Pebblesnail (*Fluminicola coloradoensis*)	SGCN / None	2 miles
Mountain Marshsnail (*Stagnicola montanensis*)	SGCN / None	2 miles

[1]UWAP SGCN: Species of greatest conservation need listed in the Utah Wildlife Action Plan (UWAP) and also included in the Utah Field Guide/ ESA protected species.

3.3.6.2 Special Status Animal Species

Resource Issue & Indicator: The indicators to describe effects to candidate, threatened, and endangered animal species are acres of suitable habitat affected and resulting implications for these species' populations.

The USFWS IPaC report identified one ESA-listed animal species and two ESA-proposed insect species as potentially occurring within the Analysis Area, presented in Table 3-17. (USFWS 2025a). No ESA listed fish species or designated critical habitat (DCH) occur in the Analysis Area.

A BA was prepared for the Proposed Project that identifies species characteristics, habitat requirements, and potential effects to federally listed species from implementing the Proposed Project (Appendix E1).

Table 3-17. Endangered Species Act (ESA) Species

Species	ESA Designation
Yellow-billed Cuckoo (*Coccyzus americanus*)	Threatened
Monarch Butterfly (*Danaus plexippus*)	Proposed Threatened
Suckley's Cuckoo Bumble Bee (*Bombus suckleyi*)	Proposed Endangered

3.3.6.3 Migratory Birds and Bald and Golden Eagles

Resource Issue & Indicator: The indicators to describe effects to migratory birds, bald and golden eagles, and habitat are the qualitative changes to habitat affected for each species and resulting implications for their populations.

Under the MBTA (16 U.S.C. 703-712), it is considered "illegal to take, possess, import, export, transport, sell, purchase, barter, or offer for sale, purchase, or barter, any migratory bird, or the parts, nest, or eggs of such a bird except under the terms of a valid permit issued pursuant to federal regulations." The BGEPA forbids anyone from taking bald eagles, including their parts, nests, or eggs; take is defined as "pursue, shoot, shoot at, poison, wound, kill, capture, collect, molest or disturb" (CFR 50 Part 22).

The USFWS IPaC Report identified 26 avian species protected under the MBTA, including two species protected under the BGEPA as potentially occurring within the Analysis Area, presented in Table 3-18.

Table 3-18. Migratory Bird Treaty Act (MBTA) and Bald and Golden Eagle Protection Act (BGEPA) Protected Avian Species

Common Name	Scientific Name
American Avocet	*Recurvirostra americana*
American White Pelican	*Pelecanus erythrorhynchos*
Bald Eagle[1]	*Haliaeetus leucocephalus*
Black Rosy-Finch	*Leucosticte atrata*
Black Tern	*Chlidonias niger*
Broad-tailed Hummingbird	*Selasphorus platycercus*
California Gull	*Larus californicus*
Calliope Hummingbird	*Selasphorus calliope*
Cassin's Finch	*Haemorhous cassinii*

Common Name	Scientific Name
Clark's Grebe	*Aechmophorus clarkii*
Evening Grosbeak	*Coccothraustes vespertinus*
Forster's Tern	*Sterna forsteri*
Franklin's Gull	*Leucophaeus pipixcan*
Golden Eagle[1]	*Aquila chrysaetos*
Lesser Yellowlegs	*Tringa flavipes*
Long-eared Owl	*Asio otus*
Marbled Godwit	*Limosa fedoa*
Northern Harrier	*Circus hudsonius*
Olive-sided Flycatcher	*Contopus cooperi*
Pectoral Sandpiper	*Calidris melanotos*
Pinyon Jay	*Gymnorhinus cyanocephalus*
Rufous Hummingbird	*Selasphorus rufus*
Sage Thrasher	*Oreoscoptes montanus*
Virginia's Warbler	*Leiothlypis virginiae*
Western Grebe	*Aechmophorus occidentalis*
Willet	*Tringa semipalmata*

[1]Species is also protected under the BGEPA.

3.3.7 Human Environment

This section discusses resource categories within the Project Area related to the human environment, including cultural and historic properties, scientific resources, public health and safety, hazardous materials, transportation and infrastructure, noise, visual resources and scenic beauty and recreation.

3.3.7.1 Cultural and Historic Properties

Resource Issue & Indicator: The purpose of the Section 106 process of the NHPA is, through consultation, to identify historic properties potentially affected by the undertaking, assess its effects and seek ways to avoid, minimize, or mitigate any adverse effects on historic properties (36 CFR 800.1). The indicators to describe effects to cultural and historic resources are the effects to these resources, any subsequent resolution of effects as agreed upon by the Utah SHPO, collaboration with Native American Tribes concerned with effects to cultural resources in the Project Area, and the protection of inadvertent discoveries.

The following sections provide information on regulatory overview, NRHP evaluation criteria, Tribal consultation, agency, and consulting party coordination, the APE, and cultural resources inventory results. Additional information on cultural resources' consultation, findings, and agreements can be found in Chapter 5, Appendix A (Section 106 Consultation documents—including SHPO Concurrence, Tribal Section 106 letters, and the Cultural MOA), and in Appendix E1 (Cultural Resources Report [*redacted*]).

Regulatory Overview

Several federal statutes and E.O.s direct the protection and consideration of cultural and historic resources, namely NEPA and the NHPA. Under NEPA, federal agencies must consider the effect of federal action upon historical, archeological, and paleontological resources. In addition,

Section 106 of the NHPA requires federal agencies to consider the effects of their actions on historic properties. NHPA defines a historic property as "any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion in, the National Register of Historic Places (NRHP)…" (36 CFR 800.16).

Pursuant to Section 106 of the NHPA, SHPO and/or Tribal Historic Preservation Office (THPO) must be consulted to determine whether the Proposed Project could have an adverse effect on NRHP listed and eligible properties, and the Advisory Council on Historic Preservation (ACHP) is afforded the opportunity to comment as well.

NRHP Evaluation Criteria

The criteria for evaluating cultural resources for inclusion in the NRHP are codified under the authority of the NHPA of 1966, as amended (36 CFR 60.4 [a–d]), and 36 CFR 800.4 that calls for the use of the Secretary of the Interior's Standards and Guidelines (48 FR 44720-44726) for both identification and evaluation, which was set forth by the NPS under the U.S. Department of the Interior (NPS 1995). The ACHP uses these guidelines in determining site eligibility. Federal regulations indicate that "[t]he term 'eligible for inclusion in the National Register' includes both properties formally determined as such in accordance with regulations of the Secretary of the Interior and all other properties that meet the National Register criteria" (36 CFR 800.16(l)(2)). Based on these guidelines, any cultural resource that is included in or eligible for inclusion in the National Register is a historic property.

After identifying the relevant historical themes and research questions, four eligibility criteria are applied. The quality of significance in American history, architecture, archeology, engineering, and culture is present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, material, workmanship, feeling, and association and:

- **Criterion A:** that are associated with events that have made a significant contribution to the broad patterns of our history; or
- **Criterion B:** that are association with the lives of significant people in our past; or
- **Criterion C:** that embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or
- **Criterion D:** that have yielded, or may be likely to yield, information important in prehistory or history.

The objective of this analysis is, through consultation, to identify historic properties that may be affected by the undertaking and if the effects are adverse, to resolve them.

Tribal Consultation

Pursuant to Section 106 of the NHPA, the ACHP, Utah SHPO, federally recognized Tribes, and/or Tribal Historic Preservation Offices (THPO), and other identified consulting parties, must be consulted at all steps of the Section 106 process. Per 36 CFR 800.3, the NRCS State Conservationist is the responsible federal official for assessing effects of activities, considering tribal interests, and assuring that tribal interests are considered in conjunction with federal activities and undertakings. NRCS has responsibility to help fulfill the U.S. Government's responsibilities toward tribes when considering actions that may affect tribal rights, resources, and assets. The ACHP is afforded the opportunity to comment as well.

Per 36 CFR 800.3 the NRCS identified the SHPO, THPOs, federally recognized Tribes, and other consulting parties for the project. The project team also prepared a public participation plan to include Tribes, the public, and other stakeholders in the process. The NRCS provided opportunity for comment and participation in developing the scope of the watershed plan in coordination and consultation with the following Tribes during the scoping period: Eastern Shoshone Tribe of the Wind River Reservation, Wyoming, the Shoshone-Bannock Tribes of the Fort Hall Reservation, the Ute Indian Tribe of the Uintah & Ouray Reservation, Utah, the Northwest Band of the Shoshone Nation, Skull Valley Band of Goshute, and the Confederated Tribes of the Goshutes. A scoping meeting was held on November 9, 2023.

NRCS formally initiated Section 106 consultation with these six federally recognized tribes via letters sent on June 12, 2024, during the scoping period for the Draft Plan-EIS.

The NRCS sent the cultural resources survey report with the inventory results to all six Tribes on May 16, 2025. The letter included the identification of the NRCS as the lead federal agency, delineation of the APE, identification of historic properties, and finding of effects, request for concurrence, and the invitation to participate in the development of the MOA. Follow up with the Tribes was completed on June 16, 2025 via electronic mail about the 30-day consultation request for concurrence on the May 16, 2025, letter; and shared the SHPO concurrence and ACHP response. The NRCS included an invitation to the Tribes to participate in the development of the MOA. Tribes will be contacted again by forthcoming telephone calls. To date, no responses have been received from any Tribes/THPOs. See documentation in Appendix A.

Agency and Consulting Parties Coordination

The USACE, EPA, Reclamation, USFWS, NPS, and UDWiR are serving as consulting parties for the Proposed Project.

Cooperating Agencies

The NRCS as the Lead Agency signed a Memorandum of Understanding (MOU) with the USACE, EPA and Reclamation as Cooperating Agencies in the development of the Plan-EIS on July 30, 2024 (Appendix A). As detailed in the MOU, pursuant to 50 CFR Part 402.07 and 36 CFR 800.2(a)(2), the NRCS will serve as the agency official who shall act on behalf of the USACE and Reclamation, fulfilling their collective responsibilities for compliance with Section 106 of the NHPA. Additionally, NRCS will conduct consultations with the Utah SHPO, as well as the Tribes on behalf of the USACE and Reclamation. The MOU also states that the NRCS is the lead federal agency for compliance with Section 106 of the NHPA, and pursuant to 36 CFR 800.2(a)(2), the USACE and Reclamation designated the NRCS to act on their behalf in any consultations conducted for compliance with NHPA (see Appendix A for letters). The NRCS will inform USACE and Reclamation of any consultations conducted for compliance with these laws.

The NRCS coordinated further with the USACE, Reclamation, and EPA in a letter on March 31, 2025 detailing NRCS's role as the lead federal agency for the purposes of Section 106 consultation under 36 CFR 800.2(a)(2), including for the delineation of the APE, identification of historic properties, and finding of effect; and requested review of the Tribal list for subsequent consultation and for any additions. The USACE, Reclamation, and the EPA did not submit any additional Tribes.

Other Consulting Parties

The NRCS coordinated with the NPS in March 2025 regarding the California National Historic Trail (NHT) corridor which bisects the Project Area. The California NHT in Box Elder County, Utah, is managed through a partnership between the NPS and the Bureau of Land Management (BLM), along with other federal, state, local, and private stakeholders, and the NPS administers the California NHT as part of the National Trails System, established under the National Trails System Act of 1968 (NPS 2025e). Although the California National Historic Trail is plotted as extending through the Project Area, no visible traces of it were found during the survey.

The NPS contributed to the Proposed Project analysis as a participating agency without status by providing subject matter expertise and guidance while acknowledging that they are neither the manager or owner of the resources, the lead agency, nor a regulatory agency (see correspondence in Appendix A).

The NRCS also coordinated with USFWS in April and May 2025 on proposed activities located on the USFWS Bear River Migratory Bird Refuge-administered property adjacent to the Bear River Club. USFWS participated in a site visit with NRCS, the Co-sponsor, and J-U-B on April 17, 2025. They reviewed the draft cultural resources report, and after the site visit determined to continue as a participating agency without cooperating agency status by providing subject matter expertise and guidance while acknowledging that they are not the lead agency (see correspondence in Appendix A). USFWS coordination also occurred separately for ESA species (see Section 3.3.6.2).

The NRCS also conferred with the UDWiR in May 2025 because of the activities on the Salt Creek WMA in the Project Area. The UDWiR determined they did not need to be a cooperating agency and reviewed the draft cultural resources report and agreed with the findings (see correspondence in Appendix A).

SHPO Consultation

Per the Section 106 process at 36 CFR 800.3 through 800.4, the NRCS initiated consultation with the Utah SHPO and consulted with the applicable Tribes, cooperating agencies (USACE, EPA, and Reclamation) and other consulting parties (NPS, USFWS, and UDWiR) on the delineation of the APE, site eligibility, and findings of Adverse Effects to Historic Properties, provided the cultural resources survey report, and informed the agencies and Tribes that NRCS would be the lead federal agency in letters dated May 16, 2025 and May 27, 2025.

SHPO concurrence was received on May 23, 2025. The SHPO concurred with the delineation of the APE and determinations of eligibility and effect for the undertaking. On June 5, 2025, NRCS corresponded with SHPO regarding the draft MOA to mitigate adverse effects to four historic ditches. SHPO responded that the draft mitigation measures were appropriate.

On May 27, 2025, the NRCS emailed a notification to ACHP of the adverse effects to four historic properties (historic ditches/canals) as a result of the Proposed Project. The ACHP responded in a letter dated June 10, 2025, declining participation in consultation to resolve adverse effects.

Area of Potential Effects

In accordance with 36 CFR 800.16(d), and Utah Code Section 9-8-404, the APE, is defined as "the geographic area where a project could directly or indirectly affect historic properties. Per 36 CFR 800.4, the NRCS, in consultation with the Utah SHPO, EPA, USACE, Reclamation, and

applicable Tribes, determined the APE to be 634.1 acres for direct and indirect effects (36 CFR 800.16(d)) as described in Section 1.4.3. The APE is depicted in the Cultural Resources Report (redacted) in Appendix E1 and is consistent with the proposed activities footprint in Figure 1-2.

As detailed in Section 1.4.3, no Visual APE has been established due to the absence of potential direct or indirect visual effects to cultural resources or to the visual setting from proposed project measures. The NRCS has determined no potential for direct or indirect visual effects to cultural resources would occur from the Proposed Project. The cultural resource inventory included an intensive pedestrian inventory. Proposed measures that could visually affect the characteristics of historic properties or make them eligible for inclusion in the NRHP were considered. In general, potential visual effects could arise from converting earthen and concrete-lined canals to pipes, where historic trees are present along the banks of the canals. However, the setting of the Proposed Project is agricultural in nature with sparse farmsteads, and a lack of mature trees along the canals whose health could decline due to loss of water seepage from the earthen canals. Temporary atmospheric (e.g., dust, emissions) and auditory (e.g., construction noise) effects were also considered. These effects would be temporary, minor, and not of a scale or duration likely to alter the character or use of any historic properties. Therefore, they were not included in the APE. The potential for other indirect effects (such as vibration, changes in land use, or access) was also reviewed. No such effects were identified that would extend the APE beyond the direct footprint of the project.

Cultural Resources Inventory Results

To identify historic properties within the APE, a literature review (Class I), followed by an intensive pedestrian inventory, was completed by Steven W. Carothers & Associates Environmental Consultants (SWCA). Survey methodology was developed through joint communication between SWCA, NPS, USFWS, J-U-B, and the NRCS. Of the APE, 386.8 acres were surveyed at a Class III (intensive) level, and 0.5 acres were surveyed at a Class II (reconnaissance) level. The reconnaissance survey was limited to unpaved road corridors.

In total, 246.8 acres (31.2 acres of DNR land and 215.6 acres of private land) of the APE was excluded and could not be surveyed at either an intensive or a reconnaissance level. Some areas could not be surveyed because they were on private property or in areas where access was prevented by locked gates. Other areas could not be surveyed because the ground surface had been obscured by dense vegetation, flooding, or modern development activities. For areas of the APE that only Class I surveys were conducted, the likelihood of encountering historic properties is extremely low, and per 36 CFR 800.4.b.1, NRCS and the consulting parties agreed that the level of effort (Class I, II, or III) meets "the reasonable and good faith effort to carry out appropriate identification efforts." If previously unidentified cultural resources are encountered during construction, the project would follow the procedures in the Prototype Programmatic Agreement.

Fieldwork was managed by SWCA Principal Suzanne Eskenazi, M.A., RPA, who meets the Secretary of the Interior's Professional Qualifications Standards in archaeology. The NRCS State Conservationist reviewed the Cultural Resource Report and initial findings.

In total, fourteen sites were recorded as a result of the archaeological resources survey: eight new cultural sites, six previously recorded sites, and eleven new isolated finds. All of the isolated finds lacked historical significance and are not eligible for the NRHP.

Of the cultural sites, eight were determined eligible for listing on the NRHP, including the Union Pacific Railroad, West Main Canal, East Canal/Corinne Canal, Hammond Main Canal, Willow Ditch, Bear River Club Dike, Unnamed Levee, and Old River Channel Canal. Although the California National Historic Trail is plotted as extending through the APE, no visible traces of it were found during survey. See Table 3-19 for a summary of the identified cultural sites. Details can be found in the Cultural Resource Report (*redacted*) located in Appendix E1.

Table 3-19. Identified Cultural Resources within the Area of Potential Effect

Smithsonian Number	Site Type/ Name	Eligibility Determination	Project Component
42BO822	Union Pacific Railroad	Eligible, A, contributing	BRCC Canyon
42BO1182	West Main Canal	Eligible, A, C, contributing	BRCC Canyon and Tremonton Pressure Irrigation
42BO1185	East Canal/ Corinne Canal (new segment)	Eligible, A, C, contributing	Bear River City, BRCC Red Flume, Central Canal Company, Highland Ditch, and Tremonton Pressure Irrigation
42BO1507	Hammond Main Canal	Eligible, A, C, contributing	BRCC Canyon
42BO1775	Bear River National Wildlife Refuge Headquarters	Not eligible	Bear River Duck Club
42BO2059	Highline Canal	Not eligible	Tremonton Pressure Irrigation
42BO2989	Highland Ditch (new)	Not eligible	Highland Ditch
42BO2990	Willow Ditch (new)	Eligible, A, contributing	Bear River City and Highland Ditch
42BO2991	Central Canal (new)	Not eligible	Central Canal Company
42BO2992	Transmission line (new)	Not eligible	Bear River City
42BO2993	Artifact scatter (new)	Not eligible	Bothwell Pocket
42BO2997	Bear River Club Dike (new)	Eligible, A, B, C	Bear River Club
42BO2998	Unnamed Levee (new)	Eligible, A, B, C	Bear River Club
42BO2999	Old River Channel Canal (new)	Eligible, A, B, C	Bear River Club

3.3.7.2 Scientific Resources

Resource Issue & Indicator: The indicators to describe effects to paleontological resources are the likelihood of discovery of paleontological resources based on the UDNR database.

The potential effect area for paleontological resources is consistent with the APE for cultural resources, as described in Section 3.3.7.1.

NRCS also considers the effects to additional scientifically valuable resources such as paleontological resources. The NRCS Title 190 National Cultural Resources Procedures Handbook Part 601, Subpart G, Section 601.70, describes paleontological resources as "plant and animal fossils that may be the original preserved organism, molds, and casts, and casts that have been completely replaced by minerals…and secondary fossils such as animal footprints and preserved burrows..."

Responsibility and procedures for handling these noncultural resources are defined in Title 210, National Engineering Manual (NEM), Part 531.4(5), which states, "Resources that may have historical, archeological, cultural, paleontological, or other scientific significance or value discovered during any type of investigation or construction must be immediately reported in accordance with NRCS policy" (210-NEM-531.4(5)).

Additionally, for federal lands, the Paleontological Resources Preservation Act of 2009 (PRPA) requires Department of the Interior agencies to manage paleontological resources using scientific principles and expertise (43 CFR 49). Based on the scientific procedures identified in the "Potential Fossil Yield Classification System" (PFYC) (BLM 2022), an initial assessment of paleontological resources for the Project Area was conducted.

The Utah Geological Survey (UGS), a division of the UDNR, was contacted regarding the potential for paleontological resources in the APE. According to the UGS, two paleontological localities have been recorded in the watershed area, neither of which are within the Project Area. The Paleontological localities were collected from Lake Bonneville lacustrine deposits that would not be exposed by the Proposed Project. Quaternary and recent alluvial and lacustrine deposits currently exposed within the Project Area have a "low potential for yielding significant fossil localities." The UDNR concurrence letter is located in Appendix A–Paleontological Concurrence.

3.3.7.3 Public Health and Safety

Resource Issue & Indicator: The indicators to describe effects to public health and safety are the improved infrastructure and the reduced risk of open canals.

The Project Area is in a mainly rural agricultural setting. No known health concerns occur in the project area. Safety concerns in the area are mainly related to the dangerous conditions of the aging infrastructure, mainly those canals located along the steep hillsides. Sections of the steep canyon slopes along the Hammond Canal are prone to landslides, which have disrupted normal water deliveries and affected agricultural production for extended periods (see TM-001 in Appendix E1 for details).

The BRCC has experienced at least 13 major canal failures over the past forty years due to landslides and hillside failures caused by a combination of steep, unstable slopes and continued erosion from storm events and water seepages. Canal failures cause major service disruptions to the watershed area. The landslides and hillside failures also pose an inherent risk to the public from injury and damage to structures or property both within the canyon and downstream. Additionally, the Highland Ditch irrigation system manages stormwater flows during high storms and frequently overtops, creating dangerous flood conditions.

Safety concerns are also associated with open canals. The existing open canal systems, such as those managed by the Highland Ditch Company and the Central Canal Company, pose a threat to

the community due to open running water. People, including children, often play in the open canals during warm weather and can be pulled into the culverts and drowned.

Additionally, open canals can overtop during high storm events and spring run-off, creating dangerous conditions for the public with canals overtopping from concentrated high runoff events, common in the area, because floodwater and irrigation water are conveyed within the same canal system.

Heavy storm events and spring melt events transport large amounts of water into the irrigation canals, bringing with it heavy sediment and debris, blocking and obstructing flow, and putting public and property at risk for flood damage. Overtopping occurs when floodwaters exceed the height of the canal and flow over its bank The most dangerous events happen quickly during periods of high water or when debris blocks diversion infrastructure, which causes near immediate flooding events. Unfortunately, in the case of overtopping the canal system, severe flooding can occur due to the increased water velocity. The FEMA FIRM maps indicate that several portions of the Project Area are within 100-year floodplains, situated close to both the Bear and Malad Rivers and various wetland areas (see FEMA FIRM flood inundation maps for the 100-year floodplain in Appendix C).

3.3.7.4 Hazardous Materials

Resource Issue & Indicator: The indicators to describe effects to existing hazardous material sites include overlap of disturbance with sites and measures to prevent disturbance or handle potential hazardous materials.

The Resource Conservation and Recovery Act (RCRA) is the primary statute established with the purpose of providing a structure for hazardous waste management. For a substance to be considered a hazardous waste, it must first be classified as a "solid waste" under RCRA. Any material that is abandoned, inherently waste-like, discarded military munition, or recycled in certain ways is considered a "solid waste" and is subject to RCRA. It is important to note that the definition of "solid waste" is not limited to wastes that are physically solid. Many "solid wastes" are liquid, semi-solid, or contain gaseous material. Hazardous waste is defined as any liquid, solid, gas, or sludge that poses a hazard to human health or the environment because of its quantity, concentration, or physical or chemical characteristics (EPA 2025c).

A review of the UDEQ Environmental Interactive Map was conducted to determine the presence of hazardous or solid waste disposal sites in the proximity of the Project Area. The UDEQ Environmental Interactive Map was mapped based on a 15-foot buffer around the project measures. In the review, one facility was identified within 15 feet of the proposed activities (see UDEQ Hazardous Materials Map in Appendix C for location details). This facility is classified as a Tier 2 facility. Tier 2 facilities have an aggregate aboveground oil storage capacity of 10,000 gallons or less and meet the oil discharge history criteria of the EPA. No petroleum storage tanks are located within 15 feet of the Project Area. Results of the database search are displayed in Map 4 in Appendix C.

3.3.7.5 Transportation and Infrastructure

Resource Issue & Indicator: The indicators to describe effects to transportation and infrastructure are miles of distribution system pipeline installed, and the qualitatively reduced occurrences of flooding.

Given the scope of the Proposed Project, multiple roads, business and residential structures, and irrigation features exist within the Project Area. Transportation resources and access to the Project Area include U.S. Interstates I-84 and I-15, U.S. Highway 89, State Highway 30, and numerous local roads. Interstate I-15 runs north-south through the Project Area and is the main transportation corridor for the majority of Utah's population centers. The I-84 splits off of I-15 just north of Tremonton and runs northwest-southeast through Idaho and up to Oregon. U.S. Highway 89 provides access to I-15 near the Bear River Migratory Bird Refuge and access to the Logan Valley from the Project Area. State Highway 30 provides access to I-15 and Logan City. Local roads in the area are typically developed on a grid system and provide local access and mobility for residents. Access and transportation to the Project Area are managed by various local, state, and federal agencies, including the Utah Department of Transportation (UDOT), Box Elder County Road Department, Box Elder County Sheriff, and multiple local cities and towns. Approximately 500 housing units exist within the Project Area.

Agricultural Water Management

The Project Area also consists of numerous irrigation services providers. BRCC is the primary supplier of irrigation water in the Bear River Watershed, providing the cities and towns of Tremonton, Elwood, Fielding, Riverside, Garland, Thatcher, Penrose, Deweyville, Honeyville, Collinston, Bear River, Corinne, and unincorporated Box Elder County with irrigation water through 124 miles of canals. BRCC also serves 65,500 acres of agricultural land. The existing irrigation infrastructure is deteriorating and requires continued labor and capital to perform maintenance and operations activities. Additionally, the West Main Canal and the Hammond Canal both convey water from the Cutler Reservoir through the Canyon following the Bear River. These canals are located on steep slopes that provide dangerous operating conditions. Past land slide failures have disrupted normal water deliveries.

Tremonton City currently offers its residents access to secondary water for outdoor use through a pressurized irrigation network that is being constructed in phases. This resource decreases demand on the City's culinary system and limited water supply. The pressure irrigation network receives water from a collection of pumping stations that pump water from the Bear River Canal system. These pumping stations are accompanied by equalization storage facilities to reduce the peak drawdown on the canals. As additional residential growth occurs, irrigated agricultural lands are being converted to residential areas and irrigation water shares are being transferred to the existing secondary water irrigation network. The existing system needs to be expanded to handle the increased demand and water supply.

Bear River City's existing canal system provides both residents and agricultural lands with irrigation water from the BRCC canal system. The canal system is aging and in poor condition, resulting in high maintenance costs, seepage losses, and high risk of failure.

Highland Ditch Company's existing irrigation system was installed in 1961 and provides irrigation water to approximately 3,000 acres of agricultural land using water from the BRCC system. The Highland Ditch also conveys flood waters during spring melt and large storm events, assisting in flood prevention. The canal system is aging and in poor condition, resulting in high maintenance costs and ineffective flood water conveyance due to debris build-up in the open channel.

Central Canal Company's existing irrigation system provides irrigation water to approximately 1,400 acres of agricultural land using water from the BRCC system. According to the canal

company, moss is of particular concern for the irrigation system. Due to the open channel design, moss grows in the channel, and a bi-monthly moss treatment is needed to maintain conveyance capacity. The canal system is aging and in poor condition, resulting in high maintenance costs to treat seasonal moss growth and ineffective irrigation water delivery due to water losses from leakage.

In total, the open project irrigation canal systems serviced by BRCC, Tremonton City, Bear River City, Highland Ditch Company, and Central Canal Company are estimated to service more than 65,500 acres of agricultural land. The systems deliver water to highly productive agricultural lands and residential water users. The current deteriorating irrigation canal systems lose water to seepage and evaporation annually, as well as service interruptions from past breaches, debris build-up, and maintenance and repair issues. When failures occur or water cannot be delivered in the spring, the result is a reduced crop yield (Appendix E1, Benefit-cost Analysis).

Watershed Management

The management of the Bear River Wetlands involves a network of canals that facilitate the controlled flow of water between the Bear River, the wetland areas, and the GSL. These wetlands rely on carefully regulated water levels to promote the growth of native vegetation and sustain biodiversity. This canal network is managed by multiple entities, including the Bear River Club, which manages approximately 14,000 acres of these wetlands, and the CDC, which manages approximately 4,000 acres of this wetland habitat. The canals are protected by levees that safeguard habitat for millions of migratory birds and other ecologically important species. However, these levees are aging and fail to allow efficient management of water, which can result in poor habitat conditions in the wetlands due to deficient water levels.

The UDWiR manages approximately 6,000 acres of wetland habitat within the established Salt Creek WMA using a series of canals and levees to control water flow and maintain wetland conditions. The canals and levees, which are crucial infrastructure for management and protection of the wetlands and inhabitants, are aging and failing. Additionally, sediment from upstream erosion processes along Salt Creek accumulates in the wetlands, decreasing their functionality and causing debris to build up.

3.3.7.6 Noise

Resource Issue & Indicator: The indicator to describe noise effects is the mitigation taken to avoid conflicts with residents within the Project Area.

Various factors influence the perception of noise, such as volume, frequency, atmospheric conditions, background noise, and the nature of the activity generating the noise. Background noise (ambient noise) is associated with road traffic and the use of agricultural equipment. Special consideration must be given to noise sensitive areas and noise sensitive receptors within and adjacent to the Proposed Project. In these quiet areas, noise effects are more substantial.

Tremonton City zoning ordinance noise regulations state that in residential areas continuous and intermittent noises, sounds of commerce and industry shall not exceed 85 decibels (dB) during the day and 55 dB at night. Noise associated with public disturbance including vehicles, machinery, motors, equipment, and music shall not exceed 65 dB during the day and 55 dB at night in residential and mixed-use zones (Tremonton City 2017). Box Elder County and Bear River City do not have a noise ordinance in place.

3.3.7.7 Visual Resources and Scenic Beauty

Resource Issue & Indicator: The indicator to describe effects to visual resources and scenic beauty is the ability of the landscape to retain the existing characteristics, with a low level of change in any of the basic landscape elements due to management activities.

The land surrounding the Project Area is mainly agricultural land with small pockets of residential and rural residential development. The surrounding landscape typically consists of lake terraces, lake plains, narrow valleys and floodplains, and alluvial fans. The Bear River flows through many of these land cover types in the vicinity of the Project Area. The project includes several water bodies, including the Cutler Reservoir, the Bear River, the Malad River, the Bear River Migratory Bird Refuge, the Salt Creek Wildfowl Management Area, and other riparian/wetland and waterfowl areas on the east side of the GSL.

The BLM manages public lands to ensure that the scenic value of those lands is considered. BLM's Visual Resource Management (VRM) system provides an inventory of scenic values and sets management objectives for those values. Once BLM land is inventoried, it is given a class designation from I (most protected) to IV (least protected). Only portions of the Proposed Project's components have BLM VRM classifications, including the BRCC Canyon Improvements, which are both VRI Class III and IV near Cutler towards the reservoir and a portion of the Tremonton Irrigation Storage component, the Salt Creek WMA Levee Improvements and Sediment Removal, the Bear River Club Levee Improvements, and the CDC Levee Improvements, which are all VRI Class III (BLM 2025a). The remainder of the Proposed Project components do not have VRM classifications. Class III indicates mid-low visual value and allows for a moderate characteristic change to the landscape, provided the basic elements in the predominant natural features are maintained (BLM 1986). Class IV indicates low visual value and allows management activities to dominate the view; however, attempts should be made to minimize effects (BLM 1986).

3.3.7.8 Recreation

Resource Issue & Indicator: The indicators to describe effects to recreation are the effects to recreational opportunities.

Recreational opportunities present adjacent to the Project Area include various camping and picnicking areas, city parks and splash pads, community pools, hiking, biking, horseback riding, and OHV trails, fishing, hunting, and wildlife watching opportunities throughout the Project Area and greater Box Elder County. Additionally, in the summer there are various farmer's markets and fruit stands throughout Box Elder County, known as Utah's Famous Fruit Way (Visit Box Elder 2025a).

Willard Bay State Park, located south of the Project Area in Willard, offers a variety of outdoor recreational opportunities. The Arthur Watkins Reservoir on the east side of the park, provides areas for boating, waterskiing, wind surfing, swimming, camping, and day use facilities (Visit Box Elder 2025b).

The Bear River Migratory Bird Refuge, located just south of the Project Area, contains more than 74,000 acres of habitat and provides many recreational opportunities, including an auto tour loop, birdwatching and wildlife watching for more than 210 bird species, photography, hiking, and cycling, 1.5 miles of walking and running trails, hunting, and fishing (USFWS 2025c).

The Bear River Club uses a 6,000-foot levee along the Bear River to maintain 14,000 acres of wetland habitat. The levee serves as a critical link between habitat on the Bear River Migratory Bird Refuge and adjacent lands. The Bear River Club is hidden gem for wildlife enthusiasts. This area offers a tranquil escape where visitors can immerse themselves in the natural beauty of the area and enjoy hiking, bird and wildlife watching.

The CDC's levee along the Bear River, crucial for controlling water levels within 4,000 acres of wetland habitat. The CDC uses the levee for controlling water levels within the Main Marsh and other managed wetland units, and the levee links habitat between the Bear River Migratory Bird Refuge and adjacent private wetlands. The CDC offers a unique and exclusive experience for hunting enthusiasts, with a focus on waterfowl hunting.

Salt Creek WMA, located within the Project Area, provides bird watching, hunting, hiking, and camping opportunities for the public on more than 6000 acres (UDWiR 2025a). The UDWiR relies on carefully regulated water levels to promote the growth of native vegetation and sustain biodiversity. The Salt Creek WMA offers not only a safe haven for wildlife but also an enriching experience for visitors seeking to connect with nature and witness the wonders of migratory bird populations. The wetland habitats are a vital sanctuary for migratory birds and other wildlife.

Additionally, the Golden Spike National Historical Park and the California National Historic Trail (NHT) offer walking tours and sightseeing opportunities within the county (NPS 2025a; NPS 2025b).

The Bear River, which originates in the Uinta Mountains and crosses through three states before terminating at the GSL, provides several recreational opportunities, including fishing, hiking, backpacking, and sightseeing. The Bear River feeds both the GSL and the adjacent Bear River Migratory Bird Refuge. The Bear River also supports twelve species of native fish, including the Bonneville cutthroat trout, northern leatherside chub, and bluehead sucker (Western 2025).

Camp Fife, a Boy Scouts of America day camp facility, is located in the Bear River Canyon. Camp Fife provides archery, biking, shooting, outdoor skills, nature exploration, and team-building programs for Cub Scouts and local religious youth groups (Scouting 2025).

3.3.8 Special Land Designations

Special land designations are areas designated at the Federal, state, and local level that are designed to protect and preserve certain land features and characteristics. These designations could include zoning regulations, protection areas, or State and National resource areas.

3.3.8.1 Land Use

Resource Issue & Indicator: The indicators to describe effects to land use are consistency with zoning and land use requirements, and consistency with the goals of the Box Elder County Resource Management Plan, any local city planning regulations, and the Utah State Resource Management Plan.

The Project Area is located in Box Elder County, Utah in portions of Tremonton City, the unincorporated Bear River City and Elwood Town.

Box Elder County

Box Elder County consists of 16 incorporated communities and incorporated county areas. A few of the incorporated communities, including Tremonton City and Elwood Town, have developed their own general plans and outlined their own zoning, as discussed below. Land use within unincorporated Box Elder County is regulated by the Box Elder County Resource Management Plan (RMP) (Box Elder 2017) and the Box Elder County General Plan, which was developed and accepted in 2021 (Box Elder County 2021). The Box Elder County RMP sets goals and objectives for the protection and use of natural resources as well as the development of land use plans for planning purposes (Box Elder County 2017). The Box Elder County General Plan provides growth and development policies and goals (Box Elder County 2021).

Within the Box Elder County RMP, goals outlined for the county include, but are not limited to: encouraging activities on public lands to have a positive effect on agricultural land; preserving, maintaining, and developing county water resources; promoting and supporting efforts to improve air quality for NAAQS monitored pollutants; implementing land use and development strategies to protect life and property from geologic hazards; preserving and strengthening the agricultural economy; supporting vegetation management within their historic range or variation; supporting water quality BMPs to improve water quality in the GSL; increasing riparian resilience; protecting and improving water quality and the watershed; maximizing water yields to support water for livestock, wildlife, and human uses; and conserving and enhancing wetlands.

Within the Box Elder County General Plan, the majority of unincorporated Box Elder County is classified as agricultural land protected by the Agricultural Heritage Area (AHA) designation, which is defined by large agricultural lots with typical zoning classifications of agricultural (A), rural residential (RR), and mixed use (MU), which are all designed to promote agricultural land uses (Box Elder County 2021). According to the Box Elder County Land Use Development & Management Code, lands designated as agricultural (A) have a minimum lot size of 20 acres, while lands designated as rural residential (RR) have a minimum lot size of between 0.45 acres and 20 acres, depending on the area (Box Elder County 2014). A portion of the BRCC Canyon Improvements is located within the unincorporated Fielding Area and does not have designated zoning classifications (Box Elder County 2021). However, Box Elder County generally employes a RR-20 zoning for this area, which is a rural residential zoning with lots of 20 acres of more to protect agricultural land uses. These zoning classifications within unincorporated portions of Box Elder County are designed to protect the agricultural land uses and rural character of the area.

Tremonton City

Land Use within Tremonton City is regulated by the Tremonton Integrated Land Use Plan (Tremonton City Council 2023). According to the Tremonton Land Use Maps (see Maps 7 and 8 in Appendix C), the Tremonton Pressure Irrigation Improvements components lie within the R1-10 and R1-20 Residential Districts, as well as the Rivers Edge Overlay Zone (a subdivision development area) and a mixed-use area (Jones and Associates Consulting Engineers 2024). Additionally, a portion of the Tremonton Pressure Irrigation Improvements component overlaps a designated agricultural protection area within the Rivers Edge Overlay Zone (Jones and Associates Consulting Engineers 2016). The Tremonton Irrigation Storage component lies within the R1-12—Residential District. All three identified residential districts are slated for future single-family residential of various densities (Tremonton 2023).

Tremonton City has also designated Water Source Protection Zones within and adjacent to the city boundaries. These zones are designated areas with restricted land uses that are designed to protect water sources, in compliance with the State of Utah's Drinking Water Source Protection Rules and Regulations. Restrictions on land use include prohibition of liquid hazardous substance facilities, septic tanks and septic drain fields, Class V underground injection wells, landfills or open dumps, and animal feed operations within the designated areas, as well as any prohibited uses in the State of Utah Drinking Water Source Protection Rules (Tremonton City 2025). The closest water source protection area is located approximately 0.28 miles north of the Tremonton Irrigation Storage component in northern Tremonton City (see Map 8 in Appendix C; Jones and Associates Consulting Engineers 2016).

Elwood City

Portions of the Highland Ditch Piping, the Central Canal Company piping, and the Bear River City Pressure Irrigation components are located within Elwood Town's city limits. According to the Elwood Town Zoning Map (Map 9 in Appendix C), the Highland Ditch and the Central Canal Company piping project components lie in both commercial and residential zones while the Bear River City Pressure Irrigation component lies within the R-1-20 residential district as well as an industrial/manufacturing zoning area (Jones and Associates Consulting Engineers 2023).

State of Utah

The Utah State Resource Management Plan (RMP) also provides guidance for natural resource management with the overall objective of enhancing the quality of life in Utah (Utah Public Lands 2024). Goals within the State RMP include, but are not limited to: supporting agricultural development and protecting agricultural production; safeguarding and improving air quality; providing safe and reliable water conveyance for beneficial uses (including supporting county plans for ditches, canals, and irrigation); protecting and conserving fish and aquatic wildlife habitats; supporting efforts to eradication of noxious weeds (including the use of BMPs to control noxious weeds); maintain healthy riparian and wetland habitats; and improving water quality and water quantity resources.

3.3.8.2 Natural Areas

Resource Issue & Indicator: The indicators to describe effects to natural areas are the acres of wetlands designated as natural areas that are improved by project activities.

Salt Creek WMA is a 6,200-acre designated area managed by the UDWiR to conserve critical habitat and allow for recreational opportunities (UDWiR 2025b). The WMA provides freshwater wetland and lakeside upland habitat for more than 50 bird species (UDWiR 2025c). Currently the UDWiR uses the existing system of levees and canals to control and maintain wetland conditions within the WMA. This system of levees and canals gets filled with sediment every year, requiring ongoing maintenance and decreases the UDWiR ability to properly manage the habitat. Additionally, the lower wetland areas fill with sediment every 3 to 5 years and require dredging. The dredging disrupts the wetland habitat, and the excess of sediment causes poor water quality and wildlife habitat conditions in the wetlands. Excess sedimentation can cause both water quality and wildlife/wetland habitat concerns, including reduced levels of dissolved oxygen for aquatic life, increased water temperature via reduced water flow, and an increased potential for harmful bacterial and algae blooms. Additionally, sediment can transport nutrients

and pathogens (such as *E. coli*) into the water system, which can degrade water quality and reduce its potential beneficial uses for wildlife and recreation.

The Bear River Migratory Bird Refuge, managed by the USFWS, is part of the National Wildlife Refuge system, and large acres of land are designated for the conservation and restoration of fish, wildlife, and plant habitats. The refuge contains more than 80,000 acres of habitat for more than 250 bird species and hosts multiple colonies of more than 10,000 individual birds (USFWS 2025c).

At the north end of the Bear River Migratory Bird Refuge lies the Bear River Club and its 14,000 acres of managed wetlands. The Bear River Club levee is used to maintain the wetland habitat and direct water from the Bear River into either the club wetlands or allows it to flow into Bear River Migratory Bird Refuge.

The CDC manages approximately 4,000 acres of wetland habitat along the Bear River upstream of both the Bear River Club and the Bear River Migratory Bird Refuge. Like the Bear River Club levee, the CDC levee is used to maintain its wetland habitat and direct water from the Bear River into either the clubs' wetlands or allows it to flow downstream into the Bear River Migratory Bird Refuge. In total, the Bear River Club, CDC, and Bear River Migratory Bird Refuge wetlands provide critical habitat to link the Bear River Migratory Bird Refuge with adjacent lands and provide in excess of a combined 24,000 acres of critical wetland habitat for waterfowl, shorebirds, and other waterbird species.

3.3.8.3 Ecologically Critical Areas

Resource Issue & Indicator: The indicators to describe effects to ecologically critical areas are the efforts to address the failing infrastructure to reduce seepage and evaporation, and the acres of wetlands preserved.

The GSL is considered an ecologically critical area, as it is an essential habitat for many different species and considered a continental priority area for migratory birds. The wetlands of the GSL extend into the Project Area. These wetlands are an important part of the ecosystem and provide essential nesting habitat, and the lake is a major stopover point for birds on migration (Great Salt Lake Collaborative 2023). However, because of drought and a decreasing water supply, the evaporation of the GSL has exposed 800 square miles, which heavily affects the overall ecosystem. Now birds face more competition for food and are forced into smaller wetlands, and toxic dust is being released from the arsenic and other metals contained in the lake (University of Utah 2025). The Bear River is the largest tributary to the GSL, and its contributions are essential in maintaining the lake's water levels. Deteriorating levees along the Bear River and at the Salt Creek WMA and associated bank erosion threatens failure of the levees and loss of water management, agricultural water, and thousands of acres of high-quality wetland habitat.

3.3.8.4 Parklands, National Parks, Monuments, and Historic Sites

Resource Issue & Indicator: The indicators to describe effects to parklands, national parks, monuments, and historic sites are the effects to the historic setting, recreation, scenery, natural resources, and significant events that contributed to the designation of the California NHT.

No National or State Parks are located within or adjacent to the Project Area (NPS 2025a; UDNR 2025). The closest National Historic Park is the Golden Spike National Historical Park,

located in Promontory, UT, approximately 20 miles west of the Project Area. The closest State Park is Willard Bay, approximately 19.8 miles south of the Project Area.

No National Monuments or Historical Sites are located within or adjacent to the Project Area (NPS 2025a). However, the California National Historic Trail (NHT) is located in northern Utah and generally follows Interstate 15/84 through Brigham City, Tremonton, and up into Idaho (NPS 2025b). The California NHT is a 2,000 mile plus travel path that commemorates the routes made by emigrants from the eastern U.S. to the California area in the 1840s and 1850s (NPS 2025e). The NPS administers the California NHT in this area. The Salt Lake Cut-off of the California NHT is one of many shortcuts that branch off the California NHT. It was identified in 1848 when a group of travelers between Salt Lake City and California were travelling in the area, widening it into a passable wagon road with grass and water available on the route (BLM 2025b). The Cut-off runs from Salt Lake City north for about 180 miles before joining the California Trail in southern Idaho, which allowed travelers to detour to Salt Lake City to restock supplies and livestock on the route to California and Oregon (BLM 2025c). The Salt Lake Cut-off of the California NHT intersects the proposed activities in multiple locations; however, no evidence of the trail exists on the ground and no official visitation sites occur within the Project Area.

3.4 Forecast Future Conditions

The No Action condition is the most likely future condition or set of conditions if no effort is made to resolve existing Project Area problems and maximize opportunities or address project objectives and eliminate constraints. It includes any changes expected to result directly, indirectly, or cumulatively from all reasonably foreseeable circumstances without alternative actions.

Chapter 4 Alternatives

This section describes the rationale of the Draft Plan–EIS formulation for the development and comparison of alternatives and describes the alternatives including those eliminated from detailed study.

4.1 Formulation Process

Early in the Proposed Project development, comments were requested and received from the public, and Tribes, as well as from local, state, and federal agencies. Information from the scoping process was used to define watershed problems, opportunities, project objectives, constraints, and resource concerns to consider in the alternative development process. The public scoping process is described in detail in Section 1.5.5 and additional information on the scoping process is included in the Scoping Report in Appendix A.

The Sponsor and Co-sponsors representatives, the NRCS, agency and public stakeholders, and environmental and engineering professionals—the project team—followed an iterative process of plan formulation that included the following phases:

- Identification and evaluation of initial management measures, described in Section 4.1.2 .
- Combination of management measures into initial alternatives, described in Section 4.1.2.
- Screening of initial alternatives, described in Section 4.3.
- Identification of final alternative plans, described in Section 4.4.

The project team developed the Proposed Project alternatives with input from stakeholders during the scoping phase. Addressing the problems in the watershed by meeting the project objectives while avoiding constraints was the primary consideration during the process, while adhering to NRCS procedures in the National Planning Procedures Handbook (NRCS 2021), the NWPM (NRCS 2015) Parts 500 through 505, the NWPH (NRCS 2014), and additional NRCS watershed planning policy, relying primarily on the NRCS PR&G as described in USDA DM 9500-13 (USDA 2017a).

4.1.1 Guiding Principles

The Federal Objective, as listed in USDA DR-9500-13 and described in Section 2.1.1, was used as a guide but not as a screen tool for the planning process. The Guiding Principles, as described in Section 3.1.1, guided the identification, formulation, and evaluation of measures. Additionally, Plan criteria, which include the following four criteria of completeness, effectiveness, efficiency, and acceptability, were used during the plan formulation but not screening criteria.

Risk and uncertainty are inherent in water resources planning and were considered both in the formulation and evaluation of alternatives. Risk refers to those outcomes which can be described using reasonably well-known probability distributions, such as the chance of extreme or adverse flood events. Uncertainty refers to potential outcomes that cannot be described in objectively known probability distributions, such as changes in land use that do not follow historical rates of change. Risk and uncertainty naturally arise from the underlying variability of complex natural, social, and economic situations.

While the future is indeterminate, an approach of adaptive management allows NRCS, the Sponsors, Co-sponsors, and stakeholders to respond to unforeseen events in as timely and effective a manner as practicable. Adaptive management is an integral component of the action alternatives and is reflected in part in the Watershed Plan Agreement.

An Ecosystem Services Framework was used in the formulation of alternatives for the Proposed Project. Section 3.2, the Investigation and Analyses Report (Appendix D), and the Benefit-cost Analysis (Appendix E1) describe the ecosystem services framework in greater detail.

4.1.2 Alternative Formulation Criteria

Project management measures were identified and evaluated for agricultural water management and watershed protection. Each project measure was screened for its ability to meet the purpose and need of the project. Table 4-1 below displays if each project measure was excluded from incorporation into a proposed alternative and the reasoning behind its exclusion. Many of these project measures were screened by Sponsors, Co-sponsors, and potential Co-sponsors. The remaining project measures were formulated into four proposed action alternatives which are described in Section 4.2.2. See additional details in the Technical Memorandums in Appendix E1.

Table 4-1. Initial Approaches and Management Measures

Initial Approaches and Management Measures	Initial Qualitative Evaluation	Carried Forward
Agricultural Water Management		
BRCC Irrigation System Delivery Improvements—Bear River Canal Company		
BRCC Irrigation System Delivery Improvements—Bear River Canyon Improvements Siphons Installation—construct a siphon through Camp Fife, construct box culvert through three key sections of the Main Canal, construct another siphon at the Main Canal pump station, and construct box culvert on the Hammond Canal.	This measure addresses the purpose and need of rural and agricultural water supply, irrigation, water conservation, and water quality improvement by addressing canal deficiencies and increasing efficiency, though siphon installation costs are high. This increment potentially provides combined beneficial effects outweighing combined adverse effects.	Yes
BRCC Irrigation System Delivery Improvements—Bear River Canyon Improvements Hammond Canal Improvements—construct box culvert through the Camp Fife area and along one other key location on the Main Canal; based on geotechnical study, construct box culvert along the Hammond Canal at five key locations ending after the canal bend out of the canyon.	This measure addresses the purpose and need of rural and agricultural water supply, irrigation, water conservation, and water quality improvement including an appropriate length of box culvert installation that addresses canal deficiencies and increases efficiency, and the construction cost is within Sponsors' capability to provide matching funds. This increment potentially provides combined beneficial effects outweighing combined adverse effects.	Yes
BRCC Irrigation System Delivery Improvements—Bear River Canyon Improvements Double Siphon and Canal Enclosure (Option 1)—install a siphon on the PacifiCorp property near the Bear River Bridge, install box culvert along the entire Main Canal, and install another siphon further downstream at the Main Canal pump station.	This measure was not carried forward because PacifiCorp evaluated and requested that BRCC not pursue this measure. In addition, the measure would exceed local match capacity. This increment would not provide combined beneficial effects outweighing combined adverse effects.	No
BRCC Irrigation System Delivery Improvements—Bear River Canyon Improvements Single Siphon and Canal Enclosure (Option 2)—install box culvert along the West Main Canal from Cutler Dam to the Main Canal Pump Station and install a siphon over to the Hammond Canal.	This measure was not carried forward because PacifiCorp evaluated and requested that BRCC not pursue this measure. In addition, the measure would exceed local match capacity. This increment would not provide combined beneficial effects outweighing combined adverse effects.	No
BRCC Irrigation System Delivery Improvements—Bear River Canyon Improvements Box Culvert Installation (Option 3)—construct a box culvert along the West Main Canal from Cutler Dam to the West Main Pump Station and install a box culvert along the Hammond Canal from Cutler Dam to a location that is across the canyon from the Main Canal Pump Station.	This measure was not carried forward because PacifiCorp evaluated and requested that BRCC not pursue this measure. In addition, the measure would exceed local match capacity. This increment would not provide combined beneficial effects outweighing combined adverse effects.	No
BRCC Irrigation System Delivery Improvements—Bear River Canyon Improvements Box Culvert Installation (Option 4)—install box culvert along the West Main Canal and along the Hammond Canal starting near the location of the bridge that crosses the Bear River to the West Main Pump Station on both sides of canyon.	This measure was not carried forward because PacifiCorp evaluated and requested that BRCC not pursue this measure. In addition, the measure would exceed local match capacity. This increment would not provide combined beneficial effects outweighing combined adverse effects	No

Initial Approaches and Management Measures	Initial Qualitative Evaluation	Carried Forward
BRCC Irrigation System Delivery Improvements—Bear River Canyon Improvements Single Siphon and Canal Enclosure (Revised Option 2 [reduced box culvert installation])—install box culvert along the West Main Canal from Cutler Dam to the downstream side of Camp Fife, construct two short section of box culvert on the Main Canal in key areas, and install a siphon over to the Hammond Canal from the Main Canal Pump Station.	This measure was not carried forward because PacifiCorp evaluated and requested that BRCC not pursue this measure. In addition, the measure would exceed local match capacity. This increment would not provide combined beneficial effects outweighing combined adverse effects	No
BRCC Irrigation System Delivery Improvements—Bear River Canyon Improvements In-stream Water and Pumping	This measure was not carried forward because the excessive cost of pumping could not be supported by the Sponsor and PacifiCorp evaluated and requested that BRCC not pursue this measure. This increment would not provide combined beneficial effects outweighing combined adverse effects	No
BRCC Irrigation System Delivery Improvements—Red Flume—replace Red Flume with new flume. Replace existing flume in place.	This measure was not carried forward because an exposed structure would require ongoing maintenance and would not address the seismic concerns. This increment would not provide combined beneficial effects outweighing combined adverse effects	No
BRCC Irrigation System Delivery Improvements—Red Siphon—replace Red Flume with siphon. Replace existing flume with inverted siphon under the Malad River.	This measure addresses the purpose and need of rural and agricultural water supply, irrigation, water conservation, and water quality improvement by addressing the current conditions of the Red Flume and was carried forward because it would address O&M concerns as well as the seismic concerns. This increment potentially provides combined beneficial effects outweighing combined adverse effects.	Yes
BRCC Irrigation System Delivery Improvements—Canal Lateral Piping—pipe the ends of BRCC canals	This measure was not carried forward because BRCC master planning places higher priority on addressing canyon canal improvements. This increment would not provide combined beneficial effects outweighing combined adverse effects	No
BRCC Irrigation System Delivery Improvements—Headgate Automation—automate all existing turnouts with automated headgates (530 headgates)	This measure was not carried forward because BRCC master planning places higher priority on addressing canyon canal improvements. This increment would not provide combined beneficial effects outweighing combined adverse effects	No
BRCC Irrigation System Delivery Improvements—Bear River City		
BRCC Irrigation System Delivery Improvements—Bear River City (with Willow Irrigation and Pump Irrigation) Pressure Transmission Installation—construct a booster station and equalization storage facility at the diversion from the Central Canal and construct a pressure network for the city users	This measure was not carried forward because it requires purchase of land for the booster station and pond and would not accommodate current agricultural users outside of the Bear River City. This increment would not provide combined beneficial effects outweighing combined adverse effects	No

Initial Approaches and Management Measures	Initial Qualitative Evaluation	Carried Forward
BRCC Irrigation System Delivery Improvements—Bear River City Pressure Irrigation—improve 24 cfs ditch to town, pressurize Bear River City, and build one equalization storage pond with Willow Irrigation and Pump Irrigation	This measure would address the purpose and need of rural and agricultural water supply, irrigation, water conservation, and water quality improvement by addressing the problem of limited water supply and storage. This measure was carried forward because it accommodates current agricultural users and their current processes and uses. Additionally, the Co-sponsor owned the property for the pump station and equalization storage facility. This increment potentially provides combined beneficial effects outweighing combined adverse effects.	Yes
BRCC Irrigation System Delivery Improvements—Highland Ditch Company		
BRCC Irrigation System Delivery Improvements—Highland Ditch Piping—construct a new pipe distribution main line system for irrigation water and flood control.	This measure would address the purpose and need of rural and agricultural water supply, irrigation, water conservation, and water quality improvement by addressing the water delivery and infrastructure problems. This measure was carried forward because a new gravity pipe best serves the current users. In the future pressure systems can be fed from the new pipe. This increment potentially provides combined beneficial effects outweighing combined adverse effects.	Yes
BRCC Irrigation System Delivery Improvements—Highland Ditch Pressurization—construct a pressure irrigation system to serve the users	This measure was not carried forward because a pressure system does not accommodate current users. This increment would not provide combined beneficial effects outweighing combined adverse effects	No
BRCC Irrigation System Delivery Improvements—Central Canal Company		
BRCC Irrigation System Delivery Improvements—Central Canal Company Piping—pipe the Central Canal Company main ditch from JMC Heavy Truck Service in Elwood, crossing I-15, to the Bear River west of the sharp bend at N5800W	This measure would address the purpose and need of rural and agricultural water supply, irrigation, water conservation, and water quality improvement by addressing the water delivery and infrastructure problems. This measure was carried forward. A new gravity pipe best serves the current users. In the future pressure systems can be fed from the new pipe. This increment potentially provides combined beneficial effects outweighing combined adverse effects.	Yes
BRCC Irrigation System Delivery Improvements—Central Canal Company Pressurization—construct an equalization storage facility and pump station at diversion and construct a pressurized irrigation pipe system.	This measure was not carried forward because a pressure system does not accommodate current users. This increment would not provide combined beneficial effects outweighing combined adverse effects	No

Initial Approaches and Management Measures	Initial Qualitative Evaluation	Carried Forward
Tremonton City		
Tremonton Pressure Irrigation Improvement (Project 6)—construct distribution system for Irrigation Service Areas 9 and 10, expanding pressurized secondary water system.	This measure would address the purpose and need of rural and agricultural water supply, irrigation, water conservation, and water quality improvement by addressing the problem of limited water supply and storage. This measure was carried forward because Tremonton City has existing master planning that identified this as a priority project. This increment potentially provides combined beneficial effects outweighing combined adverse effects.	Yes
Tremonton Irrigation Storage (Project 8)—construct two new equalization storage ponds.	This measure would address the purpose and need of rural and agricultural water supply, irrigation, water conservation, and water quality improvement by addressing the problem of limited water supply and storage. This measure was carried forward because Tremonton City has existing master planning that identified these as a priority project. This increment potentially provides combined beneficial effects outweighing combined adverse effects.	Yes
Elwood City		
Elwood City—Secondary Water Phase 1. Construct main trunklines and booster station for a pressure irrigation system.	Although this measure was introduced in the NOI, it was not carried forward because Elwood City would complete this project before the Watershed Plan-EIS completion.	No
Elwood City—Secondary Water Phase 2. Construct additional pressure irrigation mains to serve additional homes with secondary water.	Although this measure was introduced in the NOI, it was not carried forward because Elwood City would complete this project before the Watershed Plan-EIS completion.	No
Garland City		
Garland City—Secondary Water Systems Construction—Build pressure irrigation system in the city	Although this measure was introduced in the NOI, it was not carried forward because there was no local match to complete this action. Garland City currently has no water shares.	No
Forty E Ditch Company Ditch Piping—Install 36" pipe in existing ditch.	This measure was not carried forward because there was no Co-sponsor.	No

Initial Approaches and Management Measures	Initial Qualitative Evaluation	Carried Forward
Watershed Protection		
Bear River Club Company		
Bear River Club Bear River Levee Improvements (with Soil Lifts)—Improve levee to protect wetland habitat and improve access for operation and maintenance using coconut mats and vegetation	This measure would address the purpose and need to reduce offsite floodwater, erosion, sediment, and agriculture-related pollutants. This measure was carried forward as a green infrastructure action. As part of the soil lifts, the bank would be built with coconut mat bundles to hold the sediment in place and provide some structural integrity. The coconut mats would also provide protection for new native vegetation to grow. This vegetation would replace the mats as the source of structural integrity once the coconut fibers have degraded. This increment potentially provides combined beneficial effects outweighing combined adverse effects.	Yes
Bear River Club Bear River Levee Improvements (with Riprap)—Improve levee to protect wetland habitat and improve access for operation and maintenance using rock riprap	This measure would address the purpose and need to reduce offsite floodwater, erosion, sediment, and agriculture-related pollutants. This measure was carried forward as a structural action. Though riprap is expensive, it would stand up to ice flows. This increment potentially provides combined beneficial effects outweighing combined adverse effects.	Yes
Bear River Club Bear River Dock Replacement—Replace boat dock to allow improved movement of personal and maintenance equipment by boat across the river to manage invasive species and wildlife habitat.	Although this measure was introduced in the NOI, this measure was not carried forward because it would be completed with other funds.	No
Chesapeake Duck Club (CDC)		
CDC Bear River Levee Improvements (with Soil Lifts)—Stabilizing the north riverbank to protect against erosion using coconut mats and vegetation.	This measure would address the purpose and need to reduce offsite floodwater, erosion, sediment, and agriculture-related pollutants. This measure was carried forward as a green infrastructure option. As part of the soil lifts, the bank would be built with coconut mat bundles to hold the sediment in place and provide some structural integrity. The coconut mats would also provide protection for new native vegetation to grow. This vegetation would replace the mats as the source of structural integrity once the coconut fibers have degraded. This increment potentially provides combined beneficial effects outweighing combined adverse effects.	Yes
CDC Bear River Levee Improvements (with Riprap)—Stabilizing the north riverbank to protect against erosion using rock riprap.	This measure would address the purpose and need to reduce offsite floodwater, erosion, sediment, and agriculture-related pollutants. This measure was carried forward. Though riprap is expensive, it would stand up to ice flows. This increment potentially provides combined beneficial effects outweighing combined adverse effects.	Yes

Initial Approaches and Management Measures	Initial Qualitative Evaluation	Carried Forward
CDC Lower Bear Ditch Piping—Conversion of 1,900 feet of ditch to 18" pipe to increase irrigation efficiency and deliver water from Bear River Canal directly to the West Side of CDC.	This measure has been completed by CDC, without NRCS assistance.	No
CDC Chesapeake Pea Patch Ditch—Conversion of 1,900 feet of ditch to 18" pipe to increase irrigation efficiency and deliver water from the Bear River Canal directly to the West Side of the CDC.	This measure has been completed by CDC, without NRCS assistance	No
CDC Chesapeake Rye Patch Ditch—Conversion of 4,000 feet of ditch to 24" pipe that would increase irrigation efficiency and reduce the amount of water needed to pump out of the Main Marsh unit of the CDC, enhancing wetland hydrology and drought resilience.	This measure has been completed by CDC, with NRCS assistance.	No
Salt Creek Waterfowl Management Area (WMA)		
Salt Creek WMA Levee Improvements (with Soil Lifts)—build levees and structures to divert water and prevent flooding using coconut mats and vegetation	This measure would address the purpose and need to reduce offsite floodwater, erosion, sediment, and agriculture-related pollutants. This measure was carried forward as a green infrastructure option. The bank would be built with coconut mat bundles to hold the sediment in place and provide some structural integrity. As part of the soil lifts, the coconut mats would also provide protection for new native vegetation to grow. This vegetation would replace the mats as the source of structural integrity once the coconut fibers have degraded. This increment potentially provides combined beneficial effects outweighing combined adverse effects.	Yes
Salt Creek WMA Levee Improvements (with Riprap)—build levees and structures to divert water and prevent flooding using rock riprap	This measure would address the purpose and need to reduce offsite floodwater, erosion, sediment, and agriculture-related pollutants. This measure was carried forward. Though riprap is expensive, it would stand up to ice flows. This increment potentially provides combined beneficial effects outweighing combined adverse effects.	Yes
Salt Creek WMA Salt Creek Settlement Basin—Construct sediment basin to eliminate the future need to dredge the Salt Creek channel in the WMA.	This measure would address the purpose and need to reduce offsite floodwater, erosion, sediment, and agriculture-related pollutants. This measure was carried forward because it would reduce the need and cost of future dredging. This increment potentially provides combined beneficial effects outweighing combined adverse effects.	Yes
Salt Creek WMA Salt Creek Sediment Removal—Construct mechanical sediment removal facility to eliminate the future need to dredge the Salt Creek channel in the WMA.	This measure was not carried forward because it would require power at an excessive cost. This increment would not provide combined beneficial effects outweighing combined adverse effects	No

Initial Approaches and Management Measures	Initial Qualitative Evaluation	Carried Forward
Other Measures		
Tremonton City		
Tremonton (Project 7)—Canal Rail Trail—Construct a recreational trail adjacent to part of the railroad corridor and through part of the canal alignment.	This measure is not related to other watershed actions. This is a long trail that is not connected to any other actions that meet the funding requirements.	No
Nonstructural Measures		
This approach includes measures that act upon people and property, rather than the infrastructure to improve agricultural water management. This nonstructural measure includes water metering.	This measure addresses the purpose and need of rural and agricultural water supply, irrigation, water conservation, and water quality improvement. Water metering can change behavior by making farmers more aware of their irrigation water usage and the associated costs. This awareness can lead to behavioral changes such as fixing leaks in irrigation systems, using water-efficient irrigation methods, and reducing unnecessary water use. For example, a farmer may realize they are using too much water for crop irrigation and adjust their system to reduce consumption, thereby conserving water. Water metering was incorporated into the Tremonton Pressure Irrigation Improvement, the Bear River City Pressure Irrigation, the Highland Ditch Piping, and the Central Canal Company Piping measures. This increment potentially provides combined beneficial effects outweighing combined adverse effects.	Yes
Other nonstructural measures include enacting ordinances to slow development or pay for future infrastructure; enacting maintenance and operation programs to increase efficiency; purchasing umbrella insurance to cover crop loss, creating and implementing ordinances to promote xeriscaping or reduce outdoor watering in developed areas; purchasing more water shares, developing building codes, developing land-use planning laws and their enforcement, conducting research and assessment, and providing information resources and public awareness programs to change the way that people interact with the Sponsor or Co-sponsors and irrigation water.	These nonstructural measures were outside scope of this project but were discussed with Sponsor or Co-sponsors and involved entities, and they are incorporating them into their policies. For example, to address future development in the Bothwell Pocket area, involved entities are discussing building codes to help pay for future flood infrastructure. This increment would not provide combined beneficial effects outweighing combined adverse effects	No

Initial Approaches and Management Measures	Initial Qualitative Evaluation	Carried Forward
Green Infrastructure		
Green infrastructure is an approach to water management that protects, restores, or mimics the natural water cycle (American Rivers 2024). Green infrastructure incorporates both the natural environment and engineered systems to provide clean water, conserve ecosystem values and functions, and provide a wide array of benefits to people and wildlife. Green infrastructure increases adaptive capacity in communities experiencing flooding, heat waves, and water quality challenges. Green infrastructure can be used in integrated planning to improve water quality, support stormwater management, and help comply with CWA requirements (see EPA 2022).	This measure would address the purpose and need to reduce offsite floodwater, erosion, sediment, and agriculture-related pollutants. Upon initial evaluation, the most promising application of green infrastructure in the watershed was installing soil lifts at the three levee locations, and this measure was carried forward in the Bear River Club Bear River Levee Improvements (with Soil Lifts), the CDC Bear River Levee Improvements (with Soil Lifts), and the Salt Creek WMA Levee Improvements (with Soil Lifts) measures. This increment potentially provides combined beneficial effects outweighing combined adverse effects.	Yes

The measures that the project team carried forward were then compared pairwise to determine which were mutually exclusive or unnecessarily redundant and which could be combined into alternatives and potentially provide combined beneficial effects outweighing combined adverse effects (see Appendix D for analysis). The project team again evaluated the combinations qualitatively to inform the formulation of the initial array of alternative plans detailed in the next section. Table 4-2 illustrates this pairwise compatibility for the management measures and how they were carried forward into alternatives' development.

Table 4-2. Measures Included in Each Alternative

Management Measures	Alternative 1 Siphons Installation	Alternative 2 Hammond and West Main Canals Improvements	Alternative 3 Siphons Installation with Soil Lifts	Alternative 4 Hammond and West Main Canals Improvements with Soil Lifts
Agricultural Water Management				
BRCC Irrigation System Delivery Improvements—Bear River Canal Company				
BRCC Irrigation System Delivery Improvements—Siphons Installation	Yes	No	Yes	No
BRCC Irrigation System Delivery Improvements—Hammond Canal Improvements with Riprap	No	Yes	No	Yes
BRCC Irrigation System Delivery Improvements—Red Siphon	Yes	Yes	Yes	Yes
BRCC Irrigation System Delivery Improvements—Bear River City				
BRCC Irrigation System Delivery Improvements—Bear River City Pressure Irrigation and Irrigation Storage	Yes	Yes	Yes	Yes

Management Measures	Alternative 1 Siphons Installation	Alternative 2 Hammond and West Main Canals Improvements	Alternative 3 Siphons Installation with Soil Lifts	Alternative 4 Hammond and West Main Canals Improvements with Soil Lifts
BRCC Irrigation System Delivery Improvements—Highland Ditch Company				
BRCC Irrigation System Delivery Improvements—Highland Ditch Piping	Yes	Yes	Yes	Yes
BRCC Irrigation System Delivery Improvements—Central Canal Company				
BRCC Irrigation System Delivery Improvements—Central Canal Company Piping	Yes	Yes	Yes	Yes
Tremonton City				
Tremonton Pressure Irrigation Improvement (Project 6)	Yes	Yes	Yes	Yes
Tremonton Irrigation Storage (Project 8)	Yes	Yes	Yes	Yes
Watershed Protection				
Bear River Club Company				
Bear River Club Bear River Levee Improvements with Soil Lifts	No	No	Yes	Yes
Bear River Club Bear River Levee Improvements with Riprap	Yes	Yes	No	No
Chesapeake Duck Club				
CDC Bear River Levee Improvements with Soil Lifts	No	No	Yes	Yes
CDC Bear River Levee Improvements with Riprap	Yes	Yes	No	No
Salt Creek Waterfowl Management Area (WMA)				
Salt Creek WMA Levee Improvements with Soil Lifts	No	No	Yes	Yes
Salt Creek WMA Levee Improvements with Riprap	Yes	Yes	No	No
Salt Creek WMA Salt Creek Settlement Basin	Yes	Yes	Yes	Yes
Other Measures				
Nonstructural Measures				
Water metering	Yes	Yes	Yes	Yes
Green Infrastructure				
Soil lifts	No	No	Yes	Yes

4.1.3 Risk and Uncertainty

The benefit-cost analysis required by NEPA involves both risk and uncertainty. The environmental evaluation required the use of the best available science, technology, and information to make well-informed assumptions and predictions. However, existing conditions may change, the public's opinion of a project could evolve, or unexpected circumstances with construction, funding, or design may arise. Each of these differences could alter predictions of environmental consequences.

The quantitative analysis of the action alternatives on ecosystem flows and values is a "conservative" estimate of the benefits from the action alternatives for several reasons. Some benefits (i.e., overall infrastructure reliability, water right reliability, etc.) are not feasible to estimate a quantitative benefit.

The types of activities associated with the action alternatives—siphon installation, pressurized irrigation installation and infrastructure removal and construction—are common and standard procedures and not considered highly uncertain or involving unique or unknown risks and would not set a precedent for future actions, nor are any of the activities in the action alternatives representing a decision in principle about a future consideration. The action alternatives detail the specific activities involved with the decision (Section 4.4.4).

4.2 Alternatives Considered

NWPH 601.37B requires alternatives for watershed plans to consist of either land treatment, nonstructural or structural measures, or combinations thereof that will help accomplish one or more of the authorized project purposes. Additionally, as outlined in DM 9500-013, PR&G requires the evaluation of specific alternatives in the initial alternative identification and evaluation, including a nonstructural alternative, an environmentally preferred alternative, and a locally preferred alternative. This section identifies:

- the required No Action Alternative;
- the initial array of alternatives that the team developed from the management measures detailed above; and
- common alternatives noted in DM 9500-013.

4.2.1 No Action Alternative

The No Action Alternative, also referred to as the FWOFI or the Future Without Project (FWOP), are different names for the same alternative under NEPA, PR&G, and other guidance documents. The No Action Alternative (FWOFI) forecasts future conditions with current OM&R but without any new proposed activities. It serves as a baseline for evaluating and comparing the effects of action alternatives. In this Watershed Plan, the No Action Alternative (FWOFI) outlines the most likely future scenario if no federal investment is made in the watershed. This alternative provides a baseline for comparison and has been included in the final array of alternatives, though it is not evaluated among the initial alternatives.

4.2.2 Initial Array of Action Alternatives

Four action alternatives were formulated that addressed the purpose and need for the project, the project objectives, and the Federal Objective as listed in USDA DR-9500-13 (USDA 2017b).

Additionally, alternatives were formulated with consideration to four criteria: 1) completeness, 2) effectiveness, 3) efficiency, and 4) acceptability. Individual and combinations of project measures were selected with regard to achieving the purpose and need, balancing engineering complexity and feasibility, minimizing economic and environmental effects, and adhering to budgetary constraints. The following initial array of alternatives was formulated using the combination of management measures, as identified above.

4.2.2.1 Alternative 1—Siphons Installation Alternative

In Alternative 1, the NRCS, Sponsor, and Co-sponsors combined the following measures.

- ***BRCC Irrigation System Delivery Improvements—Siphons Installation***—In this measure, BRCC proposes to make changes in the canyon area to improve reliability by avoiding problematic areas prone to landslides and canal failures by installing two new siphons across the Bear River. Water in the Hammond Canal would be diverted into the West Main Canal. The newly installed upper siphon would carry 200 cfs of irrigation water from the Hammond to the West Main Canal near Camp Fife. The newly installed lower siphon, near the opening of the canyon, would carry the 200 cfs of irrigation water back to the Hammond Canal. The Hammond Canal would be improved for 3,600 feet downstream of the siphon.
- ***BRCC Irrigation System Delivery Improvements—Red Siphon Installation***—In this measure, BRCC proposes to replace the existing Red Flume over the Malad River with a siphon.
- ***BRCC Irrigation System Delivery Improvements—Bear River City Pressure Irrigation and Storage***—In this measure, Bear River City proposes to develop a pressurized secondary irrigation system for residents of the city. This development would include piping the existing transmission canal with non-pressurized pipe, building two equalization storage ponds, installing a pumping station, and installing a pressurized pipe network to deliver the water to each resident.
- ***BRCC Irrigation System Delivery Improvements—Highland Ditch Piping***—In this measure, the Highland Ditch Company proposes to pipe the existing concrete lined and earthen sections of the Highland Ditch with a gravity piped system.
- ***BRCC Irrigation System Delivery Improvements—Central Canal Company Piping***—In this measure, Central Canal Company proposes to pipe the concrete lined canal and earthen sections of the Central Canal with a gravity piped system.
- ***Tremonton Pressure Irrigation Improvement and Irrigation Storage***—In this measure, Tremonton proposes to construct a new pressure irrigation distribution system including upgrading an existing pumping station, installing pipe, and developing two equalization storage ponds.
- ***Bear River Club Levee Improvements***—In this measure, the Bear River Club proposes to improve the 6,000 feet of the existing failing levee along the Bear River and improve approximately 6,736 feet of existing access road to the staging area to access the levee.
- ***CDC Levee Improvements***—In this measure, CDC proposes to improve 8,700 feet of the existing levee along the Bear River.
- ***Salt Creek WMA Levee Improvements***—In this measure, UDWiR proposes to improve 11,000 feet of an existing levee separating a bypass channel from a 6,000-acre wetland area in the Salt Creek WMA.

- ***Salt Creek WMA Sediment Basin Installation***—In this measure, the UDWiR proposes to construct a 200-acre-foot sediment basin (approximately 53 acres) designed to trap and intercept sediment before traveling to the Salt Creek wetlands.

The Siphons Installation Alternative is illustrated on Maps 1 and 2 in Appendix C, and Maps 5 through 13 in Appendix B.

4.2.2.2 Alternative 2—Hammond and West Main Canals Improvements Alternative

In Alternative 2, the NRCS, Sponsor, and Co-sponsors combined the following measures:

BRCC Irrigation System Delivery Improvements—Hammond and West Main Canals Improvements—In this measure, BRCC proposes to make changes in the canyon area. This Alternative would focus on improving critical sections of the two canals that were deemed most vulnerable to failure by historical and geological data. Five sections of new box culverts would be installed on the Hammond Canal and three sections of box culverts on the West Main Canal.

Other than the BRCC Siphons Installation measure, this alternative includes all the measures in the Siphons Installation Alternative as listed below (see Maps 5–13 in Appendix B):

- BRCC Irrigation System Delivery Improvements—Red Siphon Installation
- BRCC Irrigation System Delivery Improvements—Bear River City Pressure Irrigation and Storage
- BRCC Irrigation System Delivery Improvements—Highland Ditch Piping
- BRCC Irrigation System Delivery Improvements—Central Canal Company Piping
- BRCC Irrigation System Delivery Improvements—Bear River Club Levee Improvements
- Tremonton Pressure Irrigation Improvements and Irrigation Storage
- CDC Levee Improvements
- Salt Creek Waterfowl Management Area (WMA) Levee Improvements
- Salt Creek Waterfowl Management Area (WMA) Sediment Basin Installation

The Hammond and West Main Canals Improvements Alternative is illustrated on Maps 2 through 13 in Appendix B.

4.2.2.3 Alternative 3—Siphons Installation with Soil Lifts Alternative

For Alternative 3, BRCC proposes to make changes in the canyon area and other measures as described in Alternative 1, except soil lifts would be installed for the Bear River Club, CDC, and Salt Creek WMA Levee Improvements along waterways near the GSL and the Bear River Migratory Bird Refuge. As part of the soil lifts, the bank would be built with coconut mat bundles to hold the sediment in place and provide some structural integrity. The coconut mats would also provide protection for new native vegetation to grow. This vegetation would replace the mats as the source of structural integrity once the coconut fibers have degraded (see TM-002 in Appendix E1).

Alternative 3—Siphons Installation with Soil Lifts Alternative is located in the same location as Alternative 1 as illustrated on Maps 1 and 2 in Appendix C, and Maps 5 through 13 in Appendix B.

4.2.2.4 Alternative 4—Hammond and West Main Canals Improvements with Soil Lifts Alternative

For Alternative 4, BRCC proposes to make changes in the canyon area and other measures as described in Alternative 2, except soil lifts using coconut mats would be installed for the Bear River Club, CDC, and Salt Creek WMA Levee Improvements along waterways near the GSL and the Bear River Migratory Bird Refuge.

Alternative 4—Hammond and West Main Canals Improvements with Soil Lifts Alternative is located in the same location as Alternative 2 as illustrated on Maps 2 through 13 in Appendix B.

4.2.3 Nonstructural Alternatives

No standalone nonstructural alternative was identified that would address the watershed problems while meeting the Sponsor's or Co-sponsor's objectives and avoiding the constraint, however, nonstructural measures to meter water were included in all the alternatives included in the final array. Other nonstructural measures were considered but were outside the scope of our project (Table 4-1). These measures were not carried forward but were discussed with Sponsor or Co-sponsors and involved entities, and they are incorporating them into their policies.

4.2.4 Locally Preferred Alternative

"In cooperation with local interests that have oversight or implementation authorities and responsibilities, agencies may identify a 'locally preferred' alternative. This alternative may emerge from the collaborative process during agency and public scoping" (see Section 6b(4)(b)3 of DM 9500-013 [USDA 2017a]).

The Hammond and West Main Canals Improvements Alternative was created, modified, and supported through a public and local stakeholder process per PR&G. As part of this process, the public and other stakeholders were invited to provide comments and input on the proposed design and evaluation of alternatives. As a result of this input, the agricultural and watershed protection improvements from the Hammond and West Main Canals Improvements Alternative would provide the greatest benefit to the community—at the lowest cost and with the ability to phase installation in the canyon—and addressed the concerns regarding costs, environmental considerations, extensive permitting issues, and the need to acquire property or easements in the Siphons Installation Alternative. Alternative 2—Hammond and West Main Canals Improvements Alternative—subsequently, is the locally preferred alternative.

4.2.5 Environmentally Preferred Alternative

The NEPA Environmentally Preferred Alternative is not a formulation, but rather it is identified through the comparison of alternatives. Based on analysis documented in Section 5.3, Alternative 2—the Hammond and West Main Canals Improvements Alternative—was determined to be the environmentally preferred alternative.

4.2.6 Economic Considerations

With the federal law passage of the 2007 Water Resources Development Act, Congress directed the federal government to update and consolidate its past guidance on evaluating the costs and

benefits of federal investments. The original Principles and Guidelines (P&G) was replaced by PR&G as of April 2019. The PR&G allow for:

> … maximizing public benefits (of all types) relative to costs, the use of quantified and unquantified information in the tradeoff analysis, flexibility in decision making to promote localized solutions, ability to rely on the best available science and objectivity, and advance transparency for Federal investments in water resources.

The PR&G further state:

> Federal investments in water resources as a whole should strive to maximize public benefits, with appropriate consideration of costs. Public benefits encompass environmental, economic, and social goals; include monetary and non-monetary effects; and allow for the consideration of both quantified and unquantified measures.

Efficiency is the extent to which an alternative alleviates the specified problems and realizes the specified opportunities at least cost. The PR&G and ecosystem services analysis allow for selecting an alternative that may not be the most economically efficient based on consideration of other economic, social, and environmental tradeoffs. Based on analysis documented in Sections 5.1, 5.2, and 5.3, Alternative 2—Hammond and West Main Canals Improvements Alternative—was determined to be the alternative with the most beneficial economic effects.

4.3 Alternative Screening: Alternatives and Options Considered but Eliminated from Detailed Study

In accordance with NEPA and NRCS planning policy in the NWPM (NRCS 2015), multiple alternatives were examined to address watershed problems, to identify potential opportunities, and to meet project objectives. The initial array of alternatives was first screened against the project objectives and constraints (Section 4.3.1) and the remaining initial alternatives were then screened against ecosystem services and economic considerations (Section 4.3.2) to arrive at the final array of alternative plans (Section 4.4).

4.3.1 Screen 1: Objectives and Constraints

Project objectives and constraints are identified in Section 2.1. Each of the alternatives was screened to determine if it met the project objectives and constraints as shown in Table 4-3.

Table 4-3. Summary of Initial Alternatives and First Screening Based on Objectives and Constraints

Criteria	Alternative 1 Siphons Installation	Alternative 2 Hammond and West Main Canals Improvements	Alternative 3 Siphons Installation with Soil Lifts	Alternative 4 Hammond and West Main Canals Improvements with Soil Lifts
Objectives				
Objective 1: Improve reliability and efficiency of agricultural water by decreasing water losses associated with seepage and evaporation, and spillage from the aging canal system (feet of siphons, or canal boxed, piped, or improved).	Yes; Canyon siphons & canals–12,620 feet; plus, up to 93,470 feet.	Yes; Canyon canals–17,300 feet; plus, up to 93,470 feet.	Yes; Canyon siphons & canals–12,620 feet; plus, up to 93,470 feet	Yes; Canyon canals–17,300 feet; plus, up to 93,470 feet.
Objective 2: Improve reliability and efficiency of agricultural water by addressing deteriorating infrastructure and replacement needs, and improving capability of irrigation within the BRCC, Tremonton City, Bear River City, Highland Ditch Irrigation Ditch, Central Canal Company service areas (installation cost**).**	Yes; $115,934,425 •BRCC Canyon Siphons–$ 59,254,400 and added maintenance costs •Red Siphon $3,381,333 •Bear River City $14,476,595 •Highland Ditch $5,232,656 •Central Canal Company $6,230,075 •Tremonton City $12,969,564	Yes; $115,568,297 •BRCC Canyon Canals—$58,888,275 and lower maintenance costs •Red Siphon $3,381,333 •Bear River City $14,476,595 •Highland Ditch $5,232,656 •Central Canal Company $6,230,075 •Tremonton City $12,969,564	Yes; $115,934,425 •BRCC Canyon Siphons–$59,254,400 and added maintenance costs •Red Siphon $3,381,333 •Bear River City $14,476,595 •Highland Ditch $5,232,656 •Central Canal Company $6,230,075 •Tremonton City $12,969,564	Yes; $115,568,297 •BRCC Canyon Canals—$58,888,275 and lower maintenance costs •Red Siphon $3,381,333 •Bear River City $14,476,595 •Highland Ditch $5,232,656 •Central Canal Company $6,230,075 •Tremonton City $12,969,564
Objective 3: Address agricultural water management deficiencies by reducing the potential for failure of the Hammond Main and West canals in the canyon area (Yes/No).	Yes; Reduces risk of canal failure by installing two siphons to avoid the canyon area most prone to canal breaches. Improves water delivery but would need extensive permitting issues and added maintenance.	Yes; Reduces risk of canal failure by improving critical areas of the Hammond and West Main Canals. Easier to permit, construct, and maintain because it does not include siphons under the Bear River.	Yes; Reduces risk of canal failure by installing two siphons to avoid the canyon area most prone to canal breaches. Improves water delivery but would need extensive permitting issues and added maintenance.	Yes; Reduces risk of canal failure by improving critical areas of the Hammond and West Main Canals. Easier to permit, construct, and maintain because it does not include siphons under the Bear River.

Criteria	Alternative 1 Siphons Installation	Alternative 2 Hammond and West Main Canals Improvements	Alternative 3 Siphons Installation with Soil Lifts	Alternative 4 Hammond and West Main Canals Improvements with Soil Lifts
Objective 4: Address agricultural water management deficiencies by improving secondary water irrigation efficiency to reduce culinary water supply strains in Tremonton City and Bear River City (feet of secondary water piping; ac-ft of new irrigation storage).	Yes; Improves secondary water irrigation efficiency by installing 50,170 feet of canal/pipe and adding 26.1 ac-ft of water storage.	Yes; Improves secondary water irrigation efficiency by installing 50,170 feet of canal/pipe and adding 26.1 ac-ft of water storage.	Yes; Improves secondary water irrigation efficiency by installing 50,170 feet of canal/pipe and adding 26.1 ac-ft of water storage.	Yes; Improves secondary water irrigation efficiency by installing 50,170 feet of canal/pipe and adding 26.1 ac-ft of water storage.
Objective 5: Protect the watershed by reducing erosion and sedimentation to conserve water quantity, water quality, and wetlands (feet of levee improvement and acres of wetlands and wildlife habitat protected)	Yes; Improves 25,700 feet of levees and protects 24,000 acres of wetlands and wildlife habitat	Yes; Improves 25,700 feet of levees and protects 24,000 acres of wetlands and wildlife habitat	Yes; Improves 25,700 feet of levees and protects 24,000 acres of wetlands and wildlife habitat. Added cost for maintenance of soil lifts.	Yes; Improves 25,700 feet of levees and protects 24,000 acres of wetlands and wildlife habitat. Added cost for maintenance of soil lifts.
Objective 6: Protect the watershed by improving water quality for critical wildlife habitat near the GSL by reducing sediment delivery into Salt Creek (Yes/No).	Yes; Constructs a 200 ac-ft sediment basin	Yes; Constructs a 200 ac-ft sediment basin	Yes; Constructs a 200 ac-ft sediment basin	Yes; Constructs a 200 ac-ft sediment basin
Constraints				
Constraint 1: Levee infrastructure meets requirements to be armored against the ice flows, high spring runoff flows, and potential debris; strong enough to withstand the weight from the equipment that will be navigating it; and constructed of materials to mitigate rodent damage (Yes/No)	Yes	Yes	No	No
Alternative Carried Forward?	**Yes**	**Yes**	**No**	**No**

Alternative 3—Siphons Installation with Soil Lifts was eliminated from detailed study. Although coconut bundles in the soil lifts aid vegetation growth for erosion control, they shift after installation, especially during debris and high spring runoff, making them unsuitable for this project. The levee improvement requires widening, bank armoring, and rodent damage mitigation. The wider levee must support the weight of heavy equipment. The banks need to resist spring runoff and debris impact. Rodent issues, such as muskrats and beavers, complicate using willows, which are crucial for stabilization due to their fast-growing, strong roots. Additionally, saline soils restrict viable plant species. Therefore, this alternative was eliminated from further consideration.

Alternative 4—Hammond and West Main Canals Improvements with Soil Lifts was also eliminated from detailed study for the same reason as Alternative 3. Although coconut bundles in the soil lifts aid vegetation growth for erosion control, they shift after installation, especially during debris and high spring runoff, making them unsuitable for this project. The levee improvement requires widening, bank armoring, and rodent damage mitigation. The wider levee must support the weight of heavy equipment. The banks need to resist spring runoff and debris impact. Rodent issues, such as muskrats and beavers, complicate using willows, which are crucial for stabilization due to their fast-growing, strong roots. Additionally, saline soils restrict viable plant species. Therefore, this alternative was eliminated from further consideration.

4.3.2 Screen 2: Ecosystem Services and Economic Considerations

After the preliminary screening of the initial array of alternatives using the project objectives and constraints, a preliminary economic and ecosystem services analysis was conducted to determine if the remaining alternative would meet economic requirements and the extent to which it would enrich or reduce ecosystem services. The process in this watershed plan used a two-step screening process in the initial array to avoid expenditures on further economic and ecosystem services analysis by eliminating alternatives from the initial array by first applying less rigorous screening criteria before moving forward with other more involved economic and ecosystem services analysis.

As part of the formulation of alternatives process, an Ecosystem Services Framework was used to evaluate benefits and costs for the Proposed Project (see Section 1.5.2). Ecosystem services were evaluated using rough approximations of potential service flows using professional judgement and knowledge of watershed resources and conditions. Economic analyses were based upon approximate estimates of costs and benefits based upon previous projects in similar conditions. Table 4-4 displays the outcome of these analyses and shows the estimated change in ecosystem service benefits (increase, consistent with expected future conditions, or a reduction). See Appendix E1—Lower Bear River Watershed Plan Benefit-cost Analysis.

This screen resulted in final selection of both Alternative 1—Siphons Installation and Alternative 2—Hammond and West Main Canals Improvements to carry forward through the analysis.

Table 4-4. Summary of Second Screening of Initial Array of Alternatives for Ecosystem Services and Economics

Ecosystem Service	Alternatives			
	Alternative 1—Siphons Installation		Alternative 2—Hammond and West Main Canals Improvements	
	Value	Change in Ecosystem Service Benefit	Value	Change in Ecosystem Service Benefit
Regulating Services				
Reduced agricultural damage from BRCC Irrigation System Delivery Improvements	$3,375,300	Increase	$3,375,300	Increase
Reduced water treatment costs	$623,200	Increase	$623,200	Increase
Reduced damage to wetlands	$5,042,700	Increase	$5,042,700	Increase
Flood prevention (not economically quantified)	Flood risk reduction	Increase	Flood risk reduction	Increase
Provisioning Services				
Increased farm income from Highland and Central Canal Company piping	$93,400	Increase	$93,400	Increase
Cultural Services				
Recreation opportunities	Increase	Increase	Increase	Increase
Benefit-cost Analysis				
Benefit-cost ratio[1]	2.2	Increase	2.2	Increase
Average annual benefit[2]	$9,134,600	Increase	$9,134,600	Increase
Average annual cost[2]	$4,240,300	-	$4,226,700	-
ALTERNATIVE CARRIED FORWARD?	**Yes**		**Yes**	

[1] Average of all improvements.
[2] Total of all improvements. Price base: 2025 dollars amortized over 100 years at a discount rate of 3.25 percent.

4.4 Final Array of Alternatives Considered for Detailed Study

In this Draft Plan-EIS, the following alternatives for the Proposed Project were carried forward to study in greater detail: the No Action Alternative (FWOFI), and two action alternatives: the Siphons Installation Alternative and the Hammond and West Main Canals Improvements Alternative. Descriptions of these alternatives can be found below.

4.4.1 No Action Alternative (Future Without Federal Investment)

This alternative entails no federal investment in the Project Area. The No Action Alternative (FWOFI) assumes no major improvements would occur and that O&M would continue for the period of evaluation. Taking no action would consist of activities conducted if no federal action or funding were provided. Water would continue to be distributed through the existing canal systems, and the Sponsor and Co-sponsors would continue O&M. Agricultural water management in the watershed would be at continued risk of supply disruption from infrastructure failures and inefficiencies caused by poorly lined canals. Additionally, rural water supplies would be strained by the increasing demand for water used for outdoor irrigation. The

watershed's wetlands would also be at continued risk from levee failures. If the No Action Alternative is implemented because the Sponsor and Co-sponsors do not have an alternate funding source, the existing infrastructure would remain the same and capital investment or alternate funding would be required to address agricultural water management and watershed protection needs.

4.4.2 Siphons Installation Alternative (Alternative 1)

The overall goal of the Siphons Installation Alternative (Alternative 1) is to secure the agricultural water supply, improve water delivery reliability, and protect the watershed from erosion and sedimentation. Under this alternative, multiple measures would be implemented within the watershed (see Map 1 in Appendix C). The Siphons Installation Alternative has an approximate 220-acre footprint. The total estimated installation cost for this alternative is $115,934,425. The following are the key components of this alternative. The proposed agricultural water management projects all provide benefit to the overall delivery of BRCC irrigation water.

Agricultural Water Management Measures

BRCC Irrigation System Delivery Improvements—Siphons Installation
The BRCC would abandon a large section of the Hammond Canal by installing two new siphons across the Bear River to divert water from the Hammond Canal to the West Main Canal and back and would install box culverts in three critical locations along the West Main Canal and a box culvert on the Hammond Canal from the second siphon downstream along the canyon hillside (see Map 2 in Appendix C). The newly installed upper siphon would carry 200 cfs of irrigation water from the Hammond Canal to the West Main Canal near Camp Fife. As part of the aboveground disturbance, approximately eleven manhole access points would be installed. The manhole access points would be spaced every 500 feet throughout the length of the siphons. Each manhole access point would be approximately 3-feet by 3-feet (9 square feet) of total aboveground disturbance. The manholes would be flush with the ground. The newly installed lower siphon, near the opening of the canyon, would carry the 200 cfs of irrigation water back to the Hammond Canal. The Hammond Canal would be improved for 3,600 feet downstream of the siphon. This measure would also require property acquisition or easements.

BRCC Irrigation System Delivery Improvements—Red Siphon Installation
The BRCC proposes to replace the existing Red Flume with an approximately 450-foot siphon under the Malad River along the East Canal to reduce maintenance and improve agricultural water delivery (see Map 5 in Appendix B). The existing flume is deteriorating and nearing the end of its useful life and is difficult to operate and maintain.

BRCC Irrigation System Delivery Improvements—Bear River City Pressure Irrigation and Storage
Bear River City proposes to develop a pressurized secondary irrigation system for residents of the city (see Map 6 in Appendix B). This development would include piping the existing transmission canal with non-pressurized pipe, building two equalization storage ponds, installing a pumping station, and installing a pressurized pipe network to deliver the water to each resident. The agricultural water users outside of the city are not equipped to use pressurized water and require non-pressurized connections. The pressurized network would consist of 48,550 feet of pipe and the non-pressurized piping would consist of 18,970 feet of pipe. The equalization

storage pond could store up to 1.7 ac-ft (558,467 gallons) of water. The existing agricultural turnouts would be maintained. This system would reduce the demand on culinary water, provide residents of Bear River City with access to less expensive water for outdoor use, and increase the reliability of agricultural water delivery.

BRCC Irrigation System Delivery Improvements—Highland Ditch Piping

The Highland Ditch Company proposes to pipe the existing concrete lined and earthen sections of the Highland Ditch with a gravity piped system (non-pressurized) (see Map 7 in Appendix B). The concrete lining was installed in 1961 and is deteriorating. Approximately 18,400 feet of HDPE pipe and would be installed. The existing agricultural turnouts would be maintained. Two flow measurement devices would also be installed to replace the existing measurement devices. The upgrades would improve water delivery to agriculture users and businesses, reduce flooding of homes, and improve safety by enclosing the ditch in a pipe thereby eliminating drowning potential. The system would also improve the use of irrigation water shares by reducing evaporation and leakage via piping.

BRCC Irrigation System Delivery Improvements—Central Canal Company Piping

The Central Canal Company proposes to pipe the concrete lined canal and earthen sections of the Central Canal with a gravity piped system to improve reliability and delivery to agricultural users (see Map 8 in Appendix B). The existing canal is 24,600 feet and its concrete liner is approaching the end of its useable life. There are a few sections of existing pipe that would not be replaced. Approximately 22,100 feet of pipe would be installed. Piping would improve delivery to users, improve safety, and improve the efficiency of use of irrigation water shares.

Tremonton Pressure Irrigation Improvement and Irrigation Storage

Tremonton City proposes to construct a new pressure irrigation distribution system including upgrading an existing pumping station, installing pipe, and developing two equalization storage ponds (see Maps 9 and 10 in Appendix B). The development of the equalization storage includes upgrading a pumping station, installing transmission pipe (31,200 feet), installing a pressure reducing station, and constructing two equalization storage ponds that could store up to 4.1 ac-ft (1,332,731 gallons) of water. The new infrastructure would provide residents with less expensive water for outdoor use and reduce the demand on culinary water, which is a depleting resource in the area. These measures would also improve the efficient and effective use of irrigation water shares and would conserve water through use of the pressurized irrigation system.

Watershed Protection Measures

Bear River Club Levee Improvements

The Bear River Club proposes to improve the 6,000 feet of the existing failing levee along the Bear River and improve approximately 6,736 feet of existing access road to the staging area to access the levee (see Map 11 in Appendix B). The Bear River Club uses the levee to maintain 14,000 acres of wetland habitat. The project site is adjacent to the Bear River Migratory Bird Refuge and serves as a critical link between habitat on the refuge and adjacent lands. The Bear River Club proposes to improve the levee using riprap, topsoil, and seeding. This structure would have the integrity to withstand ice flows and support vegetation growth to maintain bank stability in the long term, protect the wetland habitat, and improve access for O&M.

CDC Levee Improvements

The CDC proposes to improve 8,700 feet of the existing levee along the Bear River (see Map 12 in Appendix B). CDC uses the existing deteriorating levee to control water levels within

4,000 acres of wetland habitat. The project site is located on a sharp outside bend of the river where severe erosion often occurs within the river system. The CDC proposes to improve the levee using riprap, topsoil, and seeding. This structure would have the integrity to withstand ice flows and support vegetation growth to maintain bank stability in the long term, protect the wetland habitat, and improve access for O&M. This measure would protect the thousands of acres of wetlands that provide important habitat for tens of thousands of waterfowl, shorebirds, and many other bird species.

Salt Creek Waterfowl Management Area (WMA) Levee Improvements

The UDWiR proposes to improve 11,000 feet of an existing levee separating a bypass channel from a 6,000-acre wetland area in the Salt Creek WMA (see Map 13 in Appendix B). The levee would be improved and armored with riprap. This structure would have the integrity to withstand ice flows and support vegetation growth to maintain bank stability in the long term. The levee and bypass channel allow for O&M of the wetland.

Salt Creek Waterfowl Management Area (WMA) Sediment Basin Installation

The UDWiR proposes to construct a 200-acre-foot sediment basin (approximately 53 acres) designed to trap and intercept sediment before traveling to the Salt Creek wetlands (see Map 13 in Appendix B). The sediment basin would decrease the volume of sediment being impounded in the wetland which would protect the health of the wetland ecosystem. The sediment basin would eliminate the need to dredge the entire length of the Salt Creek channel in the WMA in the future.

4.4.3 Hammond and West Main Canals Improvements Alternative

The Hammond and West Main Canals Improvements Alternative (Alternative 2) would secure the agricultural water supply, improve water delivery reliability, and protect the watershed from flooding, erosion, and sedimentation (see Map 2 in Appendix B). This alternative differs from the Siphons Installation Alternative (Alternative 1) because instead of siphoning the water from the Hammond Canal to the West Main Canal through the Bear River canyon area, it would improve both canals to provide redundancy in water delivery methods. All other components remain the same between the two alternatives. This alternative has an approximate 224-acre footprint. The total estimated installation cost for this alternative is $115,568,297. The following are the key components of this alternative. Detailed descriptions of all measures can be found in Chapter 6. The proposed agricultural water management projects all provide benefit to the overall delivery of BRCC irrigation water.

BRCC Irrigation System Delivery Improvements—Hammond and West Main Canals Improvements

BRCC proposes to construct a box culvert along the Hammond Canal at five key locations based on geotechnical study, ending after the canal bend out of the canyon, and would construct box culvert through the Camp Fife area and along two other key locations on the West Main Canal (see Maps 3 and 4 in Appendix B). Multiple breaches have occurred within the Hammond and West Main Canal over the years and are becoming increasingly more significant over time. The improvements for both the Hammond and West Main Canals would reduce seepage and evaporation losses, reduce maintenance, and enhance structural integrity to prevent failures and ensure consistent, reliable water delivery.

This alternative would install 15,300 feet of 8’ by 8’ concrete box culverts on the Hammond East Canal, and 2,000 feet of 12’ by 13’ concrete box culverts on the West Main Canal through the Camp Fife area and along two other key locations on the West Main Canal.

Other Measures

Other than the BRCC Siphons Installation measure, this alternative includes all the measures in the Siphons Installation Alternative as listed below (see Maps 5–13 in Appendix B):

Agricultural Water Management Measures

- BRCC Irrigation System Delivery Improvements—Red Siphon Installation
- BRCC Irrigation System Delivery Improvements—Bear River City Pressure Irrigation and Storage
- BRCC Irrigation System Delivery Improvements—Highland Ditch Piping
- BRCC Irrigation System Delivery Improvements—Central Canal Company Piping
- Tremonton Pressure Irrigation Improvements and Irrigation Storage

Watershed Protection Measures

- Bear River Club Levee Improvements
- CDC Levee Improvements
- Salt Creek Waterfowl Management Area (WMA) Levee Improvements
- Salt Creek Waterfowl Management Area (WMA) Sediment Basin Installation

4.4.4 Final Array of Alternatives Summary

Table 4-5 displays the project measures by alternative and purpose. The Siphons Installation Alternative has an approximate 220-acre footprint. The Hammond and West Main Canals Improvements Alternative have an approximate 224-acre footprint. Table 4-6 displays the quantity of associated activities by alternative.

Table 4-5. Project Measures Disturbance Quantities

Project Measures	Purpose Addressed	
	Agricultural Water Management	Watershed Protection
NO ACTION ALTERNATIVE		
Continued maintenance and operations by: BRCC, Tremonton City, Bear River City, Highland Ditch Company, Central Canal Company, Bear River Club, CDC, and UDWiR	No new additional disturbance would occur.	No new additional disturbance would occur.
SIPHONS INSTALLATION ALTERNATIVE		
BRCC Bear River Canyon Improvements Siphons Installation, upper siphon (feet)	1,650	0
BRCC Bear River Canyon Improvements Siphon Installation, lower siphon (feet)	1,670	0
BRCC Bear River Canyon Improvements, Canal Improvements, installation of box culverts in three critical locations along the West Main Canal, and a box culvert on the Hammond Canal from the second siphon downstream along the canyon hillside (total feet)	9,300	0

Project Measures	Purpose Addressed	
	Agricultural Water Management	Watershed Protection
HAMMOND AND WEST MAIN CANALS IMPROVEMENTS ALTERNATIVE		
BRCC Irrigation System Delivery Improvements—Bear River Canyon Improvements Hammond Canal Improvements, installation of box culverts (total feet)	17,300	0
MEASURES COMMON TO BOTH ACTION ALTERNATIVES		
BRCC Irrigation System Delivery Improvements—Red Siphon (feet)	450	0
BRCC Irrigation System Delivery Improvements—Bear River City Pressure Irrigation, Canal Piping with water meters (feet)	18,970	0
BRCC Irrigation System Delivery Improvements—Bear River City Storage (ac-ft)	1.7	0
BRCC Irrigation System Delivery Improvements—Highland Ditch Piping with water meters (feet)	18,400	0
BRCC Irrigation System Delivery Improvements—Central Canal Company Piping with water meters (feet)	Up to 24,600	0
Tremonton Pressure Irrigation Improvement with water meters (Project 6) (feet)	31,200	0
Tremonton Irrigation Storage (Project 8) Footprint (acre) (Located by Bear Mountain)	4.0	0
Tremonton Irrigation Storage (Project 8) Storage Capacity (ac-ft) (Located by Bear Mountain)	2.2	0
Tremonton Irrigation Storage (Project 8) Footprint (acre) (Located west of canal)	4.5	0
Tremonton Irrigation Storage located by Bear Mountain (Project 8) Storage Capacity (ac-ft) (Located west of canal)	1.9	0
Tremonton Irrigation Storage by Bear Mountain (Project 8) Footprint (acre)	4.0	0
Bear River Club Bear River Levee Improvements Access Road Work (feet)	0	6,736
Bear River Club Bear River Levee Improvements with Riprap (feet)	0	6,000
CDC Bear River Levee Improvements with Riprap (feet)	0	8,700
Salt Creek WMA Levee Improvements with Riprap (feet)	0	11,000
Salt Creek WMA Salt Creek Sediment Basin Footprint (acre)	0	53

Project Measures	Purpose Addressed	
	Agricultural Water Management	Watershed Protection
Salt Creek WMA Salt Creek Sediment Basin Capacity (ac-ft)	0	200

Table 4-6. Staging Area Acres for Associated Activities by Alternative

Staging Areas by Associated Activities (acres)	Alternatives		
	No Federal Action	Siphons Installation	Hammond and West Main Canals Improvements
BRCC Canyon Improvements—Siphons staging area	0.0	16.9	0.0
BRCC Canyon Improvement—Hammond staging area	0.0	0.0	16.9
Red Siphon staging area	0.0	4.7	4.7
Tremonton Pressure Irrigation Improvement (Project 6) staging area	0.0	3.0	3.0
Tremonton Irrigation Storage (Project 8) staging area	0.0	3.7	3.7
Bear River City Pressure Irrigation, Canal Piping staging area	0.0	0.5	0.5
Highland Ditch Piping staging area	0.0	9.5	9.5
Central Canal Company Piping staging area	0.0	5.8	5.8
Bear River Club Bear River Levee Improvements with Riprap staging area	0.0	0.8	0.8
CDC Bear River Levee Improvements with Riprap staging area	0.0	0.6	0.6
Salt Creek WMA Levee Improvements with Riprap and Sediment Basin staging area	0.0	6.5	6.5
Total staging area acres	**0.0**	52.0	52.0
Jobs during construction	**0**	**100**	**100**

Chapter 5 Environmental Consequences—Evaluation of Alternatives

This chapter of the plan evaluates and compares alternatives in detail based on their performance against planning criteria (Section 5.1), ecosystems services (Section 5.2), and environmental effects (Section 5.3). Appendix D provides additional detail on the analysis methodologies used in this section.

5.1 Summary and Comparison of Alternatives—Planning Process

Table 5-1 compares the alternatives on how well they resolve the identified problems, examining their performance against the project objectives, constraints, and the evaluation criteria of completeness, acceptability, efficiency, and effectiveness. PR&G defines these evaluation criteria as follows:

- *Completeness* is the extent to which an alternative provides and accounts for all features, investments, and/or other actions necessary to realize the planned effects, including any necessary actions by others. It does not necessarily mean that alternative actions need to be large in scope or scale.
- *Effectiveness* is the extent to which an alternative alleviates the specified problems and achieves the specified opportunities.
- *Efficiency* is the extent to which an alternative alleviates the specified problems and realizes the specified opportunities at the least cost.
- *Acceptability* is the viability and appropriateness of an alternative from the perspective of the Nation's public and consistency with existing Federal laws, authorities, and public policies. It does not include local or regional preferences for particular solutions or political expediency.

Table 5-1. Summary and Comparison of Alternatives—Planning Process

Item of Concern	Alternative		
	No Action (FWOFI) Alternative	Siphons Installation	Hammond and West Main Canals Improvements
Measures by Authorized Purpose			
Agricultural Water Management	Does not address agricultural water management.	Addresses agricultural water management by implementing measures to improve BRCC's, Bear River City's, Highland Ditch's, Central Canal Company's, and Tremonton City's ability to manage agricultural water.	Addresses agricultural water management by implementing measures to improve BRCC's, Bear River City's, Highland Ditch's, Central Canal Company's, and Tremonton City's ability to manage agricultural water.
Watershed Protection	Does not address watershed protection	Addresses watershed protection by improving 25,700 feet of levees and constructing a sediment basin.	Addresses watershed protection by improving 25,700 feet of levees and constructing a sediment basin.
Objectives			
Objective 1: Improve reliability and efficiency of agricultural water by decreasing water losses associated with seepage and evaporation, and spillage from the aging canal system. (feet of canal-boxed, piped or improved)	Does not address agricultural water management issues. The Project Area would continue to experience water loss from seepage.	Addresses agricultural water management issues by implementing measures such as siphons, box culverts, lining canals and improved infrastructure that conserve water by improving irrigation water delivery.	Addresses agricultural water management issues by implementing measures such as siphons, box culverts, lining canals and improved infrastructure that conserve water by improving irrigation water delivery.
Objective 2: Improve reliability and efficiency of agricultural water by addressing deteriorating infrastructure and replacement needs, and improving capability of irrigation within the BRCC, Tremonton City, Bear River City, Highland Ditch Irrigation Ditch, Central Canal Company service areas (construction cost)	Does not address deteriorating infrastructure and replacement needs nor improve capability of irrigation.	Yes; $115,934,425 •Siphons–BRCC $59,254,400 and added maintenance costs. •Red Siphon $3,381,333 •Bear River City $14,476,595 •Highland Ditch $5,232,656 Central Canal Company $6,230,075 •Tremonton City $12,969,564	Yes; $115,568,297 •Canals—BRCC $58,888,275 and lower maintenance costs. •Red Siphon $3,381,333 •Bear River City $14,476,595 •Highland Ditch $5,232,656 •Central Canal Company $6,230,075 •Tremonton City $12,969,564
Objective 3: Address agricultural water management deficiencies by reducing the potential for failure of the Hammond Main and West canals in the canyon area. (Yes/No)	Does not reduce potential failure of Hammond Main or West Main canals in the canyon area.	Reduces risk of canal failure by installing two siphons to avoid the canyon area most prone to canal breaches. Improves water delivery but would need extensive permitting issues and added maintenance.	Reduces risk of canal failure by improving critical areas of the Hammond and West Main Canals. Easier to permit, construct, and maintain because it does not include siphons under the Bear River.

Item of Concern	Alternative		
	No Action (FWOFI) Alternative	**Siphons Installation**	**Hammond and West Main Canals Improvements**
Objective 4: Address agricultural water management deficiencies by improving secondary water irrigation efficiency to reduce culinary water supply strains in Tremonton City and Bear River City (feet of secondary water piping; ac-ft of new irrigation storage)	Does not address secondary water irrigation efficiency to reduce culinary water supply strains.	Improves secondary water irrigation efficiency by installing 50,170 feet of canal/pipe and adding 26.1 ac-ft of water storage.	Improves secondary water irrigation efficiency by installing 50,170 feet of canal/pipe and adding 26.1 ac-ft of water storage.
Objective 5: Protect the watershed by reducing erosion and sedimentation to conserve water quantity, water quality, and wetlands (feet of levee improvement and acres of wetlands and wildlife habitat protected)	Does not protect the watershed.	Protects the watershed by improving 25,700 feet of levees adjacent to Bear River and 24,000 acres of wetlands and wildlife habitat.	Protects the watershed by improving 25,700 feet of levees adjacent to Bear River and 24,000 acres of wetlands and wildlife habitat.
Objective 6: Protect the watershed by improving water quality for critical wildlife habitat near the GSL by reducing sediment delivery into Salt Creek (Yes/No)	Does not protect the watershed	Improves water quality by constructing a 200 ac-ft sediment basin to reduce sediment delivery	Improves water quality by constructing a 200 ac-ft sediment basin to reduce sediment delivery
Constraints			
Constraint 1: Ensures levee infrastructure meets requirements to be armored against the ice flows, high spring runoff flows, and potential debris; strong enough to withstand the weight from the equipment that will be navigating it; and constructed of materials to mitigate rodent damage (Yes/No)	No	Yes	Yes
Evaluation Criteria			
Completeness	Incomplete—the FWOFI does not account for all features, investments, and/or other actions necessary to realize the planned effects of addressing the watershed problems and objectives.	Complete—The Siphons Installation Alternative is complete, in that it provides and accounts for all necessary investments to ensure the realization of the planned effects, including coordination with USACE, EPA, and Reclamation.	Complete—The Hammond and West Main Canals Improvement Alternative is complete, in that it provides and accounts for all necessary investments to ensure the realization of the planned effects, including coordination with USACE, EPA, and Reclamation.

Item of Concern	Alternative		
	No Action (FWOFI) Alternative	Siphons Installation	Hammond and West Main Canals Improvements
Effectiveness	Ineffective—does not address the problem, achieve objectives, or avoid the constraint.	Effective—addresses the problems, objectives, opportunities, and avoid the constraint. The Siphons Installation Alternative is effective in that it secures the agricultural water supply, improves water delivery reliability, and protects the watershed from erosion and sedimentation.	Effective—addresses the problems, objectives, opportunities, and avoid the constraint. The Hammond and West Main Canals Improvement Alternative is effective in that it secures the agricultural water supply, improves water delivery reliability, and protects the watershed from erosion and sedimentation.
Efficiency	Efficiency does not exist in the absence of effectiveness.	Efficient—A BCR of 2.2 and monetized annual net economic benefits of $9,134,600 are considered efficient.	Efficient—A BCR of 2.2 and monetized annual net economic benefits of $9,134,600 are considered efficient.
Acceptability	The FWOFI is neither entirely acceptable nor entirely unacceptable as defined in PR&G. This is a viable alternative from the national perspective as it is consistent with existing Federal laws, authorities, and policies. However, the FWOFI is not an appropriate alternative as it leaves considerable canal breach risk.	Acceptable—The Siphons Installation Alternative is acceptable, in that no controversy from the general public exists, and it is consistent with existing federal laws, authorities, and public policies.	Acceptable—The Hammond and West Main Canals Improvement Alternative is acceptable, in that no controversy from the general public exists, and it is consistent with existing federal laws, authorities, and public policies.

5.2 Summary and Comparison of Alternatives—Ecosystem Services

This section provides the PR&G tradeoff analysis between the economic, environmental, and social goals. Alternatives were similarly compared in terms of their contribution to the Federal Objective and its Guiding Principles and economic costs and benefits. Table 5-2 depicts the results of this comparison.

Table 5-2. Summary of Project Alternatives, Consideration of Principles, Requirements and Guidelines (PR&G) Guiding Principles, National Economic Efficiency (NEE), and Associated Ecosystem Services

Item	No Action Alternative FWOFI[1]	Siphons Installation[1]	Hammond and West Main Canals Improvements[1]
Alternatives			
Locally Preferred	While the FWOFI would maintain the existing conditions, it does not address the agricultural water management and watershed protection needs.	Though the Siphons Installation Alternative was comparable in the quantified ecosystem services benefit-cost analysis compared to the Hammond and West Main Canals Improvements Alternative, it was not locally preferred because of the lack of ability to phase the siphons installation, which would require a significant capital expenditure in one year, in addition to concerns about environmental considerations, extensive permitting issues, and the need to acquire property or easements.	The Hammond and West Main Canals Improvements Alternative was created, modified, and supported through a public and local stakeholder process per PR&G. As part of this process, the public and other stakeholders were invited to provide comments and input on the proposed design and evaluation of alternatives. As a result of this input, the agricultural and watershed protection improvements from the Hammond and West Main Canals Improvements Alternative would provide the greatest benefit to the community—at the lowest cost and with the ability to phase installation in the canyon—and addressed the concerns regarding costs, environmental considerations, extensive permitting issues, and the need to acquire property or easements in the Siphons Installation Alternative. Alternative 2—Hammond and West Main Canals Improvements Alternative—subsequently, is the locally preferred alternative

Item	No Action Alternative FWOFI[1]	Siphons Installation[1]	Hammond and West Main Canals Improvements[1]
Nonstructural	The FWOFI would maintain the existing conditions in the Project Area.	There was no standalone nonstructural alternative that would address the watershed problems while meeting the Sponsor's or Co-sponsor's objectives and avoiding the constraint, however, nonstructural measures to meter water were included in this alternative.	There was no standalone nonstructural alternative that would address the watershed problems while meeting the Sponsor's or Co-sponsor's objectives and avoiding the constraint, however, nonstructural measures to meter water were included in this alternative.
Economic Efficiency	The FWOFI would require no Federal project investment.	This alternative would require an average annualized investment of $4,240,300, and provide $9,134,600 in annualized benefits, representing a BCR of 2.2. Though the Siphons Installation Alternative was comparable in the quantified ecosystem services benefit-cost analysis compared to the Hammond and West Main Canals Improvements Alternative, it was not the most economic efficient alternative because of the lack of ability to phase the siphons installation, which would require a significant capital expenditure in one year, in addition to concerns about environmental considerations, extensive permitting issues, and the need to acquire property or easements.	Based on analysis documented in Sections 5.1, 5.2 and 5.3, the Hammond and West Main Canals Improvements Alternative was determined to be the alternative that increases economic efficiency. The Hammond and West Main Canals Improvements Alternative would require an average annualized investment of $4,226,700, and provide $9,134,600 in annualized benefits, representing a BCR of 2.2.

Item	No Action Alternative FWOFI[1]	Siphons Installation[1]	Hammond and West Main Canals Improvements[1]
Environmentally Preferable	With the FWOFI, canal breach risk would remain high in the BRCC canyon area, leaving the watershed vulnerable to erosion and sedimentation that would affect water quality compared to the action alternatives.	Compared to the other alternatives, in this alternative, the construction of two siphons across the Bear River in the BRCC canyon area may affect, is likely to adversely affect the yellow-billed cuckoo and would permanently remove approximately 15 acres of riparian fringe within the siphon areas along the Bear River.	Based on analysis documented in Section 5.3, the Hammond and West Main Canals Improvements Alternative was determined to be the environmentally preferred alternative. This alternative may affect, is not likely to adversely affect yellow-billed cuckoo and would not remove the riparian habitat in the BRCC canyon area.
Guiding Principles			
Healthy and Resilient Ecosystems	-	X	X
Sustainable Economic Development	-	X	X
Watershed Approach	-	X	X
Public Safety	-	X	X
Floodplains	-	X	X
National Economic Efficiency			
Total Project Investment (Annualized Average)	$0	$4,240,300	$4,226,700
Monetized Total Benefits (Annualized Average)	$0	$9,134,600	$9,134600
Monetized Net Benefits (Annualized Average)	$0	$4,894,300	$4,907,900
Ecosystem Services Addressed and Tradeoffs Identified			
Regulating Services (Annualized Average)			
Reduced farm income damage	$0	$3,375,300	$3,375,300
Reduced water treatment costs	No change	$623,200	$623,200
Reduced damage to wetlands	$0	$5,042,700	$5,042,700
Flood prevention	No change	Reduced flooding risk	Reduced flooding risk
Provisioning Services (Annualized Average)			
Increased farm income	$0	$93,400	$93,400

Item	No Action Alternative FWOFI[1]	Siphons Installation[1]	Hammond and West Main Canals Improvements[1]
Cultural Services			
Recreation	No change	Improves recreational opportunities	Improves recreational opportunities
Economic Analysis			
Costs			
Total Project Investment (Installation Costs)	**-**	**$115,934,425**	**$115,568,297**
Annual Project Investment	-	$3,786,300	$3,774,300
Annual OM&R Costs	-	$454,000	$452,400
Total Annual Project Costs	**-**	$4,240,300	$4,226,700
Monetized Benefits for Ecosystem Services			
Regulating	$0	$9,041,200	$9,041,200
Provisioning	$0	$93,400	$93,400
Cultural	$0	$0	$0
Supporting	$0	$0	$0
Total Annual Monetized Benefits	$0	$9,134,600	$9,134,600
Total Annual Monetized Costs	$8,418,000	$4,240,300	$4,226,700
Benefit-cost Ratio	N/A	2.2	2.2
Annual Monetized Net Benefits	$0	$4,894,300	$4,907,900
Regional Economic Development/Economic Impact Assessment			
Regional Employment	N/A	N/A	N/A
Regional Income	N/A	N/A	N/A
Regional Impacts (Other)	N/A	N/A	N/A

[1]All monetary values reported in 2025 dollars, amortized over 100 years at a discount rate of 3.25 percent.
Prepared: October 2025

5.2.1 No Action Alternative/FWOFI

Ecosystem service flow effects for the No Action Alternative (FWOFI) were projected assuming that current trends would continue to occur for the lifetime of the proposed program while considering the potential effects of all reasonably foreseeable changes within the watershed.

The total annualized average damages and cost for the FWOFI is $8,418,000, with an annualized average benefit of $0. Compared to the Siphons Installation Alternative and the Hammond and West Main Canals Improvements Alternative, the FWOFI would not meaningfully change any ecosystem service within the watershed. Compared to the two action alternatives, the quantified ecosystem services of the FWOFI are $0.

5.2.2 Siphons Installation Alternative

The Siphons Installation Alternative, which used a watershed approach to characterize problems and solutions in the watershed, meets the federal principles for investments in water resources, and provides multiple ecosystem services. Compared to the FWOFI Alternative, the quantified ecosystem services benefits of this alternative are $9,134,600. Compared to the Hammond and West Main Canals Alternative, the quantified ecosystem services benefits are the same, though the cost of this alternative is slightly higher.

For non-quantified ecosystem services, this alternative addresses the non-monetized ecosystem service for flood prevention by reducing the flooding risk. The installation of concrete box culverts, piping, and riprap would stabilize canals and levees, reducing the flooding risk by preventing canal overtopping and infrastructure failures. Additionally, although this alternative would install two new siphons under the Lower Bear River, the above-ground structures within the floodplain would not increase. The Siphons Installation Alternative would replace an existing flume with a siphon beneath the Malad River, reducing above-ground structures within the 100-year floodplain and decreasing flood risks associated with structural impediments during flood events.

This alternative also addresses the non-monetized ecosystem service for recreation by protecting recreation values associated with wetlands from the risk of levee failure, thereby reducing the expected annual damages and improving recreational opportunities.

No hierarchy exists among the economic, environmental, and social goals and, as a result, tradeoffs among alternatives are assessed.

5.2.3 Hammond and West Main Canals Improvements

The Hammond and West Main Canals Improvements Alternative, which used a watershed approach to characterize problems and solutions in the watershed, meets the federal principles for investments in water resources, and provides multiple ecosystem services. Compared to the FWOFI, the quantified ecosystem services benefits of this alternative are $9,134,600. Compared to the Siphons Installation Alternative, the quantified ecosystem services benefits are the same, though the cost of this alternative is slightly lower.

For non-quantified ecosystem services, this alternative would reduce the risks of flooding. The installation of concrete box culverts, piping, and riprap would stabilize canals and levees, reducing the flooding risk by preventing canal overtopping and infrastructure failures. Additionally, the FWFI would replace an existing flume with a siphon beneath the Malad River,

reducing above-ground structures within the 100-year floodplain and decreasing flood risks associated with structural impediments during flood events.

This alternative also addresses the non-monetized ecosystem service for recreation by protecting recreation values associated with wetlands from the risk of levee failure, thereby reducing the expected annual damages and improving recreational opportunities.

No hierarchy exists among the economic, environmental, and social goals and, as a result, tradeoffs among alternatives are assessed.

The Hammond and West Main Canals Improvements Alternative would yield economic returns exceeding its upfront and ongoing costs compared to the FWOFI.

Table 5-2 summarizes the Hammond and West Main Canals Improvements Alternative's consideration of the PR&G Guiding Principles, economic efficiency, and quantified ecosystem services.

5.2.4 Ecosystem Services Alternative Tradeoff Analysis

The effect of the action alternatives on ecosystem flows and values is shown in Table 5-2. The action alternatives would positively affect regulating, provisioning, and cultural services in the watershed compared to the FWOFI, but the Siphons Installation Alternative would require a significant capital expenditure in one year, in addition to concerns about environmental considerations—specifically the adverse effect to the yellow-billed cuckoo, extensive permitting issues, and the need to acquire property or easements—compared to the Hammond and West Main Canals Improvements Alternative.

The quantified benefits of both action alternatives provide a clear financial benefit with an overall BCR of 2.2. Besides the BRCC Irrigation System Delivery Improvements measure, both action alternatives provide the same benefits and costs. The remaining measures had variable BCRs, ranging from a low of 1.0 to a high of 13.6 for the Salt Creek WMA levee.

Important tradeoffs should be considered to account for the broader, less tangible advantages these projects bring compared to the No Action Alternative. For example, the Central Canal Company Piping Project would yield substantial economic and environmental benefits. Increased agricultural income resulting from more reliable water delivery has a strong economic multiplier effect. Reliable irrigation improves crop yields, reduces operational uncertainty, and enhances farm-level financial stability. This increased productivity translates into higher local incomes, greater spending within the regional economy, and more resilient rural communities. Benefits of this kind are particularly valuable in agricultural areas where water reliability is a key constraint to economic growth.

Another critical element of the project benefits is the reduction in wetland damages. By improving the levy systems that sustain the wetlands, the risk of a catastrophic levy breach is drastically reduced, which reduces the expected damages to wetland habitat should a levy failure occur. Wetlands provide exceptionally high-value ecosystem services, including wildlife habitat, water quality enhancement, water quality improvements, and other benefits often at relatively low cost compared to other environmental mitigation measures. Protecting these wetland functions yields long-lasting ecological and economic benefits that extend beyond the immediate Project Area. The high value of wetland habitat per dollar of investment makes these reduced

damages and preservation benefits particularly meaningful in the overall benefit–cost framework.

The key trade-off between the Hammond and West Main Canals Improvements Alternative and the Siphons Installation Alternative lies in the fact that both alternatives achieve essentially the same level of benefit, but the Siphons Installation Alternative does so at a higher cost, both in terms of capital investment, long-term operation and maintenance (O&M), and environmental costs.

While the Siphons Installation Alternative can deliver comparable improvements in water delivery efficiency, seepage reduction, and system performance, its design introduces greater operational complexity and ongoing maintenance requirements. This higher O&M burden, combined with greater initial construction costs, reduces the overall cost-effectiveness of the Siphons Installation Alternative relative to the Hammond and West Main Canals Improvements Alternative. From an economic perspective, the Hammond and West Main Canals Improvements Alternative achieves equivalent performance with a lower total life-cycle cost, making it the more efficient investment.

5.3 Summary and Comparison of Alternatives—Environmental Effects

Under NEPA, the NRCS is required to identify and address environmental and human health effects that may occur from implementing the alternatives. The purpose of this chapter is to describe the potential effects of each alternative on the environmental and human health resource categories defined in the Inventory of Existing Resources and Conditions. Unless otherwise noted, the area of analysis for each resource is the Project Area as described and depicted in Section 1.4.2. The effects analysis of the Proposed Project is categorized as follows:

- Not Applicable (N/A)
- No Effect
- Negligible Effect—An effect so small that it is not measurable or perceptible. It does not alter the environment in any significant way.
- Minor Effect—An effect that is noticeable but not significant. It may cause some changes to the environment, but these changes are not substantial and do not require major mitigation measures; or
- Major Effect—An effect that is significant and substantial. It causes considerable changes to the environment, potentially requiring extensive mitigation measures to address the adverse effects.

Two types of effects may occur and are discussed in this chapter:

- Direct Effect: Effects from a proposed action that occur at the same time and same place.
- Indirect Effect: Effects from a proposed action that occur later in time, at some distance from the project, and are changes due to cause and effect relationships.

Section 5.3.9 identifies the known ongoing, recently completed, or future foreseeable projects that could potentially contribute interactive effects with the Proposed Project. The analysis considers the effects of Proposed Project and reasonably foreseeable/probable effects of any related activities (DM 9500-013 4.b.(2)(m) [USDA 2017a]).

The No Action Alternative/FWOFI and the action alternatives have been compared against each other to identify tradeoffs between economic, environmental, and social goals for each of the alternatives (USDA 2017a). Table 5-3 presents a summary of this evaluation and detailed information follows. BMPs would be implemented on site during and post-construction to minimize and avoid effects to environmental resources. BMPs and mitigation measures are discussed in Section 6.6 and Appendix E1. Permits and other compliance actions are discussed in Section 6.5.

Table 5-3. Summary of Alternatives

Resource Area	No Action Alternative (FWOFI)	Siphons Installation Alternative	Hammond and West Main Canals Improvements Alternative
Ecosystem Services			
Regulating Services	The FWOFI would not change the regulating services.	BRCC Irrigation Delivery System Improvements reduce farm income damage by $3,375,300. Reduces water treatment costs by $623,200. Reduces damage to wetlands by $5,042,700. Reduces flooding risk.	BRCC Irrigation Delivery System Improvements reduce farm income damage by $3,375,300. Reduces water treatment costs by $623,200. Reduces damage to wetlands by $5,042,700. Reduces flooding risk.
Provisioning Services	The FWOFI would not change the provisioning services.	BRCC Irrigation Delivery System Improvements increase farm income by $93,400.	BRCC Irrigation Delivery System Improvements increase farm income by $93,400.
Cultural Services	The FWOFI would not change the cultural services.	Protects recreation values associated with wetlands in the Project Area from the risk of levee failure reducing the expected annual damages and improving recreational opportunities.	Protects recreation values associated with wetlands in the Project Area from the risk of levee failure reducing the expected annual damages and improving recreational opportunities.
Economics/Socioeconomics			
Economics/ Socioeconomics	No local match funds would be required, and no jobs would be created under the FWOFI.	The Siphons Installation Alternative would have direct effects including the use of approximately $26,383,773 in local match funds to construct the Siphons Installation Alternative. In addition, the Siphons Installation Alternative would temporarily create 100 jobs. The Siphons Installation Alternative would require an annualized investment of $4,240,300, and provide $9,134,600 in annualized benefits, representing a BCR of 2.2.	The Hammond and West Main Canals Improvements Alternative would have direct effects including the use of approximately $26,304,867 in local match funds to construct the Hammond and West Main Canals Improvements Alternative. In addition, the Hammond and West Main Canals Improvements Alternative would temporarily create 100 jobs. The Hammond and West Main Canals Improvements Alternative would require an annualized investment of $4,226,700, and provide $9,134,600 in annualized benefits, representing a BCR of 2.2.

Resource Area	No Action Alternative (FWOFI)	Siphons Installation Alternative	Hammond and West Main Canals Improvements Alternative
Air Quality and Climate			
CAA/NAAQS & Climate/GHG	Under the No Action Alternative, no long-term or direct effects on air quality would occur. Ongoing maintenance activities and debris cleanup after floods would continue to have negligible and temporary effects on air quality. These maintenance activities would not violate the CAA or NAAQS. Under the No Action Alternative, seepage and evaporative losses would persist within the watershed, and local agricultural producers would continue to have little flexibility or resilience to future drought conditions.	The Siphons Installation Alternative would temporarily negligibly affect air quality during construction due to equipment operation and land disturbance, but these effects would be minimized through BMPs. New electric pumps would cause minor emissions increases in the long term, remaining well below state and federal $PM_{2.5}$ emission thresholds. The alternative would not violate the CAA or NAAQS. Fugitive dust and GHG emission increases associated with the Siphons Installation Alternative would be minimized by implementation of applicable BMPs. These emission rates would not increase in the Project Area over the long term. By improving agricultural water management, including conserving and improving water quality, the Siphons Installation Alternative would make the watershed area and the irrigation systems more resilient to climate stress.	The Hammond and West Main Canals Improvements Alternative would temporarily, negligibly affect air quality during construction due to equipment operation and land disturbance, but these effects would be minimized through BMPs. New electric pumps would cause minor emissions increases in the long term, remaining well below state and federal $PM_{2.5}$ emission thresholds. The alternative would not violate the CAA or NAAQS. Fugitive dust and GHG emission increases associated with the Hammond and West Main Canals Improvements Alternative would be minimized by implementation of applicable BMPs These emission rates would not increase in the Project Area over the long term. By improving agricultural water management, including conserving and improving water quality, the Hammond and West Main Canals Improvements Alternative would make the watershed area and the irrigation systems more resilient to climate stress.

Resource Area	No Action Alternative (FWOFI)	Siphons Installation Alternative	Hammond and West Main Canals Improvements Alternative
Soils and Geology			
Upland Erosion and Sedimentation	The No Action Alternative would not address ongoing erosion and sedimentation issues. Long-term and major impacts throughout the watershed would continue due to risk of canal failure, sediment build-up, flooding damage, and levee breach. Seismic risks would continue.	The Siphons Installation Alternative would cause temporary increases in erosion and sedimentation during construction, especially around the BRCC Canyon siphons, Bear River, Malad River, and levee improvements in the Bear River Migratory Bird Refuge and Salt Creek WMA. As required by UDEQ, the UPDES Program Large CGP would be followed for proposed activities. Erosion control measures including BMPs and SWPPP would be applied to minimize effects. Long-term, the alternative would reduce canal seepage, thereby decreasing erosion and sedimentation, and indirectly benefiting slope stability in the Bear River Canyon, and would repair the levees and install a sediment basin indirectly improving wildlife habitat in the Bear River Migratory Bird Refuge, Salt Creek WMA, and the GSL. By improving canal infrastructure in the steep canyon area and replacing aging infrastructure, the Siphons Installation Alternative would reduce the failure risks associated with seismic activity.	The Hammond and West Main Canals Improvements Alternative would cause temporary increases in erosion and sedimentation during construction, particularly during the rehabilitation of the Hammond East and West Main Canals, as well as the replacement of the BRCC Red Siphon, and levee improvements in the Bear River Migratory Bird Refuge and Salt Creek WMA. As required by UDEQ, the UPDES Program Large CGP would be followed for proposed activities Erosion control measures including BMPs and SWPPP would be applied to minimize effects. Long-term, the alternative would reduce canal seepage, thereby decreasing erosion and sedimentation, and indirectly benefiting slope stability in the Bear River Canyon, and would repair the levees and install a sediment basin indirectly improving wildlife habitats in the Bear River Migratory Bird Refuge, Salt Creek WMA, and GSL. By improving canal infrastructure in the steep canyon area and replacing aging infrastructure, the Hammond and West Main Canals Improvements Alternative would reduce the failure risks associated with seismic activity.

Resource Area	No Action Alternative (FWOFI)	Siphons Installation Alternative	Hammond and West Main Canals Improvements Alternative
Prime and Unique Farmlands	No effects to prime and unique farmland would occur. However, flooding and canal overtopping risks have the potential to continue negatively affecting approximately 450 acres of prime farmland from flooding related erosion effects due to high flows.	The Siphons Installation Alternative would cause temporary effects on approximately 13.0 acres and permanent effects on 9.0 acres of prime and unique farmlands. Consistent with the FPPA, the project is designed to support agricultural productivity and does not convert the 9.0 acres to non-agricultural use. Alternative sites were considered for the equalization ponds, but the selected sites were determined to be the most suitable due to proximity to existing operations and minimal environmental impact. BMPs and a SWPPP would be implemented to minimize erosion, while the rehabilitation of canal systems would reduce flood damage to around 450 acres of prime farmland in the long term. The project enhances the long-term viability of agricultural operations and aligns with both federal and local farmland protection goals and complies with the FPPA.	The Hammond and West Main Canals Improvements Alternative would cause temporary effects on approximately 13.0 acres and permanent effects on 9.0 acres of prime and unique farmlands. Consistent with the FPPA, the project is designed to support agricultural productivity and does not convert the 9.0 acres to non-agricultural use. Alternative sites were considered for the equalization ponds, but the selected sites were determined to be the most suitable due to proximity to existing operations and minimal environmental impact. BMPs and a SWPPP would be implemented to minimize erosion, while the rehabilitation of canal systems would reduce flood damage to around 450 acres of prime farmland in the long term. The project enhances the long-term viability of agricultural operations and aligns with both federal and local farmland protection goals and complies with the FPPA.
Vegetation			
Special Status Plant Species	No effect would occur to ULTs or any other special-status plant species in the action area.	The Siphons Installation Alternative would have no effect to ULTs because no suitable habitat for this species was identified within the Project Area. Conservation measures, such as minimizing vegetation removal and reseeding disturbed areas with native species, ensure no adverse effects to ULT.	The Hammond and West Main Canals Improvements Alternative would have no effect to ULTs because no suitable habitat for this species was identified within the Project Area. Conservation measures, such as minimizing vegetation removal and reseeding disturbed areas with native species, ensure no adverse effects to ULT.

Resource Area	No Action Alternative (FWOFI)	Siphons Installation Alternative	Hammond and West Main Canals Improvements Alternative
Riparian Areas	Under the FWOFI, no direct or indirect alteration of riparian areas or ecologically critical areas would occur. Approximately 35 acres of low-quality, seepage-induced riparian area vegetation would continue to persist in the Project Area.	The Siphons Installation Alternative, piping projects would directly and indirectly contribute to the loss of seepage induced riparian vegetation in the short and long term, including disturbance and removal during construction, and eventual vegetation loss of 35 acres of low quality, seepage induced riparian fringe after removal of hydrology from open canals sources when they are piped. New siphon construction would affect riparian vegetation along the Bear River.	The Hammond and West Main Canals Improvements Alternative piping projects would directly and indirectly contribute to the loss of seepage induced riparian vegetation in the short and long term, including disturbance and removal during construction, and eventual loss of 35 acres of low quality, seepage induced riparian fringe after removal of hydrology from open canals sources when they are piped. No vegetation removal along the Bear River would occur.
Noxious Weeds and Invasive Plants	The FWOFI would not alter current invasive plant species and noxious weed control practices; therefore, the FWOFI would have no effect on noxious weeds and invasive plant species. The BRCC, Highland Ditch Company, Central Canal Company, Salt Creek WMA, Bear River Club and CDC would continue to actively implement noxious weed and invasive species controls to manage and prevent their introduction and establishment.	During construction, BMPs would be incorporated into contractor specifications to control and prevent the introduction and spread of any invasive plant species or noxious weeds during construction activities. In the long term, the Siphons Installation Alternative would mitigate sedimentation within the Project Area and therefore would decrease the potential for spread and establishment of invasive plant species. The proposed siphon installations and box culvert installations in the BRCC Canyon area would decrease the likelihood of landslides and canal failures, events which potentially increase transport of sediment and invasive species. Improved water control capabilities at the levees and the sediment basin at the Salt Creek WMA would allow better management of invasive species such as *Phragmites*, helping to maintain and improve habitat diversity.	During construction, BMPs would be incorporated into contractor specifications to control and prevent the introduction and spread of any invasive plant species or noxious weeds during construction activities. In the long term, the Hammond and West Main Canals Improvements Alternative would mitigate sedimentation within the Project Area and therefore would decrease the potential for spread and establishment of invasive plant species. The proposed box culvert installations in the BRCC Canyon area would decrease the likelihood of landslides and canal failures, events which potentially increase transport of sediment and invasive species. Improved water control and capabilities at the levees and the sediment basin at the Salt Creek WMA would allow better management of invasive species such as *Phragmites*, helping to maintain and improve habitat diversity.

Resource Area	No Action Alternative (FWOFI)	Siphons Installation Alternative	Hammond and West Main Canals Improvements Alternative
Water Resources			
Surface & Ground Water Quality	The FWOFI would not alter surface and groundwater quality and remain subject to existing inefficiencies and infrastructure challenges. Aging infrastructure, such as levees and canals, would lead to further degradation in water quality due to ongoing erosion, sedimentation, and pollutant runoff.	During construction including installation of two siphons in Bear River and one siphon in Malad River, the Siphons Installation Alternative would temporarily alter hydrologic conditions and channel morphology, temporarily increasing the potential for sedimentation. A SWPPP and BMPs, such as erosion control and construction timing strategies, would minimize these temporary effects. In the long term, enhanced canal infrastructure would further minimize pollutant runoff and sediment deposition, promoting improved overall surface water quality. Long-term water quality benefits resulting from levee improvements and the installation of a sediment basin include reduced sediment transport into waterways, improved wetland function, and improved aquatic habitat conditions, and the project would comply with the Utah Surface Water Quality Standards and the CWA.	During construction including installation of one siphon on the Malad River, the Hammond and West Main Canals Improvements Alternative would temporarily alter hydrologic conditions and channel morphology, temporarily increasing the potential for sedimentation. A SWPPP and BMPs, such as erosion control and construction timing strategies, would minimize these temporary effects. In the long term, enhanced canal infrastructure would further minimize pollutant runoff and sediment deposition, promoting improved overall surface water quality. Long-term water quality benefits resulting from levee improvements and the installation of a sediment basin include reduced sediment transport into waterways, improved wetland function, and improved aquatic habitat conditions, and the project would comply with the Utah Surface Water Quality Standards and the CWA.
Surface & Ground Water Quantity	The FWOFI would not alter surface and groundwater quantity and remain subject to existing inefficiencies and infrastructure challenges. Existing canals would continue to experience water losses due to seepage and evaporation. Aging infrastructure, such as levees and canals, would lead to further degradation in water quality due to ongoing erosion and sedimentation.	The Siphons Installation Alternative would substantially enhance water conservation by reducing seepage and evaporative losses through over 9,300 feet of box culvert installations and over 61,970 feet of canal piping. This Alternative would result in infrastructure enhancements that would provide greater reliability and availability of water resources. A long-term improvement would occur in irrigation water delivery, increased water efficiency, and storage.	The Hammond and West Main Canals Improvements Alternative would substantially enhance water conservation by reducing seepage and evaporative losses through over 17.300 feet of box culvert installations and over 61,970 feet of canal piping. This Alternative would result in infrastructure enhancements that would provide greater reliability and availability of water resources. A long-term improvement would occur in irrigation water delivery, increased water efficiency, and storage.

Resource Area	No Action Alternative (FWOFI)	Siphons Installation Alternative	Hammond and West Main Canals Improvements Alternative
		These improvements collectively contribute to achieving regional goals for sustainable water management, benefiting agricultural productivity, ecological health, and long-term water delivery efficiency and reliability.	These improvements collectively contribute to achieving regional goals for sustainable water management, benefiting agricultural productivity, ecological health, and long-term water delivery efficiency and reliability.
Clean Water Act/ WOTUS	The FWOFI would not alter existing hydrological conditions, and inefficiencies in the irrigation system would persist.	The Siphons Installation Alternative construction actions would temporarily affect WOTUS through sedimentation, and alterations to hydrology, and channel morphology. Construction activities that involve dredging or filling in WOTUS would require Section 404 permitting from the USACE and Section 401 water quality certification from UDEQ. Including three siphon installations, transitioning the existing irrigation infrastructure to a pressurized system, box culvert and pipeline installation, levee improvement, and sediment basin construction. Through these regulatory processes, any effects to WOTUS would be mitigated, ensuring compliance with the CWA. Long-term, this alternative would result in improvement of water quality and quantity, and wetland functions within the Bear River watershed.	The Hammond and West Main Canals Improvements Alternative construction actions would temporarily affect WOTUS through sedimentation, and alterations to hydrology, and channel morphology. Construction activities that involve dredging or filling in WOTUS would require Section 404 permitting from the USACE and Section 401 water quality certification from UDEQ. Including one siphon installation, transitioning the existing irrigation infrastructure to a pressurized system, box culvert and pipeline installation, levee improvement, and sediment basin construction. Through these regulatory processes, any effects to WOTUS would be mitigated, ensuring compliance with the CWA. Long-term, this alternative would result in improvement of water quality and quantity, and wetland functions within the Bear River watershed.

Resource Area	No Action Alternative (FWOFI)	Siphons Installation Alternative	Hammond and West Main Canals Improvements Alternative
Wetlands	The FWOFI would have no new construction activities and therefore no direct effects to the 41.9 acres of wetlands and 77.2 acres of linear features delineated as WOTUS. Ongoing infrastructure challenges, including risks to agricultural water supplies, levee deterioration, and potential levee failures along Bear River, could indirectly degrade important wetland and aquatic resource conditions over time.	The Siphons Installation Alternative would have direct effects to wetlands from temporary and permanent disturbances, these effects would be minimized through BMPs, including revegetation, noxious weed prevention, and erosion control. Construction activities such as siphon installation, canal piping and box culvert installation, levee improvements, and sediment basin construction would have direct effects to wetlands. Permanent long-term effects would also occur, primarily limited to infrastructure footprints, including siphon installations, concrete structures, and levee armoring using riprap. Riprap would provide structural integrity, erosion protection, and accommodate environmental constraints such as ice flows, saline soils, and rodent pressures. Permanent effects would be limited to the footprint of these features. Final disturbance amounts would be refined during final design and permitting in coordination with USACE to ensure compliance with applicable regulatory requirements. Levee improvement would have an indirect long-term beneficial effect to thousands of acres of wetlands adjacent to the GSL.	The Hammond and West Main Canals Improvements Alternative would have direct effects to wetlands from temporary and permanent disturbances, these effects would be minimized through BMPs, including revegetation, noxious weed prevention, and erosion control. Construction activities such as siphon installation, canal piping and box culvert installation, levee improvements, and sediment basin construction would have direct effects to wetlands. Permanent long-term effects would also occur, primarily limited to infrastructure footprints, including a siphon installation, concrete structures, and levee armoring using riprap. Riprap would provide structural integrity, erosion protection, and accommodate environmental constraints such as ice flows, saline soils, and rodent pressures. Permanent effects would be limited to the footprint of these features. Final disturbance amounts would be refined during final design and permitting in coordination with USACE to ensure compliance with applicable regulatory requirements. Levee improvement would have an indirect long-term beneficial effect to thousands of acres of wetlands adjacent to the GSL.
Regional Water Management Plans	The FWOFI would not invest in infrastructure or water conservation. Persistent inefficiencies would continue, limiting achievement of Utah State Water Plan water management goals.	The Siphons Installation Alternative would meaningfully support regional sustainability goals by enhancing water conservation, improving infrastructure reliability, and protecting ecological habitats.	The Hammond and West Main Canals Improvements Alternative would meaningfully support regional sustainability goals by enhancing water conservation, improving infrastructure reliability, and protecting ecological habitats.

Resource Area	No Action Alternative (FWOFI)	Siphons Installation Alternative	Hammond and West Main Canals Improvements Alternative
Floodplain Management	Ongoing degradation of infrastructure would heighten the risk of flooding from levee failures, potentially affecting agricultural lands, homes, and infrastructure, and diminishing the floodplain's natural flood-moderating capacity.	The Siphons Installation Alternative would improve floodplain functionality by reinforcing levees with riprap armoring and constructing sediment basins to reduce sedimentation issues within the floodplain. Additionally, this alternative would install two siphons below the Bear River and one siphon below the Malad River, reducing the number of above-ground structures within the 100-year floodplain and decreasing flood risks associated with structural impediments during flood events. The levee stabilization methods selected under this alternative would provide necessary structural integrity, effectively protecting agricultural areas, homes, and other infrastructure within the floodplain. Improving approximately 25,700 feet of levees along the Bear River would significantly reduce the risk of levee failure and enhance flood management and stability. The sediment basin proposed at Salt Creek WMA would reduce sediment deposition and enhance floodplain capacity. These actions would enhance floodplain functionality and protect substantial wetland habitats from inundation and sediment deposition.	The Hammond and West Main Canals Improvements Alternative would improve floodplain management through extensive infrastructure upgrades. Installation of concrete box culverts and riprap armoring would stabilize canals and levees, significantly reducing the flooding risk by preventing canal overtopping and infrastructure failures. Additionally, this alternative would install one siphon beneath the Malad River, reducing above-ground structures within the 100-year floodplain and decreasing flood risks associated with structural impediments during flood events. The levee stabilization methods selected under this alternative would provide necessary structural integrity, effectively protecting agricultural areas, homes, and other infrastructure within the floodplain. Improving approximately 25,700 feet of levees along the Bear River would significantly reduce the risk of levee failure and enhance flood management and stability. The sediment basin proposed at Salt Creek WMA would reduce sediment deposition and enhance floodplain capacity. These actions would enhance floodplain functionality and protect substantial wetland habitats from inundation and sediment deposition.

Resource Area	No Action Alternative (FWOFI)	Siphons Installation Alternative	Hammond and West Main Canals Improvements Alternative
Wildlife			
Fish and Wildlife Habitat	The FWOFI would not change existing conditions of fish and wildlife habitat. Under the FWOFI, tailwater and sediment would continue to enter natural waterways and affect water quality, indirectly affecting wildlife, including fish species, and wildlife habitat in the Bear River, Malad River and the GSL. Seepage would continue under the FWOFI, which reduces available water within the Bear River Valley.	The Siphons Installation Alternative would temporarily increase ambient noise levels causing habitat disturbances and individual displacement during construction, but mitigation strategies such as seasonal construction timing, buffer zone maintenance, and habitat restoration efforts would help minimize adverse effects on wildlife. Long-term, piping canals and installing box culverts would permanently remove open water sources for wildlife and remove 35 acres of low-quality, seepage-induced riparian vegetation that wildlife, such as small mammals, waterfowl, and avian species, may use for forage, shelter, and stopover habitat. No sagebrush or crucial habitat would be removed that would affect the Columbian sharp-tailed grouse. mule deer, ring-necked pheasant, or turkey. Construction of two siphons in the BRCC Canyon Area would cause the permanent removal of approximately 6.9 acres of riparian fringe within the upper siphon area and 8.1 acres of riparian fringe within the lower siphon area along the Bear River, for a total of approximately 15 acres. Long-term benefits include improved water management, enhanced wetland ecosystems, and reduced risks of habitat loss due to erosion and infrastructure failures.	Under the Hammond and West Main Canals Improvements would temporarily increase ambient noise levels causing habitat disturbances and individual displacement during construction, but mitigation strategies such as seasonal construction timing, buffer zone maintenance, and habitat restoration efforts would help minimize adverse effects on wildlife. Long-term, piping canals and installing box culverts would permanently remove open water sources for wildlife and remove 35 acres of low-quality, seepage-induced riparian vegetation that wildlife, such as small mammals, waterfowl, and avian species, may use for forage, shelter, and stopover habitat. No sagebrush or crucial habitat would be removed that would affect the Columbian sharp-tailed grouse. mule deer, ring-necked pheasant, or turkey. Long-term benefits include improved water management, enhanced wetland ecosystems, and reduced risks of habitat loss due to erosion and infrastructure failures.

Resource Area	No Action Alternative (FWOFI)	Siphons Installation Alternative	Hammond and West Main Canals Improvements Alternative
Special Status Animal Species	The FWOFI would not change habitat for special status animal species. No effects to special status animal species or habitat in the action area would occur under the FWOFI.	The Siphons Installations Alternative would have no effect to the monarch butterfly and the Suckley's cuckoo bumble bee and may affect, is likely to adversely affect the yellow-billed cuckoo (YBCU). Construction of two siphons in the BRCC Canyon Area would cause the permanent removal of approximately 6.9 acres of riparian fringe within the upper siphon area and 8.1 acres of riparian fringe within the lower siphon area along the Bear River, for a total of approximately 15 acres of low quality and marginally suitable YBCU habitat.	The Hammond and West Main Canals Improvements Alternative would have no effect to the monarch butterfly and the Suckley's cuckoo bumble bee, and may affect, is not likely to adversely affect the YBCU. Although marginally suitable habitat for the YBCU may exist within the canyon section of the Lower Bear River, no potentially suitable habitat would be affected by project activities. Improvements to the Hammond and West Main Canals would not require construction or vegetation removal immediately on the banks of the Bear River or involve direct removal of vegetation within the delineated YBCU habitat patches. BMPs include measures to avoid construction during the YBCU's breeding and nesting season (June 30–August), which would limit noise disturbance within 0.5 miles of the Project Area. Long-term, project activities would benefit habitat through improved water management, enhanced wetland ecosystems, and reduced risks of habitat loss due to erosion and infrastructure failures.

Resource Area	No Action Alternative (FWOFI)	Siphons Installation Alternative	Hammond and West Main Canals Improvements Alternative
Migratory Birds and Bald and Golden Eagles	The FWOFI would not change habitat for protected avian species, including migratory birds, eagles, or raptors. No effects to protected avian species or habitat in the Project Area would occur under the FWOFI.	The Siphons Installation Alternative would have minor, temporary and short-term effects to migratory bird species in the Project Area from construction noise, vegetation removal along piped areas and the siphon installation locations, and loss of open water sources and seepage induced wetlands. BMPs, including pre-construction surveys and seasonal restrictions, would avoid and minimize the effects to protected avian species consistent with the MBTA and BGEPA. Long-term, project activities would benefit habitat through improved water management, enhanced wetland ecosystems, and reduced risks of habitat loss due to erosion and infrastructure failures.	The Hammond and West Main Canals Alternative would have minor, temporary and short-term effects to migratory bird species in the Project Area from construction noise, vegetation removal along piped areas, and loss of open water sources and seepage induced wetlands. BMPs, including pre-construction surveys and seasonal restrictions, would avoid and minimize effects to protected avian species consistent with the MBTA and BGEPA. Long-term, project activities would benefit habitat through improved water management, enhanced wetland ecosystems, and reduced risks of habitat loss due to erosion and infrastructure failures.

Resource Area	No Action Alternative (FWOFI)	Siphons Installation Alternative	Hammond and West Main Canals Improvements Alternative
Human Environment			
Cultural and Historic Resources	The FWOFI would not cause effects to historic properties, however long-term neglect could result in an adverse effect if the irrigation and levee systems cease to function properly. Eight sites were determined eligible for listing on the NRHP.	The Siphons Installation Alternative would have an adverse effect on four canals and no adverse effect on the Union Pacific Railroad, the Bear River Club Dike, the Unnamed Levee, and the Old River Channel Canal sites. If construction activities uncover any materials of cultural or historic significance (i.e., bone fragments, pottery, stone tools, burial features, etc.), construction would halt, and procedures outlined in the NRCS Prototype Programmatic Agreement with the Utah SHPO would be followed (NRCS and SHPO 2025).	The Hammond and West Main Canals Alternative would have an adverse effect on four canals and no adverse effect on the Union Pacific Railroad, the Bear River Club Dike, the Unnamed Levee, and the Old River Channel Canal sites. Section 106 consultation was initiated on June 12, 2024 and is ongoing with the Eastern Shoshone Tribe of the Wind River Reservation, Wyoming, the Shoshone-Bannock Tribes of the Fort Hall Reservation, the Ute Indian Tribe of the Uintah & Ouray Reservation, Utah, the Northwest Band of the Shoshone Nation, the Skull Valley Band of Goshute and the Confederated Tribes of the Goshute Reservation. The NRCS State Conservationist, in consultation with the Utah SHPO, Tribes/THPOs, cooperating agencies (USACE, EPA, and Reclamation), and other consulting parties (USFWS, NPS, and UDWiR) determined that the project would have an Adverse Effect to Historic Properties (36 CFR 800.5(d)). NRCS prepared a draft Memorandum of Agreement (MOA) to resolve the adverse effects. Copies of all consultation correspondence and the Utah SHPO concurrence letter are located in Appendix A. If construction activities uncover any materials of cultural or historic significance (i.e., bone fragments, pottery, stone tools, burial features, etc.), construction would halt, and procedures outlined in the NRCS Prototype Programmatic Agreement with the Utah SHPO would be followed (NRCS and SHPO 2025).

Resource Area	No Action Alternative (FWOFI)	Siphons Installation Alternative	Hammond and West Main Canals Improvements Alternative
Scientific Resources	The FWOFI would have no effects to paleontological resources.	The Siphons Installation Alternative is not expected to uncover significant fossils (see UDNR concurrence letter in Appendix A). Unless fossils are discovered during construction activities this alternative would have no direct or indirect effects because the quaternary and recent alluvial and lacustrine deposits in the area are unlikely to contain paleontological resources. If fossils are discovered during construction activities, work would be halted within 50 feet of the discovery and notification made to UDNR.	The Hammond and West Main Canals Alternative is not expected to uncover significant fossils (see UDNR concurrence letter in Appendix A). Unless fossils are discovered during construction activities this alternative would have no direct or indirect effects because the quaternary and recent alluvial and lacustrine deposits in the area are unlikely to contain paleontological resources. If fossils are discovered during construction activities, work would be halted within 50 feet of the discovery and notification made to UDNR.
Public Health and Safety	The No Action Alternative would not address safety hazards. The potential for canal failures in the canyon and flooding would persist. Open canals would continue to pose a public risk from flooding and open sources of water near residential areas would continue to pose long-term public health and safety hazards.	The Siphons Installation Alternative would install a siphon system in the canyon area to reduce water losses and help stabilize landslide prone soils. The alternative would also replace open canals with piped systems to prevent flooding and eliminate open water hazards. These improvements would reduce the likelihood of landslides and improve safety. Given the history of major canal failures in the BRCC water system, which provides irrigation water to over 65,500 acres of agricultural land, as well as was to nearby cities and towns like Tremonton and Bear River City, and the dangers open canals pose to the public, this alternative would provide major long-term beneficial improvements to public health and safety in the Project Area and the Watershed Area.	The Hammond and West Main Canals Improvements Alternative would install box culverts in the canyon area to reduce water losses and help stabilize landslide prone soils. The alternative would also replace open canals with piped systems to prevent flooding and eliminate open water hazards. These improvements would reduce the likelihood of landslides and improve safety. Given the history of major canal failures in the BRCC water system, which provides irrigation water to over 65,500 acres of agricultural land, as well as was to nearby cities and towns like Tremonton and Bear River City, and the dangers open canals pose to the public, this alternative would provide major long-term beneficial improvements to public health and safety in the Project Area and the Watershed Area.

Resource Area	No Action Alternative (FWOFI)	Siphons Installation Alternative	Hammond and West Main Canals Improvements Alternative
Hazardous Materials	No direct effects to hazardous materials in the Project Area would occur under the FWOFI. Ongoing flooding could disturb existing facilities and environmental incidents.	The Siphons Installation Alternative has one hazardous materials site identified within 15 feet of project activities. This site is unlikely to be disturbed because activities are confined to the road ROW. Additionally, BMPs would be implemented to minimize potential effects including minimizing soil disturbance, and if hazardous materials are encountered, notifying UDEQ, and handling site material appropriately. No hazardous materials would be generated under this alternative. Because the Proposed Project would comply with contract provisions regarding hazardous or solid waste and they would also develop and implement the SPCC Plan and the SWPPP, handling of hazardous materials would comply with all applicable laws and regulations and would not cause health hazards or environmental concerns.	The Hammond and West Main Canals Improvements Alternative has one hazardous materials site identified within 15 feet of project activities. This site is unlikely to be disturbed because activities are confined to the road ROW. Additionally, BMPs would be implemented to minimize potential effects including minimizing soil disturbance, and if hazardous materials are encountered, notifying UDEQ, and handling site material appropriately. No hazardous materials would be generated under this alternative. Because the Proposed Project would comply with contract provisions regarding hazardous or solid waste and they would also develop and implement the SPCC Plan and the SWPPP, handling of hazardous materials would comply with all applicable laws and regulations and would not cause health hazards or environmental concerns.
Transportation and Infrastructure	The No Action Alternative would not address aging and inefficient infrastructure concerns or levee breach risks, continuing to put nearby transportation and infrastructure at risk.	The Siphons Installation Alternative would cause temporary, localized traffic delays would occur during construction activities. Long-term, beneficial effects to transportation and infrastructure would occur by reducing the risk of landslides, flood damage, and levee breach.	The Hammond and West Main Canals Improvements Alternative would cause temporary, localized traffic delays during construction activities. Long-term, beneficial effects to transportation and infrastructure would occur by reducing the risk of landslides, flood damage, and levee breach.

Resource Area	No Action Alternative (FWOFI)	Siphons Installation Alternative	Hammond and West Main Canals Improvements Alternative
Noise	The No Action Alternative would have no effect on noise levels in the Project Area.	The Siphons Installation Alternative would temporarily increase noise associated with construction equipment and vehicles during implementation. Noise mitigation measures would be implemented during construction to minimize temporary noise effects. Permanent noise effects would occur from the Siphons Installation Alternative from the construction of a new pump station in Bear River City. This pump station would have a masonry control house to minimize noise. The long-term noise level increase from the pump station would be minor.	The Hammond and West Main Canals Improvements Alternative would temporarily increase noise associated with construction equipment and vehicles during implementation. Noise mitigation measures would be implemented during construction to minimize temporary noise effects. Permanent noise effects would occur from the Hammond and West Main Canals Improvements Alternative from the construction of a new pump station in Bear River City. This pump station would have a masonry control house to minimize noise. The long-term noise level increase from the pump station would be minor.

Resource Area	No Action Alternative (FWOFI)	Siphons Installation Alternative	Hammond and West Main Canals Improvements Alternative
Visual Resources and Scenic Beauty	The No Action Alternative would not affect visual resources and scenic beauty; however, ongoing landslides, flooding, and levee breach risks could potentially alter the landscape.	The Siphons Installation Alternative would temporarily affect visual quality and recreational activities due to the presence of construction equipment and crews. However, implementation of BMPs would help minimize potential visual effects. In the long term, future canal overtopping and flooding, landslides in the canyon area, and levee degradation and sedimentation would be reduced, preserving the existing scenic beauty of cities, towns, and the canyon and wetland areas. The Siphons Installation Alternative would have permanent effects to visual resources from installation of eleven manhole access areas for the siphons. The visual effect of these manholes would be negligible, as they would be installed flush with the ground, measuring 3-feet by 3-feet, and spaced 500 feet apart. They would be difficult to notice unless directly over them. After reclamation and vegetation establishment, the visual changes from the Siphons Installation Alternative would be substantially unnoticeable and not measurably different from current conditions of the surrounding landscape, and would not change the VRM classifications, nor would it change the visual characteristic of the landscape.	The Hammond and West Main Canals Improvements Alternative would temporarily affect visual quality and recreational activities due to the presence of construction equipment and crews. However, implementation of BMPs would help minimize potential visual effects. In the long term, future canal overtopping and flooding, landslides in the canyon area, and levee degradation and sedimentation would be reduced, preserving the existing scenic beauty of cities, towns, and the canyon and wetland areas. After reclamation and vegetation establishment, the visual changes from the Hammond and West Main Canals Improvements Alternative would be substantially unnoticeable and not measurably different from current conditions of the surrounding landscape, and would not change the VRM classifications, nor would it change the visual characteristic of the landscape.

Resource Area	No Action Alternative (FWOFI)	Siphons Installation Alternative	Hammond and West Main Canals Improvements Alternative
Recreation	The No Action Alternative would result in continued landslide, flooding, and levee breach risks, negatively affecting recreational facilities and 24,000 acres of critical wetland habitat in the area.	The Siphons Installation Alternative would cause temporary disruptions to some recreational activities during construction due to increased traffic, construction equipment, and noise. Some undesignated camping and hiking access or fishing areas may temporarily be closed during construction around the BRCC canals. These recreational opportunities would be expected to resume following completion of nearby construction activities. Long-term benefits include reducing landslide potential, creating a safer canyon area, and improving wetland habitats for better wildlife and bird viewing opportunities.	The Hammond and West Main Canals Improvements Alternative would cause temporary disruptions to some recreational activities during construction due to increased traffic, construction equipment, and noise. Some undesignated camping and hiking access or fishing areas may temporarily be closed during construction around the BRCC canals. These recreational opportunities would be expected to resume following completion of nearby construction activities. Long-term benefits include reducing landslide potential, creating a safer canyon area, and improving wetland habitats for better wildlife and bird viewing opportunities.
Special Designations			
Land Use	The No Action Alternative would result in continued landslide, flooding, and levee breach risks, leaving homes, structures, agricultural lands, and 24,000 acres of critical wetland habitat at risk. There would be no change to land use. This alternative would not meet the goals of either the Box Elder County RMP or the State RMP.	The Siphons Installation Alternative would permanently convert approximately 9.0 acres of prime and unique farmlands to water storage uses as a result of new equalization ponds. This land use would still be consistent with local zoning as it would be used for secondary water management purposes. No work would take place within or over the Water Source Protection Zone 2 within Tremonton City and no land use would change in this area. The Siphons Installation Alternative would meet the goals of the Box Elder County RMP and the State RMP.	The Hammond and West Main Canals Improvements Alternative would permanently convert approximately 9.0 acres of prime and unique farmlands to water storage uses as a result of new equalization ponds. This land use would still be consistent with local zoning as it would be used for secondary water management purposes. No work would take place within or over the Water Source Protection Zone 2 within Tremonton City and no land use would change in this area. The Hammond and West Main Canals Improvements Alternative would meet the goals of the Box Elder County RMP and the State RMP.

Resource Area	No Action Alternative (FWOFI)	Siphons Installation Alternative	Hammond and West Main Canals Improvements Alternative
Natural Areas	The No Action Alternative would not address failing levee concerns or sedimentation in critical habitat areas.	The Siphons Installation Alternative would protect over 24,000 acres of wetlands by improving levees and reducing sedimentation. It would provide long-term benefits to water quality and wetland habitats, with minimal effects during construction. Overall, the project would positively affect designated natural areas, enhancing water management and reducing disruptions.	The Hammond and West Main Canals Improvements Alternative would protect over 24,000 acres of wetlands by improving levees and reducing sedimentation. It would provide long-term benefits to water quality and wetland habitats, with minimal effects during construction. Overall, the project would positively affect designated natural areas, enhancing water management and reducing disruptions.
Ecologically Critical Areas	The No Action Alternative would not affect ecologically critical areas. However, deteriorating levees along the Bear River and at the Salt Creek WMA and associated bank erosion would continue to threaten failure of the levees and loss of water management, agricultural water, and thousands of acres of high-quality wetland habitat. Additionally, water would continue to be lost in the irrigation system from seepage and evaporation in the Project Area, and the additional water necessary to meet irrigation needs would be removed from the Bear River causing less water to reach the GSL.	The Siphons Installation Alternative would have an indirect long-term benefit to the ecologically critical GSL. Proposed levee improvements would help maintain the wetlands of the GSL. Furthermore, reducing seepage in the irrigation system would contribute to an increased release of water from Cutler Dam into the GSL. This measure would help mitigate the drying of the GSL, which has lost approximately half of its historical volume.	The Hammond and West Main Canals Improvements Alternative would have an indirect long-term benefit to the ecologically critical GSL. Proposed levee improvements would help maintain the wetlands of the GSL. Furthermore, reducing seepage in the irrigation system would contribute to an increased release of water from Cutler Dam into the GSL. This measure would help mitigate the drying of the GSL, which has lost approximately half of its historical volume.

Resource Area	No Action Alternative (FWOFI)	Siphons Installation Alternative	Hammond and West Main Canals Improvements Alternative
Parklands, National Parks, Monuments and Historic Sites	The No Action Alternative would have no direct effect on Parklands, National Parks, Monuments, or Historical Sites, including the Salt Lake Cut-off of the California NHT, but ongoing landslide, flooding, and levee breach risks could cause indirect long-term effects on recreational opportunities, visual resources, and land use.	The Siphons Installation Alternative could indirectly affect the Salt Lake Cut-off of the California National Historic Trail (NHT) by temporarily changing the historic setting, scenery, natural resources, and recreation of the trail. These effects would be localized and would cease following construction and site restoration. No direct or permanent effects would occur to the Salt Lake Cut-off of the California NHT itself. Long-term, the Siphons Installation Alternative would provide beneficial effects to the Salt Lake Cut-off of the California NHT. The piping and covering of post-migration period canals would enhance the historic setting and scenery of the Salt Lake Cut-off of the California NHT over time. Other benefits include enhanced recreational opportunities by reducing sedimentation and improving water quality in the surrounding wetland habitats and removing post-period canals.	The Hammond and West Main Canals Improvements Alternative could indirectly affect the Salt Lake Cut-off of the California National Historic Trail (NHT) by temporarily changing the historic setting, scenery, natural resources, and recreation of the trail. These effects would be localized and would cease following construction and site restoration. No direct or permanent effects would occur to the Salt Lake Cut-off of the California NHT itself. Long-term, the Hammond and West Main Canals Improvements Alternative would provide beneficial effects to the Salt Lake Cut-off of the California NHT. The piping and covering of post-migration period canals would enhance the historic setting and scenery of the Salt Lake Cut-off of the California NHT over time. Other benefits include enhanced recreational opportunities by reducing sedimentation and improving water quality in the surrounding wetland habitats and removing post-period canals.

5.3.1 Economics/Socioeconomics

5.3.1.1 Economics

No Action Alternative

The No Action Alternative would have a long-term effect on the economy in Tremonton, Bear River City, and unincorporated Box Elder County. The BRCC Canal would continue to fail, and the current average repair cost is approximately $268,250. Average annual damages under the No Action Alternative include approximately $3.4 million in expected agricultural damages and $5.0 million in wetland damages, for a total of approximately $8.4 million in damages per year. The BCR was not calculated as no benefits would occur.

Siphons Installation Alternative

To improve agricultural water management and watershed protection in the Lower Bear River Watershed, the Siphons Installation Alternative would cost $4,240,300 annually for installation and O&M associated with installation, operation, and replacement of project structures, but would generate $9,134,600 annually in benefits from reduced agricultural damage, reduced farm income damage, reduced OM&R, reduced infrastructure investment costs, reduced water treatment costs, and reduced damage to wetlands. The resulting BCR for the Siphons Installation Alternative is 2.2. See the Benefit-cost Analysis (Appendix E1) for additional details on the costs and benefits of the Siphons Installation Alternative.

Hammond and West Main Canals Improvements Alternative

To improve agricultural water management and watershed protection in the Lower Bear River Watershed, the Hammond and West Main Canals Improvements Alternative would cost $4,226,700 annually for installation and O&M associated with installation, operation, and replacement of project structures, but would generate $9,134,600 annually in benefits from reduced agricultural damage, reduced OM&R, reduced infrastructure investment costs, reduced water treatment costs, and reduced damage to wetlands. The resulting BCR for the Hammond and West Main Canals Improvements Alternative is 2.2. See Section 6.11 and the Benefit-cost Analysis (Appendix E1) for additional details on the costs and benefits of the Hammond and West Main Canals Improvements Alternative.

5.3.1.2 Socioeconomics

No Action Alternative

Under the No Action Alternative, no additional jobs would be created. Average annual damages under the FWOFI are approximately $8.4 million per year, including $3.4 million of expected agricultural damages and $5.0 million in damage to wetlands.

Siphons Installation Alternative

Several direct and indirect effects to socioeconomics in the Project Area would result from the implementation of the Siphons Installation Alternative. Direct effects of the Siphons Installation Alternative include the creation of approximately 100 temporary jobs within the Project Area during construction, and the use of $26,383,773 in local match funds to construct the Siphons

Installation Alternative. As discussed in Section 5.3.1.1 and determined by the Benefit-cost Analysis (Appendix E), the BCR for the Siphons Installation Alternative is 2.2.

Additional considerations were not quantified in the economic analysis but have economic effects. Economically, the Central Canal Company Piping would have a significant economic multiplier effect. The economic benefits generated from a more productive agricultural sector would include local job retention, increased market activity and reduced economic volatility.

In addition, the Siphons Installation Alternative would replace the existing rural water delivery systems in Bear River City and Tremonton. This upgrade would include the construction of storage and pumping facilities. These improvements would provide pressurized water to a new secondary irrigation network for both Bear River City and Tremonton, resulting in more efficient water use and lower water treatment costs. The implementation of these systems would conserve a significant amount of rural water annually, resulting in long-term beneficial effects on the Bear River City and Tremonton.

Hammond and West Main Canals Improvements Alternative

Similar to the Siphons Installation Alternative, the Hammond and West Main Canals Improvements Alternative would produce several direct and indirect effects to socioeconomics from implementation. Direct effects include creation of approximately 100 temporary jobs within the Project Area during construction, and the use of $26,304,867 in local match funds to construct the Hammond and West Main Canals Improvements Alternative. As discussed in Section 5.3.1.1 and determined by the Benefit-cost Analysis (Appendix E1), the BCR for the Hammond and West Main Canals Improvements Alternative is 2.2.

Additional considerations were not quantified in the economic analysis but have economic effects. Economically, the Central Canal Company Piping would have a significant economic multiplier effect. The economic benefits generated from a more productive agricultural sector would include local job retention, increased market activity and reduced economic volatility.

In addition, the Hammond and West Main Canals Improvements Alternative would replace existing rural water delivery systems in Bear River City and Tremonton. This upgrade would include the construction of storage and pumping facilities. These improvements would provide pressurized water to a new secondary irrigation network for both Bear River City and Tremonton, resulting in more efficient water use and lower water treatment costs. The implementation of these systems would conserve a significant amount of rural water annually, resulting in long-term beneficial effects on the Bear River City and Tremonton.

5.3.2 Air Quality and Climate

5.3.2.1 Clean Air Act/National Ambient Air Quality Standards, Climate & Greenhouse Gases

No Action Alternative

Under the No Action Alternative, no long-term or direct effects on air quality would occur. Periodic equipment operation associated with ongoing maintenance of the existing infrastructure and debris cleanup after flood events would continue to contribute temporary, negligible effects to air quality. Emissions due to equipment operation (GHGs) and potential dust generation (PM)

from land disturbance activities associated with maintenance and flood clean-up would occur. Effects would be negligible and would be reduced following maintenance activities. It is currently unknown how often maintenance activities would be completed. The No Action Alternative would not violate the CAA or NAAQS.

Toxic dust from the GSL would likely still occur. Seepage would continue in the irrigation system requiring more water to be pulled from the Bear River causing less water to reach the GSL, contributing to the toxic dust.

Under the No Action Alternative, seepage and evaporative losses would persist within the watershed, and local agricultural producers would continue to have little flexibility or resilience to future drought conditions.

Siphons Installation Alternative

Under the Siphons Installation Alternative, temporary, direct negligible effects to air quality resulting from construction of the Siphons Installation Alternative would occur from equipment operation and land disturbance activities. These temporary effects to air quality from construction disturbances would be localized and would be reduced following construction completion.

Toxic dust would likely still occur under the Siphons Installation Alternative. However, the water conserved in the system would indirectly benefit the GSL, as the Bear River is the largest tributary to the GSL.

In the long term, two existing pump stations would be upgraded as part of the Tremonton Pressure Irrigation Improvements and the Tremonton Irrigation Storage, and one new pump station would be installed as part of the Bear River City Pressure Irrigation system. Tremonton would use the two existing pump houses and add a 75 horsepower (HP) electric pump and a 60 HP electric pump. The Bear River City system would install a new 60 HP electric pump with pump house. All pumps would be connected directly to the existing electric grid. Electric pumps traditionally produce fewer emissions than diesel or natural gas-powered devices. Due to their connectivity to the existing electric grid, their overall emission rates would be minor in the Project Area over the long term.

The General Conformity Regulations are applicable to the Proposed Project; thus, it must comply with the regulations. As part of the $PM_{2.5}$ emissions calculations, the $PM_{2.5}$ Emissions Memo in Appendix E1 reviewed two operational scenarios-normal pump operations of 24 hours/day during the irrigation season (April-October [6 months or ~183 days]) as well as a worst-case scenario where the pumps operate 24 hours/day, 365 days/yr). Using the EPA's eGRID generation region's most recent average annual $PM_{2.5}$ emissions, direct and indirect emissions of $PM_{2.5}$ were calculated for both the normal operations and worst-case scenario. $PM_{2.5}$ emissions were calculated at 24.9 lbs./yr. or 0.012 tons/yr. for normal operations, while emissions of 49.7 lbs./yr. or 0.02 tons/yr. were calculated for the worst-case scenario (see $PM_{2.5}$ Emissions Calculation Memo in Appendix E1 for details).

Regulations at 40 CFR Part 93.153 defines the *de minimis* threshold for a nonattainment area as less than 70 tons/year (CFR, 2025). The State of Utah's limits on $PM_{2.5}$ emissions are the same. According to the Utah Administrative Rule R307-403-5(2)(b)(ii), a major source is defined as one that emits or has the potential to emit 70 tpy or more of direct $PM_{2.5}$ emissions within a serious nonattainment area (UAR 2018). In either case, calculated $PM_{2.5}$ emissions are well

below the *de minimis* threshold. Additionally, in the State of Utah, R307-403-5(2)(c) defines a significant emission increase or significant net emission increase as equaling or exceeding 10 t/yr of direct $PM_{2.5}$. In either of the cases tested above, neither would equal or exceed the state limit for a significant emission increase or a net significant emissions increase, thereby not requiring permitting or emissions offsets.

40 CFR Part 95.153 states that a "conformity determination is required for each criteria pollutant or precursor where the total of direct and indirect emissions of the criteria pollutant in a nonattainment or maintenance area caused by a Federal action would equal or exceed any the rates in paragraph (b)(1) or (2) of this section." As discussed above, the $PM_{2.5}$ direct emissions from serious nonattainment areas as 70 tons/yr (CFR 2025). As discussed above, the action would NOT equal or exceed the stated rates. Therefore, a more detailed conformity determination is not required for the Siphons Installation Alternative.

According to the General Conformity Regulations, activities demonstrate conformity if a federal agency can document the annual net increase in emissions caused by the proposed activities and can demonstrate that the activities would not interfere with the State or Tribe's ability to attain or maintain NAAQS. In either normal operations (24 hours/day, 183 days/yr) or the worst-case scenario (24 hours/day, 365 days/year), the Siphons Installation Alternative would not exceed $PM_{2.5}$ emission levels for the *de minimis* threshold. In fact, the Siphons Installation Alternative would result in less than 1% of the *de minimis* emissions limit, and therefore, would not interfere with the State or Tribe's ability to attain or maintain NAAQS.

Fugitive dust and GHG emission increases associated with the Siphons Installation Alternative would be minimized by implementation of applicable BMPs (see Section 6.6 and Appendix E1). These emission rates are not expected to increase in the Project Area over the long term. These effects would not have major, long-term effects to air quality, particularly to $PM_{2.5}$ emissions, nor would they prevent or impede the meeting of CAA standards or the maintenance phase of the SIP. The alternative would not violate the CAA or NAAQS.

By improving agricultural water management, including conserving and improving water quality, including aquatic habitat, the Siphons Installation Alternative would make the watershed area and the irrigation systems more resilient to climate stress, especially with the uncertain increases in variability of temporal and spatial patterns of precipitation, evaporation, and water availability which could challenge water resource systems.

Hammond and West Main Canals Improvements Alternative

Under the Hammond and West Main Canals Improvements Alternative, temporary, negligible, direct effects to air quality resulting from construction activities would occur from equipment operation and land disturbance activities. These temporary effects to air quality from construction disturbances would be localized and would be reduced following construction completion.

Toxic dust would likely still occur under the Hammond and West Main Canals Alternative. However, the water conserved in the system would indirectly benefit the GSL, as the Bear River is the largest tributary to the GSL.

Additionally, two existing pump stations would be upgraded as part of the Tremonton Pressure Irrigation Improvements and the Tremonton Irrigation Storage, and one new pump station would be installed as part of the Bear River City Pressure Irrigation system. Tremonton would use the

two existing pump houses and add a 75 HP electric pump and a 60 HP electric pump. The Bear River City system would install a new 60 HP electric pump with pump house. All pumps would be connected directly to the existing electric grid. Electric pumps traditionally produce fewer emissions than diesel or natural gas-powered devices. Due to their connectivity to the existing electric grid, their overall emission rates would be minor in the Project Area over the long-term.

As discussed above, the CAA's General Conformity Regulations are applicable to the Proposed Project, thus it must comply with the regulations. Since the Siphons Installation Alternative and the Hammond and West Main Canals Improvements Alternative both include the pump installation components, the $PM_{2.5}$ emissions calculations apply to both alternatives. $PM_{2.5}$ emissions were calculated at 24.9 lbs./yr. or 0.012 tons/yr. for normal operations, while emissions of 49.7 lbs./yr. or 0.02 tons/yr. were calculated for the worst-case scenario (see $PM_{2.5}$ Emissions Memo in Appendix E1 for details). In either case, calculated PM 2.5 emissions are well below the *de minimis* threshold and neither case would equal or exceed the state limit for a significant emission increase or a net significant emissions increase, thereby not requiring permitting or emissions offsets within the State of Utah. Since the installation of the pumps would NOT equal or exceed the stated rates and would not interfere with the State or Tribe's ability to attain or maintain NAAQS, a more detailed conformity determination is not required for the Hammond and West Main Canals Improvements Alternative.

Fugitive dust and GHG emission increases associated with the Hammond and West Main Canals Improvements Alternative would be minimized by implementation of applicable BMPs (see Section 6.3 and Appendix E1). These emission rates are not expected to increase in the Project Area over the long term.

These effects would not have major, long-term effects to air quality, particularly to $PM_{2.5}$ emissions, nor would they prevent or impede the meeting of CAA standards or the maintenance phase of the SIP. The alternative would not violate the CAA or NAAQS.

By improving agricultural water management, including conserving and improving water quality, including aquatic habitat, the Hammond and West Main Canals Improvements Alternative would make the watershed area and the irrigation systems more resilient to climate stress, especially with the uncertain increases in variability of temporal and spatial patterns of precipitation, evaporation, and water availability which could challenge water resource systems.

5.3.3 Soils and Geology

5.3.3.1 Upland Erosion and Sedimentation

No Action Alternative

The No Action Alternative would not affect upland erosion and sedimentation as no project work would be completed. However, the No Action Alternative would also not address any project concerns, including potential erosion and sedimentation. The existing BRCC irrigation canal system would continue to be at risk of failure on the steep slopes due to slope erosion during high intensity rain events. Additionally, the seismic risks in the area would continue to affect the aging infrastructure in the Bear River Canyon, which is more likely to fail. According to the Geologic Hazard Review conducted in 2024, "the risk of seismic induced slope instability is present along the majority of the West Main and Hammond Canal alignments" (Terracon 2024). Sediment and debris build-up would continue to occur in the existing Highland Ditch irrigation

system, causing overtopping during spring run-off and heavy storms and resulting in continued flooding damage. Additionally, the watershed would continue to experience sediment build-up at the existing levees and in Salt Creek within protected wildlife habitat, causing ongoing habitat concerns.

Siphons Installation Alternative

Under the Siphons Installation Alternative, temporary, direct increases in erosion and sedimentation would occur in the Bear River, Malad River, and nearby downstream areas during construction, particularly during the construction of the BRCC Canyon siphons and replacement of the BRCC Red Siphon. Additionally, temporary, direct increases in erosion and sedimentation would occur in the Bear River Migratory Bird Refuge and Salt Creek WMA during completion of the proposed levee improvements. Erosion control measures such as BMPs and SWPPP would be implemented to minimize these effects. The erosion and sedimentation would decrease following the completion of construction and site restoration. Erosion and sedimentation into nearby surface waters would be negligible during the construction of the other alternative measures.

BMPs and soil management practices would be implemented during and after construction to minimize erosion. Additionally, the UPDES Program Large CGP would be followed for proposed activities, and a SWPPP that outlines erosion control BMPs to control erosion and sedimentation during and post-construction would be included as part of the specific requirements for the discharge of stormwater associated with construction activities.

Long-term, the Siphons Installation Alternative would decrease erosion and sedimentation by reducing canal seepage, which would have indirect but net beneficial effects on slope stability in the Bear River Canyon and downstream areas. The Siphons Installation Alternative would also have a direct and long-term net beneficial effect on the Bear River Migratory Bird Refuge, the Salt Creek WMA, and the GSL by reducing sedimentation, which would also indirectly improve wildlife habitat in those areas. The Siphons Installation Alternative would also reduce failure risks associated with seismic activity, as new infrastructure is less likely to fail than aging and leaking infrastructure, which indirectly reduces the risks of water delivery disruptions to the system.

Hammond and West Main Canals Improvements Alternative

Under the Hammond and West Main Canals Improvements Alternative, temporary, direct increases in erosion and sedimentation would occur in the Bear River, Malad River, and nearby downstream areas during construction, particularly during the rehabilitation of the Hammond East and West Main Canals, as well as the replacement of the BRCC Red Siphon. Additionally, temporary, direct increases in erosion and sedimentation would occur in the Bear River Migratory Bird Refuge and Salt Creek WMA during completion of the proposed levee improvements. As required by UDEQ, the UPDES Program Large CGP would be followed for proposed activities, and BMPs and a SWPPP would be implemented to minimize effects. The erosion and sedimentation would decrease following the completion of construction and site restoration. Erosion and sedimentation into nearby surface waters would be negligible during the construction of the other alternative measures.

Long-term, the Hammond and West Main Canals Improvements Alternative would decrease erosion and sedimentation by reducing canal seepage, which would have indirect but net

beneficial effects on slope stability in the Bear River Canyon and downstream areas. This alternative would also have a direct and long-term net beneficial effect on the Bear River Migratory Bird Refuge, the Salt Creek WMA, and the GSL by reducing sedimentation, which would also indirectly improve wildlife habitat in those areas. The Hammond and West Main Canals Improvements Alternative would also reduce failure risks associated with seismic activity, as new infrastructure is less likely to fail than aging and leaking infrastructure, which indirectly reduces the risks of water delivery disruptions to the system.

5.3.3.2 Prime & Unique Farmland

No Action Alternative

Under the No Action Alternative, no new direct effects to prime and unique farmlands would occur due to construction activities. However, flooding and canal overtopping risks have the potential to continue negatively affecting approximately 450 acres of prime farmland from flooding related erosion effects due to high flows. Continued flooding would have long-term, major direct and permanent negative effects on prime and unique farmlands in the area.

Siphons Installation Alternative

Under the Siphons Installation Alternative, approximately 60.3 acres of land classified as Farmland of Statewide Importance and 390.6 acres of land classified as Prime Farmland if irrigated are located within the Analysis Area.

During construction of the Salt Creek WMA improvements, approximately 13.0 acres of land classified as Farmlands of Statewide Importance would be used for staging areas. These lands are currently undeveloped and are used primarily as agricultural land, therefore meeting the criteria for Farmland of Statewide Importance under the FPPA. However, long-term effects to these lands would not occur after project completion because the lands classified as Farmland of Statewide Importance would be returned to pre-construction conditions following the completion of construction activities. Therefore, these lands would not be permanently removed from use as agricultural lands.

While located on lands classified as Prime Farmland if Irrigated, the new Tremonton Pressure Irrigation system would be located within a residential area that is not currently being used as agricultural lands. Likewise, the Bear River City Pressure Irrigation system is located on agricultural lands classified as both Farmlands of Statewide Importance and Prime Farmland if Irrigated. However, these lands are located within a residential area that is not currently being used for agricultural production.

Both proposed Tremonton Pressure Irrigation equalization ponds (approximately 8.5 acres) and the new Bear River City Pressure Irrigation equalization storage pond (approximately 0.5 acres) would be located on agricultural lands classified as Prime Farmland if Irrigated. These lands are currently undeveloped and are used primarily as agricultural land, therefore meeting the criteria for Prime Farmland if Irrigated under the FPPA. The Siphons Installation Alternative would permanently remove these 9.0 acres of land from agricultural production.

Consistent with the FPPA, the project is designed to support agricultural productivity and does not convert the land to non-agricultural use. In total, the Siphons Installation Alternative would temporarily affect approximately 13.0 acres and permanently affect approximately 9.0 acres of

prime and unique farmlands. Alternative sites were considered for the equalization ponds, but the selected sites were determined to be the most suitable due to proximity to existing operations and minimal environmental impact. BMPs and a SWPPP would be implemented during and post-construction to prevent erosion and minimize effects to any neighboring agricultural lands. The Siphons Installation Alternative would also rehabilitate existing canal systems and install new canal systems, resulting in a long-term reduction of flood damage to approximately 450 acres of prime and unique farmlands in the area. The project enhances the long-term viability of agricultural operations and aligns with both federal and local farmland protection goals and complies with the FPPA.

Hammond and West Main Canals Improvements Alternative

Under the Hammond and West Main Canals Improvements Alternative, approximately 60.3 acres of land classified as Farmland of Statewide Importance and 390.6 acres of land classified as Prime Farmland if irrigated are located within the Analysis Area.

During construction of the Salt Creek WMA improvements, approximately 13.0 acres of land classified as Farmlands of Statewide Importance would be used for staging areas. These lands are currently undeveloped and are used primarily as agricultural land, therefore meeting the criteria for Farmland of Statewide Importance under the FPPA. However, long-term effects to these lands would not occur after project completion as the lands classified as Farmland of Statewide Importance would be returned to pre-construction conditions following the completion of construction activities. Therefore, these lands would not be permanently removed from use as agricultural lands.

While located on lands classified as Prime Farmland if Irrigated, the new Tremonton Pressure Irrigation system would be located within a residential area that is not currently being used as agricultural lands. Likewise, the Bear River City Pressure Irrigation system is located on agricultural lands classified as both Farmlands of Statewide Importance and Prime Farmland if Irrigated. These lands are located within a residential area that is not currently being used for agricultural production.

Both proposed Tremonton Pressure Irrigation equalization ponds (approximately 8.5 acres) and the new Bear River City Pressure Irrigation equalization storage pond (approximately 0.5 acres) would be located on agricultural lands classified as Prime Farmland if Irrigated. These lands are currently undeveloped and are used primarily as agricultural land, therefore meeting the criteria for Prime Farmland if Irrigated under the FPPA. The Hammond and West Main Canals Improvements Alternative would permanently remove 9.0 acres of land from agricultural production.

Consistent with the FPPA, the project is designed to support agricultural productivity and does not convert the land to non-agricultural use. In total, the Hammond and West Main Canals Improvements Alternative would temporarily affect approximately 13.0 acres and permanently affect approximately 9.0 acres of prime and unique farmlands. Alternative sites were considered for the equalization ponds, but the selected sites were determined to be the most suitable due to proximity to existing operations and minimal environmental impact. BMPs and a SWPPP would be implemented during and post-construction to prevent erosion and minimize effects to any neighboring agricultural lands. The Hammond and West Main Canals Improvements Alternative would also rehabilitate existing canal systems and install new canal systems, resulting in a long-

term reduction of flood damage to approximately 450 acres of prime and unique farmlands in the area. The project enhances the long-term viability of agricultural operations and aligns with both federal and local farmland protection goals and complies with the FPPA.

5.3.4 Vegetation

5.3.4.1 Special Status Plant Species

No Action Alternative

No suitable habitat for ULTs or any other special-status plant species is present within the action area; therefore, the FWOFI would have no effect on special status plant species in the action area.

Siphons Installation Alternative

Because no suitable habitat was identified and no ULTs were observed within the Analysis Area during surveys within the accepted flowering period in August 2024, the Siphons Installation Alternative would have no effect to ULT or its habitat (see the BA in Appendix E1).

Conservation measures, such as minimizing vegetation removal and reseeding disturbed areas with native species, ensure no adverse effects to ULT. While specific projects like the BRCC canyon improvements, the Highland Ditch Piping and the Central Canal Company piping would reduce seepage, which could provide hydrology for potential ULT habitat, the existing habitat along canals provides unsuitable growing conditions for the species, despite available hydrology. Overall, these projects would improve water management, reducing the risk of further habitat degradation.

Hammond and West Main Canals Improvements Alternative

Because no suitable habitat was identified and no ULTs were observed within the Analysis Area during surveys within the accepted flowering period, in August 2024, the Hammond and West Main Canals Improvements Alternative would have no effect to ULT or its habitat.

Conservation measures, such as minimizing vegetation removal and reseeding disturbed areas with native species, ensure no adverse effects to ULT. Specific projects like the BRCC box culvert installation, Highland Ditch Piping, and Central Canal Company Piping would improve water management, reducing the risk of further habitat degradation.

5.3.4.2 Riparian Areas

No Action Alternative

Under the FWOFI, no direct or indirect alteration of riparian areas or ecologically critical areas would occur. Approximately 35 acres of low-quality, seepage induced riparian vegetation would continue to persist in the Analysis Area.

Siphons Installation Alternative

Under the Siphons Installation Alternative, piping projects would contribute directly and indirectly to the loss of seepage induced riparian vegetation in the short and long term, including disturbance and removal during construction, and eventual vegetation loss after removal of hydrology from open canals sources when they are piped. Additionally, portions of the Hammond East Canal would be abandoned in the canyon by diverting the flow to the West Main Canal through two siphons. New siphon construction would affect riparian vegetation along the Bear River.

As described in Section 3.3.4.2, only small patches of low-quality, fragmented, seepage-induced riparian vegetation associated with the irrigation canals occur in the Analysis Area (approximately 35 acres in total). Higher quality riparian vegetation exists along the Bear River and the Malad River, and within the Salt Creek WMA area. Some riparian vegetation was observed in the canals, such as cattail and common reed, and very little was observed within the banks, which consisted mostly of grasses. Direct effects to riparian areas would be minimized to the extent practicable by implementing BMPs, as described in Appendix E1.

An indirect effect of the canal piping and canal abandonment involves the eventual loss of trees and vegetation that may have received supplemental hydrology from canal seepage if that vegetation was not removed during construction. Piping and abandoning canals would permanently remove a source of water for vegetation that has established near the canals, likely resulting in the loss of riparian vegetation, including trees, along the canals.

Riparian vegetation that would be lost along canals in the Analysis Area is minimal because of absence of existing vegetation due to maintenance activities and limited seasonal availability of water. The Hammond Main Canal within the Bear River canyon, for example, supports cattail, reed canarygrass, and some shrub species. Other canal areas that would be piped, including the Highland Ditch and the Central Canal Company, do not support riparian vegetation beyond dense grass and common weed species. Therefore, only minimal, low growing riparian fringe vegetation would be lost by piping these open water sources. Areas with higher quality riparian fringe, including along the Bear River, would not experience vegetation removal during construction as a result of the Siphons Installation Alternative, except for at the siphon construction locations.

Construction of the two proposed siphons along the Bear River would cause temporary and permanent direct effects due to ground disturbance, and tree and shrub removal. Approximately 6.9 acres of riparian fringe within the upper siphon area and 8.1 acres of riparian fringe within the lower siphon area would be directly affected by these actions. This potential area of disturbance where vegetation removal may occur accounts for approximately 5% of the approximately 300 acres of fringe present along the seven-mile river stretch within the Analysis Area.

Watershed protection activities under the Siphons Installation Alternative, including the levee improvements and the sediment bason construction would reduce erosion and sedimentation into the Bear River system, improving the quality of adjacent riparian habitat. Stabilizing levees would also help preserve wetland areas and provide better access for maintenance, including *Phragmites* removal, helping to solve access and invasive species management problems, conserving native plant communities, and improving riparian wildlife habitat. The Salt Creek

WMA sediment basin would mitigate sediment accumulation, improving water quality and reducing invasive species expansion.

While short- and long-term effects would occur to riparian vegetation within the Analysis Area, the majority of riparian vegetation across the Analysis Area that would be affected is low quality, and a relatively small percentage of the higher quality vegetation along the Bear River may be affected. Project BMPs include erosion control measures, water quality protections, native plant protections, and revegetation with native species, which would minimize effects to water quality and riparian areas during construction and would restore and enhance riparian connectivity and function in the long term.

Hammond and West Main Canals Improvements Alternative

Under the Hammond and West Main Canals Improvements Alternative, piping projects would contribute directly and indirectly to the loss of seepage induced riparian vegetation in the short and long term, including disturbance and removal during construction, and eventual vegetation loss after removal of hydrology from open canals sources when they are piped.

As described in Section 3.3.4.2, only small patches of low-quality, fragmented, seepage-induced riparian vegetation associated with the irrigation canals occur in the Analysis Area (approximately 35 acres in total). Higher quality riparian vegetation exists along the Bear River and the Malad River, and within the Salt Creek WMA area. Some riparian vegetation was observed in the canals, such as cattail and common reed, and very little was observed within the banks, which consisted mostly of grasses. Direct effects to riparian areas would be minimized to the extent practicable by implementing BMPs, as described in Appendix E1.

An indirect effect of the canal piping and canal abandonment involves the eventual loss of trees and vegetation that may have received supplemental hydrology from canal seepage if that vegetation was not removed during construction. Piping and abandoning canals would permanently remove a source of water for vegetation that has established near the canals, likely resulting in the loss of riparian vegetation, including trees, along the canals.

Riparian vegetation that would be lost along canals in the Analysis Area is minimal because of absence of existing vegetation due to maintenance activities and limited seasonal availability of water. The Hammond Main Canal within the Bear River canyon, for example, supports cattail, reed canarygrass, and some shrub species. Other canal areas that would be piped, including the Highland Ditch and the Central Canal Company, do not support riparian vegetation beyond dense grass and common weed species. Therefore, only minimal, low growing riparian fringe vegetation would be lost by piping these open water sources. Areas with higher quality riparian fringe, including along the Bear River, would not experience vegetation removal during construction as a result of the Hammond and West Main Canals Improvements Alternative.

Watershed protection activities under the Hammond and West Main Canals Improvements Alternative, including the levee improvements and the sediment bason construction would reduce erosion and sedimentation into the Bear River system, improving the quality of adjacent riparian habitat. Stabilizing levees would also help preserve wetland areas and provide better access for maintenance, including *Phragmites* removal, helping to solving access and invasive species management problems, conserving native plant communities, and improving riparian wildlife habitat. The Salt Creek WMA sediment basin would mitigate sediment accumulation, improving water quality and reducing invasive species expansion. The Salt Creek WMA

sediment basin would also mitigate sediment accumulation, improving water quality and reducing invasive species expansion.

While short- and long-term effects would occur to riparian vegetation within the Analysis Area under the Hammond and West Main Canals Improvements Alternative, the riparian vegetation across the Analysis Area that would be affected is low quality. Project BMPs include erosion control measures, water quality protections, native plant protections, and revegetation with native species, which would minimize effects to water quality and riparian areas during construction and would restore and enhance riparian connectivity and function in the long term.

5.3.4.3 Noxious Weeds & Invasive Plant Species

No Action Alternative

The BRCC, Highland Ditch Company, Central Canal Company, Salt Creek WMA, Bear River Club and CDC actively implement noxious weed and invasive species controls to manage and prevent their introduction and establishment. The FWOFI would not alter current invasive species and noxious weed control practices; therefore, the FWOFI would have no effect on noxious weeds and invasive plant species.

Siphons Installation Alternative

Though proposed activities would disturb soil and transport vehicles which may increase the risk of introduction, establishment, and spread of noxious weeds, project design elements and BMPs minimize this risk. Current practices to control and prevent the introduction and establishment of noxious weeds and invasive plant species would continue to occur under the Siphons Installation Alternative. In addition to these general practices, during construction, BMPs would be incorporated into contractor specifications to control and prevent the introduction and spread of any invasive plant species or noxious weeds during construction activities. Appendix E1 includes a complete list of BMPs.

In the long term under the Siphons Installation Alternative, proposed siphon and box culvert installations in the BRCC Canyon area and other agricultural water management improvements would decrease the likelihood of landslides and canal failures, events which would potentially increase transport of sediment and invasive plant species. The Siphons Installation Alternative would establish a sediment basin near the Salt Creek WMA. By mitigating sedimentation, the Siphons Installation Alternative would decrease the potential for spread and establishment of invasive plant species. Improved water control capabilities associated with the levees and the Salt Creek WMA sediment basin would allow better management of invasive plant species such as *Phragmites*, helping to maintain and improve habitat diversity.

Given the implementation of BMPs described in Appendix E1 and project design, the Siphons Installation Alternative would not cause or promote the introduction or spread of noxious weeds or invasive plant species and therefore follows E.O. 13112. Furthermore, the reduction of seepage throughout the watershed and implementation of BMPs would likely result in decreased spraying of noxious weeds once the pipelines are installed.

Hammond and West Main Canals Improvements Alternative

Though proposed activities would disturb soil and transport vehicles which may increase the risk of introduction, establishment, and spread of noxious weeds, project design elements and BMPs minimize this risk. Current practices to control and prevent the introduction and establishment of noxious weeds and invasive plant species would continue to occur under the Hammond and West Main Canals Improvements Alternative. In addition to these general practices, during construction, BMPs would be incorporated into contractor specifications to control and prevent the introduction and spread of any invasive plant species or noxious weeds during construction activities. Appendix E1 includes a complete list of BMPs.

In the long term under the Hammond and West Main Canals Improvements Alternative, proposed box culvert installations in the BRCC Canyon area and other agricultural water management improvements would decrease the likelihood of landslides and canal failures, events which would potentially increase transport of sediment and invasive plant species. The Hammond and West Main Canals Improvements Alternative would establish a sediment basin near the Salt Creek WMA. By mitigating sedimentation, the Hammond and West Main Canals Improvements Alternative would decrease the potential for spread and establishment of invasive plant species. Therefore, the proposed sediment basin, box culverts, and agricultural water management measures would prevent future spread of invasive plant species. Improved water control capabilities associated with the levees and the Salt Creek WMA sediment basin would allow better management of invasive species such as *Phragmites*, helping to maintain and improve habitat diversity.

Given the implementation of BMPs described in Appendix E1 and project design, the Hammond and West Main Canals Improvements Alternative would not cause or promote the introduction or spread of noxious weeds or invasive species and therefore follows E.O. 13112. Furthermore, the reduction of seepage throughout the watershed and implementation of BMPs would likely result in decreased spraying of noxious weeds once the pipelines are installed.

5.3.5 Water Resources

5.3.5.1 Surface & Ground Water Quality and Quantity

No Action Alternative

Under the No Action Alternative, surface and groundwater quality and quantity would remain subject to existing inefficiencies and infrastructure challenges. Existing canals within the Analysis Area would continue to experience water losses due to seepage and evaporation. These inefficiencies would limit water availability and negatively affect the long-term sustainability of water use in the region. Continued reliance on aging infrastructure, such as levees and canals, would lead to further degradation in water quality due to ongoing erosion and sediment transport into aquatic habitats.

Although routine maintenance would continue, no significant improvements would be made to reduce water loss or enhance water quality. Without modernization measures, surface water conditions and groundwater recharge benefits would remain suboptimal, failing to meet regional water management goals. The No Action Alternative would not result in violations of the Utah Surface Water Quality Standards or the CWA; however, it would not improve sedimentation rates, support designated beneficial uses such as Class 3A (cold water aquatic life) or Class 4

(agricultural uses) or reduce pollutant transport. The No Action Alternative would not contribute toward the Utah Division of Water Resources' regional municipal and industrial (M&I) water conservation goal of 249 GPCD for the Bear River region by 2030, an 18 percent reduction from the 2015 baseline of 304 GPCD.

As a result, less water would reach the GSL, contributing to ongoing lake level decline, reduced wetland function, and increased dust emissions from exposed lakebed sediments.

Siphons Installation Alternative

Water Quality

The Siphons Installation Alternative would have temporary effects on water quality during construction activities, including siphon installation, canal piping, levee stabilization with riprap, and sediment basin construction. This alternative would have direct and indirect effects to water quality in Bear River and Malad River during siphon installation. These activities would temporarily alter hydrologic conditions and channel morphology, increasing the potential for sedimentation. Implementation of BMPs and SWPP, such as erosion control and construction timing strategies, would minimize these temporary effects.

In the long term, piping the earthen canals would reduce turbidity in the watershed by eliminating erosion and sediment transport in the canals, creating a minor beneficial long-term effect. Enhanced canal infrastructure would further minimize pollutant runoff and sediment deposition, promoting improved overall surface water quality.

Long-term water quality benefits would result from the levee improvements using rock riprap along the Bear River including reduced sediment transport into waterways, improved wetland function, and improved aquatic habitat conditions. The installation of the sediment basin at the Salt Creek WMA would have a long-term beneficial effect on water quality at the Salt Creek WMA and in adjacent wetlands.

The Siphons Installation Alternative would comply with the Utah Surface Water Quality Standards and the CWA through reductions in erosion, sedimentation, and pollutant loading. Long-term water quality improvements would support designated beneficial uses for Bear River and its tributaries, including Class 2B (recreation), Class 3A (cold water aquatic life), Class 3D (waterfowl and associated food chain organisms), and Class 4 (agricultural uses).

Water Quantity

The Siphons Installation Alternative would have a direct and indirect effect to water quantity. The proposed actions would substantially enhance water conservation by reducing seepage and evaporative losses through over 9,300 feet of box culvert installations and over 61,970 feet of canal piping. These infrastructure enhancements would provide greater reliability and availability of water resources. There would be a long-term improvement in irrigation water delivery, increased water efficiency and storage.

Repairing the levee systems and maintaining operational control of the canal would also result in substantial decrease in water loss. Through implementation of the project, additional water would be left in the system and not subject to loss due to seepage from the aging infrastructure. Although exact volumes have not yet been quantified, these improvements would markedly increase overall water efficiency and availability for agricultural, municipal, and ecological purposes.

Construction of sediment basins and levee improvements using rock riprap would maintain optimal water conveyance and storage efficiency, ensuring sustainable water management and availability within the watershed.

The Siphons Installation Alternative would support the Utah Division of Water Resources' regional, M&I water conservation goal of 249 GPCD for the Bear River region by 2030, by increasing conveyance efficiency and reducing system-wide water losses.

According to the BRCC (Trevor Nielson, personal communication, May 15, 2025), reductions in seepage and evaporation would significantly reduce shareholder curtailments during the 1 to 2.5-week period in late June and early July when demand exceeds contractual flows at Cutler Dam. The improved conveyance would allow available water to reach end-of-canal users more reliably. When natural flow is sufficient, less water would be diverted from the Bear River, allowing more to reach downstream resources such as the GSL. When stored water from Bear Lake is in use, these improvements would help maintain higher lake levels and potentially increase flood control releases post-irrigation season.

In addition to increasing water conservation and delivery efficiency, the proposed infrastructure improvements would improve instream flows by reducing the total volume of water diverted from the Bear River. Enclosing canals with box culverts and pipes would reduce seepage losses, resulting in a greater proportion of diverted water reaching downstream users or being returned to the system as return flows. The increased delivery efficiency would allow BRCC, Highland Ditch Company, and Central Canal Company to divert less water from the Bear River while still meeting shareholder demands, leaving more water instream to support aquatic ecosystems. These positive hydrologic modifications could influence aquatic ecosystem components through improvements in flow velocity, base flow maintenance, water temperatures, and water chemistry. Sensitive aquatic resources, such as downstream wetlands, riparian zones, and marshes are expected to benefit from increased return flow volumes and more consistent seasonal flow patterns, although the extent of these changes has not yet been quantified.

These improvements collectively contribute to achieving regional goals for sustainable water management, benefiting agricultural productivity, ecological health, and long-term water delivery efficiency and reliability.

Hammond and West Main Canals Improvements Alternative

Water Quality

The Hammond and West Main Canals Improvements Alternative would have temporary water quality effects from construction activities, including canal improvements, box culvert installations, levee stabilization using riprap, and sediment basin construction. This alternative would have direct and indirect effects to water quality in Malad River during siphon installation. These activities would temporarily alter hydrologic conditions and channel morphology, increasing the potential for sedimentation. Implementation of BMPs and SWPP, such as erosion control and construction timing strategies, would minimize these temporary effects.

In the long term, piping the earthen canals would reduce turbidity in the watershed by eliminating erosion and sediment transport in the canals, creating a minor beneficial long-term effect. Enhanced canal infrastructure would further minimize pollutant runoff and sediment deposition, promoting improved overall surface water quality.

Long-term water quality benefits would result from the levee improvements using rock riprap along the Bear River including reduced sediment transport into waterways, improved wetland function, and improved aquatic habitat conditions. The installation of the sediment basin at the Salt Creek WMA would have a long-term beneficial effect on water quality at the Salt Creek WMA and in adjacent wetlands.

The Hammond and West Main Canals Improvements Alternative would comply with the Utah Surface Water Quality Standards and the CWA through reductions in erosion, sedimentation, and pollutant loading. Long-term water quality improvements would support designated beneficial uses for Bear River and its tributaries, including Class 2B (recreation), Class 3A (cold water aquatic life), Class 3D (waterfowl and associated food chain organisms), and Class 4 (agricultural uses).

Water Quantity

The Hammond and West Main Canals Improvements Alternative would have a direct and indirect effect to water quantity. The proposed actions would substantially enhance water conservation by reducing seepage and evaporative losses through over 17,300 feet of box culvert installations and over 61,970 feet of canal piping. These infrastructure enhancements would provide greater reliability and availability of water resources. There would be a long-term improvement in irrigation water delivery, increased water efficiency, and storage.

Repairing the levee systems and maintaining operational control of the canal would also result in substantial decrease in water loss. Through implementation of the project, additional water would be left in the system and not subject to loss due to seepage from the aging infrastructure. Although exact volumes have not yet been quantified, these improvements would markedly increase overall water efficiency and availability for agricultural, municipal, and ecological purposes.

Construction of sediment basins and levee improvements using rock riprap would maintain optimal water conveyance and storage efficiency, ensuring sustainable water management and availability within the watershed.

The Hammond and West Main Canals Improvements Alternative would support the Utah Division of Water Resources' regional, M&I water conservation goal of 249 GPCD for the Bear River region by 2030, by increasing conveyance efficiency and reducing system-wide water losses.

According to the BRCC (Trevor Nielson, personal communication, May 15, 2025), reductions in seepage and evaporation would significantly reduce shareholder curtailments during the 1 to 2.5-week period in late June and early July when demand exceeds contractual flows at Cutler Dam. The improved conveyance would allow available water to reach end-of-canal users more reliably. When natural flow is sufficient, less water would be diverted from the Bear River, allowing more to reach downstream resources such as the GSL. When stored water from Bear Lake is in use, these improvements would help maintain higher lake levels and potentially increase flood control releases post-irrigation season.

In addition to increasing water conservation and delivery efficiency, the proposed infrastructure improvements would improve instream flows by reducing the total volume of water diverted from the Bear River. Enclosing canals with box culverts and pipes would reduce seepage losses, resulting in a greater proportion of diverted water reaching downstream users or being returned

to the system as return flows. The increased delivery efficiency would allow BRCC, Highland Ditch Company, and Central Canal Company to divert less water from the Bear River while still meeting shareholder demands, leaving more water instream to support aquatic ecosystems. These positive hydrologic modifications could influence aquatic ecosystem components through improvements in flow velocity, base flow maintenance, water temperatures, and water chemistry. Sensitive aquatic resources, such as downstream wetlands, riparian zones, and marshes are expected to benefit from increased return flow volumes and more consistent seasonal flow patterns, although the extent of these changes has not yet been quantified.

These improvements collectively contribute to achieving regional goals for sustainable water management, benefiting agricultural productivity, ecological health, and long-term water delivery efficiency and reliability.

5.3.5.2 Clean Water Act / WOTUS

No Action Alternative

Under the No Action Alternative, no direct or indirect effects would occur to WOTUS because no activities would occur. In the long term, the continued use of open irrigation canals under this alternative would perpetuate water losses to seepage, evaporation, and carrier losses. These losses currently reduce the volume of water available for downstream WOTUS, affecting aquatic habitats and water quality in the Bear River watershed. No measures to conserve water or enhance hydrological conditions in the watershed would be undertaken, leaving current conditions unchanged.

Siphons Installation Alternative

The Siphons Installation Alternative would have temporary effects to jurisdictional WOTUS during construction due to sedimentation, runoff, and hydrological disturbances. These effects would be addressed through compliance with the UPDES Construction Stormwater Permit and the implementation of BMPs such as sediment barriers, erosion controls, and spill prevention plans.

Construction managers would obtain Section 404 permits from the USACE and Section 401 water quality certifications from UDEQ for activities that involve dredging or filling in WOTUS. Specifically, two siphon installations in the Bear River, one siphon installation in the Malad River, transitioning the existing irrigation infrastructure to a pressurized system, pipeline installation, levee improvement, and sediment basin construction may temporarily affect WOTUS through sedimentation, and alterations to hydrology, and channel morphology and require permits. Through these regulatory processes, any effects to WOTUS would be mitigated, ensuring compliance with the CWA. Long-term, this alternative would result in improvement of water quality and quantity, and wetland functions within the Bear River watershed.

This alternative improves water delivery by avoiding the Bear River canyon area most prone to canal breaches, however, these improvements come at a much higher cost, extensive permitting issues, and added maintenance. Additionally, the Siphons Installation Alternative would require property acquisition/easements.

Hammond and West Main Canals Improvements Alternative

Construction managers would obtain Section 404 permits from the USACE and Section 401 water quality certifications from UDEQ for activities that involve dredging or filling in WOTUS. One siphon installation in the Malad River, transitioning the existing irrigation infrastructure to a pressurized system, pipeline installation, levee improvement, and sediment basin construction may temporarily affect WOTUS through sedimentation, and alterations to hydrology, and channel morphology. Through these regulatory processes, any effects to WOTUS would be mitigated, ensuring compliance with the CWA. Long-term, this alternative would result in improvement of water quality and quantity, and wetland functions within the Bear River watershed.

Hammond and West Main Canals Improvements alternative was the lowest cost for BRCC and would be easier to permit, construct, and maintain because it does not include siphons under the Bear River. This alternative would improve the reliability of water delivery from the canyon area based on the alternative screening process.

5.3.5.3 Wetlands

No Action Alternative

Under the No Action Alternative, no new construction activities would occur in the 41.9 acres of wetlands and 77.2 acres of linear features delineated as WOTUS, therefore there would be no direct effects to wetlands. The existing irrigation canals, ditches, streams, and levees would continue to support wetland hydrology and aquatic habitats through ongoing seepage and surface water flows. However, ongoing infrastructure challenges, including risks to agricultural water supplies, levee deterioration, and potential levee failures along Bear River, could indirectly degrade important wetland and aquatic resource conditions over time.

The degraded conditions of levees adjacent to Bear River would continue to affect water quality and wetlands. A breach or failure of the levee could result in draining thousands of acres of managed wetlands north of the levee. The wetland habitat provides important resources for tens of thousands of waterfowl, shorebirds, and many other species of waterbirds.

Siphons Installation Alternative

The Siphons Installation Alternative would result in both temporary and permanent effects to wetlands and linear features. Direct temporary effects would occur due to construction activities such as siphon installation, canal piping, levee improvements, and sediment basin construction. Approximately 41.9 acres of wetlands, and 77.2 acres of linear features have been delineated in the Study Area, as documented in the ARD Report. Effects associated with this alternative would occur within these delineated resources. Final disturbance amounts would be refined during final design and permitting in coordination with USACE to ensure compliance with applicable regulatory requirements.

Long-term permanent effects would also occur and would be primarily limited to infrastructure footprints associated with siphon installations, concrete structures, and levee improvement using riprap. Riprap would provide structural integrity, erosion protection, and would be designed to accommodate environmental constraints such as ice flows, saline soils, and rodent pressures. Permanent effects would be limited to the footprint of these features. Final disturbance amounts

would be refined during final design and permitting in coordination with USACE to ensure compliance with applicable regulatory requirements.

Staging Areas
All construction staging areas under the Siphons Installation Alternative would be located in upland areas, resulting in no direct effects to delineated wetlands or linear features.

Irrigation Modernization and Wetland Hydrology
The installation of siphons and piping for canals would significantly reduce seepage and evaporative losses. This reduction could alter hydrology for some wetlands and linear features. However, the anticipated substantial water conservation benefits would enhance overall watershed health and ecological stability, offsetting localized hydrological changes.

There would be an indirect long-term beneficial effect to thousands of acres of wetlands adjacent to the GSL from the proposed actions that improve agricultural management efficiencies and improve or replace failing infrastructure that would improve water quality and quantity. Effective wetlands are able to filter water, remove nutrients, trap sediments, and break down pollutants, which collectively contribute to improved water quality.

Summary and Mitigation
While direct effects to wetlands and linear features include both temporary and permanent disturbances, these effects would be minimized through BMPs, including revegetation, noxious weed prevention, and erosion control. Regulatory compliance with federal wetland protection standards under E.O. 11990 would ensure wetland conservation and enhancement. Long-term ecological benefits from increased water availability, improved aquatic habitat connectivity, and riparian vegetation recruitment would offset short-term disturbances. Coordination with the USACE has been ongoing to identify the appropriate permitting mechanism for the wetland effects associated with this alternative and to determine necessary mitigation measures, ensuring compliance with Section 404 of the CWA (See Sections 6.5 and 7.1.2).

Hammond and West Main Canals Improvements Alternative

The Hammond and West Main Canals Improvements Alternative would result in temporary and permanent effects similar to those described under the Siphons Installation Alternative. Direct temporary effects would occur due to construction activities such as siphon installation, canal piping, levee improvements, and sediment basin construction. Approximately 41.9 acres of wetlands, and 77.2 acres of linear features have been delineated in the Study Area, as documented in the ARD Report. Effects associated with this alternative would occur within these delineated resources. Final disturbance amounts would be refined during final design and permitting in coordination with USACE to ensure compliance with applicable regulatory requirements.

Long-term permanent effects would also occur and would be primarily limited to infrastructure footprints associated with siphon installations, concrete structures, and levee improvement using riprap. Riprap would provide structural integrity, erosion protection, and would be designed to accommodate environmental constraints such as ice flows, saline soils, and rodent pressures. Permanent effects would be limited to the footprint of these features. Final disturbance amounts would be refined during final design and permitting in coordination with USACE to ensure compliance with applicable regulatory requirements.

Staging Areas
All construction staging areas under the Hammond and West Main Canals Improvements Alternative would be located in upland areas, resulting in no direct effects to delineated wetlands or linear features.

Irrigation Modernization and Wetland Hydrology
The installation of siphons and piping for canals would significantly reduce seepage and evaporative losses. This reduction could alter hydrology for some wetlands and linear features. However, the anticipated substantial water conservation benefits would enhance overall watershed health and ecological stability, offsetting localized hydrological changes.

There would be an indirect long-term beneficial effect to thousands of acres of wetlands adjacent to the GSL from the proposed actions that improve agricultural management efficiencies and improve or replace failing infrastructure that would improve water quality and quantity. Effective wetlands can filter water, remove nutrients, trap sediments, and break down pollutants, which collectively contribute to improved water quality.

Summary and Mitigation
While direct effects to wetlands include both temporary and permanent disturbances, these effects would be minimized through BMPs, including revegetation, noxious weed prevention, and erosion control. Regulatory compliance with federal wetland protection standards under E.O. 11990 would ensure wetland conservation and enhancement. Long-term ecological benefits from increased water availability, improved aquatic habitat connectivity, and riparian vegetation recruitment would offset short-term disturbances. Coordination with the USACE has been ongoing to identify the appropriate permitting mechanism for the wetland effects associated with this alternative and to determine necessary mitigation measures, ensuring compliance with Section 404 of the CWA (See Sections 6.5 and 7.1.2).

5.3.5.4 Regional Water Management Plan

No Action Alternative

The No Action Alternative would maintain the current regional water management system, including its existing inefficiencies and challenges and not invest in infrastructure or water conservation. Without modernization, canals within the Study Area would continue experiencing significant water losses due to seepage, evaporation, and inefficient distribution. These inefficiencies would reduce overall water availability within the watershed and could negatively affect the long-term sustainability of agricultural water use in the region. Existing infrastructure maintenance, such as limited levee repairs, would not provide significant regional benefits in terms of water conservation or enhanced storage capacity. Persistent inefficiencies would continue, limiting achievement of Utah State Water Plan water management goals.

Siphons Installation Alternative

The Siphons Installation Alternative aligns closely with regional water management objectives by addressing water conservation and infrastructure efficiency. Installation of siphons and canal piping would significantly reduce water losses associated with seepage and evaporation, thereby enhancing water reliability and availability within the watershed for agricultural, municipal, and

ecological needs. Although exact water savings have not yet been quantified, these improvements would substantially contribute to achieving regional water sustainability goals.

This alternative also includes levee stabilization using riprap armoring at Bear River Club, CDC, and Salt Creek WMA, directly protecting approximately 24,000 acres of critical wetland habitat. Additionally, constructing a sediment basin at Salt Creek WMA would reduce sediment inflow, improving water management and habitat quality.

Overall, the proposed improvements would significantly support regional sustainability goals by enhancing water conservation, improving infrastructure reliability, and protecting ecological habitats.

Hammond and West Main Canals Improvements Alternative

The Hammond and West Main Canals Improvements Alternative substantially aligns with regional water management objectives through significant infrastructure enhancements. Installation of concrete box culverts and canal piping improvements would significantly reduce seepage and evaporation losses, thereby improving water availability, distribution efficiency, and reliability within the watershed.

Levee stabilization at CDC and Salt Creek WMA using riprap would protect critical wetland habitats, essential for maintaining regional water management and ecological health. The sediment basin proposed for Salt Creek WMA would further enhance regional water management efficiency by controlling sedimentation and improving water quality.

These infrastructure improvements collectively contribute to achieving long-term sustainability in regional water management by increasing water conservation, enhancing infrastructure resilience, and protecting important ecological habitats.

5.3.5.5 Floodplain Management

No Action Alternative

Under the No Action Alternative, existing levees and canal structures would continue to deteriorate, perpetuating flood risks within the Analysis Area. Portions of the Analysis Area identified on FEMA FIRM panels would remain vulnerable. Ongoing degradation of infrastructure would heighten the risk of flooding from levee failures, potentially affecting agricultural lands, homes, and infrastructure within Zone A and Zone AE, and diminishing the floodplain's natural flood-moderating capacity.

Siphons Installation Alternative

The Siphons Installation Alternative would improve floodplain functionality by reinforcing levees with riprap armoring and constructing sediment basins to reduce sedimentation issues within the floodplain. Additionally, this alternative would install two siphons below the Bear River and one siphon below the Malad River, reducing the number of above-ground structures within the 100-year floodplain and decreasing flood risks associated with structural impediments during flood events. By improving approximately 6,000 feet of levees at the Bear River Club, 8,700 feet at the CDC, and 11,000 feet at the Salt Creek WMA, this alternative significantly reduces the risk of levee failure and enhances flood management and stability. The sediment

basin proposed at Salt Creek WMA would reduce sediment deposition and enhance floodplain capacity and functionality.

This alternative aligns with E.O. 11988 by significantly reducing flood risks without introducing additional occupancy or permanent encroachments into the floodplain. The improvements proposed under this alternative would enhance the floodplain's natural functions, including moderating storm flows, reducing sediment transport, and maintaining water quality.

Due to the proposed improvements, a Conditional Letter of Map Revision (CLOMR) would be required during the project design phase to document proposed modifications and their effects on the floodplain. Following completion, a Letter of Map Revision (LOMR) would be necessary to formally update FEMA FIRMs, officially recognizing reductions in flood risk.

Hammond and West Main Canals Improvements Alternative

The Hammond and West Main Canals Improvements Alternative would improve floodplain management through extensive infrastructure upgrades. Installation of concrete box culverts and riprap armoring would stabilize levees and canals, significantly reducing the flooding risk by preventing infrastructure failures and canal overtopping. Additionally, this alternative would install one siphon beneath the Malad River, reducing above-ground structures within the 100-year floodplain and decreasing flood risks associated with structural impediments during flood events.

The levee stabilization methods selected under this alternative would provide necessary structural integrity, effectively protecting agricultural areas, homes, and other infrastructure within the floodplain. The same as the Siphons Installation Alternative, levee improvements at the Bear River Club, CDC and at Salt Creek WMA would enhance floodplain functionality, protecting substantial wetland habitats from inundation and sediment deposition.

This alternative complies with E.O. 11988 by effectively reducing flood risks without increasing occupancy or permanent encroachments into the floodplain. It would maintain or enhance natural floodplain functions and water quality benefits, contributing positively to the overall flood management objectives in the Study Area.

Similar to the Siphons Installation Alternative, a CLOMR would be required during the project design phase, and upon completion, a LOMR would be submitted to formally update FEMA FIRMs, officially recognizing reductions in flood risk achieved by this alternative.

5.3.6 Wildlife

5.3.6.1 Fish and Wildlife Habitat

No Action Alternative

Under the No Action Alternative, no construction activities would occur. Therefore, the FWOFI would have no direct effects on wildlife and adjacent wildlife habitat in the Analysis Area. However, under the FWOFI, existing conditions would persist. Under the FWOFI, tailwater and sediment would continue to enter natural waterways and affect water quality, indirectly affecting wildlife, including fish species, and wildlife habitat in the Bear River, Malad River and the GSL. Seepage would continue under the FWOFI, which could locally benefit wildlife by providing

hydrology to support habitat, but which overall reduces available water for wildlife within the Bear River Valley and the greater GSL ecosystem.

Siphons Installation Alternative

Under the Siphons Installation Alternative, the combination of proposed projects would have both positive and negative effects on wildlife. While temporary habitat disturbances and individual displacement are expected during construction, long-term benefits include improved water management, enhanced wetland ecosystems, and reduced risks of habitat loss due to erosion and infrastructure failures. Mitigation strategies such as seasonal construction timing, buffer zone maintenance, and habitat restoration efforts would help minimize adverse effects on wildlife.

Wildlife may be temporarily displaced during construction due to construction activities, noise, human encroachment, and staging of equipment. Wildlife would likely move to alternate locations during construction but also may choose not to return to the area if habitat is lost. Construction of two siphons in the BRCC Canyon Area would cause the permanent removal of approximately 6.9 acres of riparian fringe within the upper siphon area and 8.1 acres of riparian fringe within the lower siphon area along the Bear River, for a total of approximately 15 acres. However, this vegetation accounts for only 5% of the total riparian fringe directly present along the Bear River within the Analysis Area. Ample riparian habitat would remain undisturbed along the entire reach of the Bear River and the nearby Malad River, under the Siphons Installation Alternative.

Piping canals and installing box culverts would permanently change approximately 71,270 feet of canal/pipe that would remove seasonal open water sources for wildlife, remove 35 acres of low-quality, seepage-induced riparian vegetation that wildlife, such as small mammals, waterfowl, and avian species, may use for forage, shelter, and stopover habitat. However, the canals are managed with herbicide to minimize presence of weeds and to moderate vegetation growth, reducing the amount of existing forage and cover available for wildlife. Higher quality forage, in the form of riparian fringe habitat, is present along the Bear and Malad Rivers within and outside of Analysis Area.

Wildlife may seasonally use the open water sources to drink from when the water surface level is high enough, however, this water source presents a danger to wildlife including drowning. Additionally, this water source is not perennially available due to controlled flows. When the water surface drops and flows cease, wildlife cannot easily access water within the canals. No fish habitat is present in the canals.

Although the Siphons Installation Alternative would permanently remove open water that wildlife may seasonally use in the Analysis Area, other water sources are available in the vicinity. For example, the Bear River and the Malad River occur relatively centrally within the Analysis Area, for easy access for some wildlife (e.g., avian species).

Under the Siphons Installation Alternative, construction of the two siphons across the Bear River and replacement of the BRCC Red Siphon across the Malad River could cause negligible changes to water quality that would affect fish habitat. These changes would be temporary and would be limited to occurring during construction. BMPs would be implemented during construction to avoid and minimize effects to water quality and aquatic habitat.

No sagebrush or crucial habitat for the Columbian sharp-tailed grouse would be removed under the Siphons Installation Alternative. No effects would occur to year-long and winter crucial habitat for the mule deer, and no barriers to migration or wildlife movement would result from the Siphons Installation Alternative. Additionally, year-long substantial habitat for the ring-necked pheasant and year-long habitat for the turkey would not be affected or removed by the Siphons Installation Alternative.

Construction would be limited to daylight hours, which would reduce effects to nocturnal wildlife species. BMPs would be implemented during construction to avoid and minimize effects to water quality, wildlife, and wildlife habitat. Appendix E1 includes a complete list of BMPs.

Long-term benefits include improved water management, enhanced wetland ecosystems, and reduced risks of habitat loss due to erosion and infrastructure failures. This alternative would also improve the quality of water in natural rivers and the GSL, in the vicinity, ultimately providing a benefit to wildlife habitat in those areas.

Hammond and West Main Canals Improvements Alternative

The combination of proposed projects would have both positive and negative effects on wildlife. While temporary habitat disturbances and individual displacement are expected during construction, long-term benefits include improved water management, enhanced wetland ecosystems, and reduced risks of habitat loss due to erosion and infrastructure failures. Mitigation strategies such as seasonal construction timing, buffer zone maintenance, and habitat restoration efforts would help minimize adverse effects on wildlife.

Under the Hammond and West Main Canals Improvements Alternative, wildlife may be temporarily displaced during construction due to construction activities, noise, human encroachment, and staging of equipment. Wildlife would likely move to alternate locations during construction but also may choose not to return to the area if habitat is lost. Piping canals and installing box culverts would permanently change approximately 71,270 feet of canal/pipe that would remove seasonal open water sources for wildlife, remove 35 acres of low-quality, seepage-induced riparian vegetation that wildlife, such as small mammals, waterfowl, and avian species, may use for forage, shelter, and stopover habitat. However, the canals are managed with herbicide to minimize presence of weeds and to moderate vegetation growth, reducing the amount of existing forage and cover available for wildlife. Higher quality forage, in the form of riparian fringe habitat, is present along the Bear and Malad Rivers within and outside of Analysis Area.

Wildlife may seasonally use the open water sources to drink from when the water surface level is high enough, however, this water source presents a danger to wildlife including drowning. Additionally, this water source is not perennially available due to controlled flows. When the water surface drops and flows cease, wildlife cannot easily access water within the canals. No fish habitat is present in the canals.

Although the Hammond and West Main Canals Improvements Alternative would permanently remove open water that wildlife may seasonally use in the Analysis Area, other water sources are available in the vicinity. For example, the Bear River and the Malad River occur relatively centrally within the Analysis Area, for easy access for some wildlife (i.e., avian species).

Under the Hammond and West Main Canals Improvements Alternative, construction of the replacement of the BRCC Red Siphon across the Malad River could cause negligible changes to water quality that would affect fish habitat. These changes would be temporary and would be limited to occurring during construction. BMPs would be implemented during construction to avoid and minimize effects to water quality and aquatic habitat.

No sagebrush or crucial habitat for the Columbian sharp-tailed grouse would be removed under the Hammond and West Main Canals Improvements Alternative. No effects would occur to year-long and winter crucial habitat for the mule deer, and no barriers to migration or wildlife movement would result from the Hammond and West Main Canal Improvements Alternative. Additionally, year-long substantial habitat for the ring-necked pheasant and year-long habitat for the turkey would not be affected or removed by the Hammond and West Main Canals Improvements Alternative.

Construction would be limited to daylight hours, which would reduce effects to nocturnal wildlife species. BMPs would be implemented during construction to avoid and minimize effects to wildlife and wildlife habitat. Appendix E1 includes a complete list of BMPs.

The construction and implementation of related projects and the Hammond and West Main Canals Improvements Alternative would result in the loss of wildlife habitat associated with the low-quality, seepage-induced riparian vegetation. Long-term benefits include improved water management, enhanced wetland ecosystems, and reduced risks of habitat loss due to erosion and infrastructure failures. This alternative would also improve the quality of water in natural rivers and the GSL, in the vicinity, ultimately providing a benefit to wildlife habitat in those areas.

5.3.6.2 Special Status Animal Species

No Action Alternative

The No Federal Action Alternative would have no effect on candidate, threatened, or endangered animal species in the Analysis Area. Habitat for special status animal species would remain unchanged under the No Action Alternative. No direct effects to special status animal species or habitat in the action area would occur under the FWOFI, as no construction would take place. Under the FWOFI, existing conditions would persist. The irrigation canals would remain open and continue to provide a water source for wildlife. Seepage-induced riparian vegetation would continue to persist.

Siphons Installation Alternative

The Siphons Installations Alternative would have no effect to the monarch butterfly and the Suckley's cuckoo bumble bee and may affect, is likely to adversely affect the yellow-billed cuckoo.

Sixteen YBCU habitat patches were identified within 0.5 miles of the Analysis Area in the canyon section along the Bear River, using the USFWS 2017 Guidelines for identification and evaluation of suitable habitat for YBCU in Utah. Of these 16 patches, only four met the size, structure, and diversity criteria for habitat that YBCU may occupy (USFWS 2017). Because of fragmentation of the habitat due to agriculture and other human activities, the present habitat is marginally suitable for YBCU.

Construction of two siphons in the BRCC Canyon Area would cause the permanent removal of approximately 6.9 acres of riparian fringe within the upper siphon area and 8.1 acres of riparian fringe within the lower siphon area along the Bear River, for a total of approximately 15 acres of low quality and marginally suitable habitat. This vegetation accounts for only 5% of the total riparian fringe directly present along the Bear River within the Analysis Area. Ample riparian habitat would remain undisturbed along the entire reach of the Bear River and the nearby Malad River, under the Siphons Installations Alternative.

NRCS met with USFWS and J-U-B on February 5, 2025. USFWS agreed that marginally suitable habitat for the YBCU may occur within the Action Area in the Bear River Canyon area. Because the proposed siphon construction would take place during summer months, which overlaps with breeding season for the yellow-billed cuckoo (June 30–August 31), and because permanent removal of riparian vegetation would occur where the siphons would be installed, the USFWS agreed that the Proposed Project would be likely to adversely affect the yellow-billed cuckoo.

No other location within the Action Area supported a riparian corridor with the appropriate cover, vegetation stratification, and acreage to constitute suitable habitat for the YBCU. Urban and agricultural areas dominate the landscape and infringe on the extent of contiguous riparian habitat. Low quality riparian fringe, including stands of cattail, grasses, and shrubs, is intermittently supported along the canals, and no YBCU habitat was observed in the Salt Creek WMA or the duck and hunting club locations, which are open wetland habitats.

Although marginally suitable habitat for the YBCU may exist within the canyon section of the Lower Bear River, no potentially suitable habitat would be affected by project activities in other parts of the Analysis Area. The project's BMPs include measures to avoid all construction except for siphon installation during the YBCU's breeding and nesting season (June 30–August), which would limit noise disturbance within 0.5 miles of the Analysis Area.

Hammond and West Main Canals Improvements Alternative

The Hammonds and West Main Canal Improvements Alternative would have no effect to the monarch butterfly and the Suckley’s cuckoo bumble bee, and may affect, is not likely to adversely affect (MANLAA), the yellow-billed cuckoo.

Improvements to the Hammond and West Main Canals would not require construction or vegetation removal immediately on the banks of the Bear River or involve direct removal of vegetation within the delineated YBCU habitat patches. Temporary disturbance due to construction noise and ground disturbance would occur along the canals, which are uphill and set back from the river. No marginally suitable or low-quality habitat for the YBCU would be directly affected by the Proposed Project.

NRCS met with USFWS and J-U-B on February 5, 2025. USFWS agreed that marginally suitable habitat for the YBCU may occur within the Action Area in the Bear River Canyon area. If activities minimized vegetation removal and occurred outside of breeding season, the USFWS agreed that a MANLAA effects determination is appropriate. The USFWS concurred with NRCS’s determination on July 25, 2025, and concluded informal consultation.

No other location within the Action Area supported a riparian corridor with the appropriate cover, vegetation stratification, and acreage to constitute suitable habitat for the YBCU. Urban

and agricultural areas dominate the landscape and infringe on the extent of contiguous riparian habitat. Low quality riparian fringe, including stands of cattail, grasses, and shrubs, is intermittently supported along the canals, and no YBCU habitat was observed in the Salt Creek WMA or duck and hunting club locations, which are open wetland habitats.

Although marginally suitable habitat for the YBCU may exist within the canyon section of the Lower Bear River, no potentially suitable habitat would be affected by project activities. The project's BMPs include measures to avoid construction during the YBCU's breeding and nesting season (June 30–August), which would limit noise disturbance within 0.5 miles of the Analysis Area.

5.3.6.3 Migratory Birds and Bald and Golden Eagles

No Action Alternative

The No Federal Action Alternative would have no effect on migratory birds or eagle or raptor species in the Analysis Area. Habitat for protected avian species would remain unchanged under the No Action Alternative. No direct effects to protected avian species or habitat in the Analysis Area would occur under the FWOFI, as no construction would take place. Under the FWOFI, existing conditions would persist. Seepage-induced riparian vegetation would continue to persist along canal areas. As such, the FWOFI would have no effect on migratory birds or eagle or raptor species in the Analysis Area.

Siphons Installation Alternative

The Siphons Installation Alternative would have minor, temporary and short-term effects to migratory bird species in the Analysis Area. Though field investigations found no active migratory bird or raptor nests, the Analysis Area and the surrounding area within ½-mile could provide suitable habitat for migratory birds and eagles; therefore, protected avian species may be present within, or in the vicinity of, the Analysis Area. Project BMPs avoid and minimize the effects of the Siphons Installation Alternative on migratory bird species and eagles, and the alternative is consistent with MBTA and BGEPA.

Noise Disturbance

Noise effects from construction of the Siphons Installation Alternative would result in temporary displacement of nesting bird species within the Analysis Area. Construction activities associated with levee improvements in the Bear River Club, CDC, and the Salt Creek WMA, may temporarily disturb nesting migratory birds. To prevent effects to migratory birds or raptors from project effects, temporary construction disturbance would be avoided by scheduling work outside of nesting bird season. Construction would occur outside of the irrigation season, with work taking place from October to April and most construction activities would also occur outside of bird migration, breeding, and nesting seasons, except for bald and golden eagles. Additionally, BMPs would be implemented to ensure that work is only performed during daylight hours, limiting the duration of noise that would affect bird species.

Vegetation Removal and Vegetation Loss

The Siphons Installation Alternative would have minor short-term and long-term effects to habitat for migratory bird species from loss of riparian vegetation where siphons would be installed and eventual loss of seepage induced vegetation where canals would be piped. Siphon construction would affect approximately 15 acres of riparian vegetation. Box culvert

construction and irrigation canal piping change approximately 71,270 feet of open water source that may be used as stopover habitat by waterfowl species. It would also remove 35 acres of low-quality, seepage-induced riparian vegetation that may provide habitat for resident or migratory birds. Alterations to hydrology from piping the canals would result in the loss of seepage-induced wetland features within the Analysis Area. Approximately 35 acres of low quality, seepage induced riparian fringe acres of seepage-induced wetlands within the Analysis Area would be lost after removal of hydrology from open canals sources when they are piped in the Siphons Installation Alternative. Although avian species may use these wetland areas for foraging, these species would be able to use other nearby areas for foraging, including nearby wetlands, after construction occurs. The project would also indirectly improve habitat within natural waterbodies in the vicinity, including the Bear River and Malad River and the GSL by reducing pollutant loads and sedimentation, and conserving water, which would overall improve habitat for fish species and, which would then benefit raptors, eagles and other migratory species that use fish as a food source.

Nesting Season Avoidance

BMPs, including pre-construction surveys and seasonal restrictions, would mitigate effects to avian species. Improvements to the Bear River Club, CDC, and Salt Creek WMA levees would enhance wetland habitats, benefiting migratory bird populations. BMPs would be implemented during construction to avoid and minimize effects to wildlife and wildlife habitat. Appendix E1 includes a complete list of BMPs. The Analysis Area would be surveyed for any migratory bird or eagle nests no more than seven days ahead of construction, prior to vegetation removal and construction. For bald and golden eagles, the seasonal buffer for nesting surveys is January 1 to August 31. The raptor survey should adhere to the USFWS Wyoming Ecological Services Field Office Raptor Guidelines for appropriate nesting windows and protocols (USFWS 2022). If any active migratory bird or raptor nests are identified within the action area, construction and vegetation clearing would pause and the NRCS Biologist would be notified immediately to discuss the appropriate course of action. The Siphons Installation Alternative would have no effect on migratory birds, or bald and golden eagles.

Hammond and West Main Canals Improvements Alternative

The Hammond and West Main Canals Improvements Alternative would have minor, temporary and short-term effects to migratory bird species in the Analysis Area. Though field investigations found no active migratory bird or raptor nests, the Analysis Area and the surrounding area within ½-mile could provide suitable habitat for migratory birds and eagles; therefore, protected avian species may be present within, or in the vicinity of, the Analysis Area. Project BMPs avoid and minimize the effects of the Hammond and West Main Improvements Alternative on migratory bird species and eagles, and the alternative is consistent with MBTA and BGEPA.

Noise Disturbance

Noise effects from construction of the Hammond and West Main Canals Improvements Alternative would result in temporary displacement of nesting bird species within the Analysis Area. Construction activities associated with levee improvements in the Bear River Club, CDC, and Salt Creek WMA may temporarily disturb nesting migratory birds. To prevent effects to migratory birds or raptors from project effects, temporary construction disturbance would be avoided by scheduling work outside of nesting bird season. Construction would occur outside of the irrigation season, with work taking place from October to April and most construction

activities would also occur outside of bird migration, breeding, and nesting seasons, except for bald and golden eagles. Additionally, BMPs would be implemented to ensure that work is only performed during daylight hours, limiting the duration of noise that would affect bird species.

Vegetation Removal and Vegetation Loss

The Hammond and West Main Canals Improvements Alternative would have minor long-term effects to habitat for migratory bird species from eventual loss of seepage induced vegetation where canals would be piped. Box culvert construction and irrigation canal piping would change approximately 71,270 feet of open water source that may be used as stopover habitat by waterfowl species. It would also remove 35 acres of low-quality, seepage-induced riparian vegetation that may provide habitat for resident or migratory birds. Alterations to hydrology from piping the canals would result in the loss of seepage-induced wetland features within the Analysis Area. Although avian species may use these wetland areas for foraging, these species would be able to use other nearby areas for foraging, including nearby wetlands, after construction occurs. The project would also indirectly improve habitat within natural waterbodies in the vicinity, including the Bear River and Malad River and the GSL by reducing pollutant loads and sedimentation, and conserving water, which would overall improve habitat for fish species and, which would then benefit raptors, eagles and other migratory species that use fish as a food source.

Nesting Season Avoidance

BMPs, including pre-construction surveys and seasonal restrictions, would mitigate these effects. Improvements to the Bear River Club, CDC, and Salt Creek WMA levees would enhance wetland habitats, benefiting migratory bird populations. BMPs would be implemented during construction to avoid and minimize effects to wildlife and wildlife habitat. Appendix E1 includes a complete list of BMPs. The Analysis Area would be surveyed for any migratory bird or eagle nests no more than seven days ahead of construction, prior to vegetation removal and construction. For bald and golden eagles, the seasonal buffer for nesting surveys is January 1 to August 31. The raptor survey should adhere to the USFWS Wyoming Ecological Services Field Office Raptor Guidelines for appropriate nesting windows and protocols (USFWS 2022). If any active migratory bird or raptor nests are identified within the action area, construction and vegetation clearing would pause and the NRCS Biologist would be notified immediately to discuss the appropriate course of action. The Hammond and West Main Canals Improvements Alternative would have no effect on migratory birds, or bald and golden eagles.

5.3.7 Human Environment

This section discusses the potential effects related to the human environment, including cultural and historic properties, scientific resources, public health and safety, hazardous materials, transportation and infrastructure, noise, visual resources and scenic beauty and recreation.

5.3.7.1 Cultural and Historic Resources

No Action Alternative

The No Action Alternative would not cause effects to historic properties. If no federal action occurs, long-term degradation could result if the irrigation and levee systems cease to function properly. Additionally, the potential exists that smaller improvements associated with O&M over

time could have cultural resource effects that would not be mitigated and could destroy the integrity of linear sites.

No effects to the California NHT or its historic setting would occur.

Siphons Installation Alternative

Eligible cultural resources located within the APE and the effects of the Siphons Installation Alternative are shown in Table 5-4. Applying the Criteria of Adverse Effect (36 CFR 800.5), the NRCS determined that the Siphons Installation Alternative would have an *adverse effect* on four eligible canals, and *no adverse effect* on the Union Pacific Railroad, the Bear River Club Dike, the Unnamed Levee, and the Old River Channel Canal.

Table 5-4. Historic Properties within the Area of Potential Effect, National Register of Historic Places Eligibility, and Effects

Smithsonian No./Site Name	NRHP Eligibility	Effects
42BO822/Union Pacific Railroad	Eligible under Criterion A	No adverse effect
42BO1182/West Main Canal	Eligible under Criterion A and C	Adverse effect
42BO1185/East Canal/Corinne Canal	Eligible under Criterion A and C	Adverse effect
42BO1507/Hammond Main Canal	Eligible under Criterion A and C	Adverse effect
42BO2990/Willow Ditch	Eligible under Criterion A	Adverse effect
42BO2997/Bear River Club Dike	Eligible under Criterion A, B, and C	No adverse effect
42BO2998/Unnamed Levee	Eligible under Criterion A, B, and C	No adverse effect
42BO2999/Old River Channel Canal	Eligible under Criterion A, B, and C	No adverse effect

No adverse effects would occur to the Union Pacific Railroad because the project Co-sponsors would bore underneath the railroad without disturbing the surface.

The project Co-sponsors have proposed improvements to four of the canals (42BO1182, 42BO1185, 42BO1507, and 42BO2990) by either installing box culverts or piping them underground. These actions would result in severe impacts to the integrity of these sites that would affect their eligibility for the NRHP, and resultant findings of adverse effect for the West Main Canal, the East Canal, the Hammond Main Canal, and the Willow Ditch.

The project sponsors have also proposed improving existing levees (42BO2997 and 42BO2998) in the Bear River Duck Club project component by adding road base gravel to these features. Because these actions would not result in effects to the integrity of these sites that would affect their eligibility for the NRHP, no adverse effects would occur to these sites.

The project sponsors have not proposed any changes to the Old River Channel Canal (42BO2999), which is adjacent to 42BO2998, and, therefore, would not adversely affect this canal.

The Siphons Installation Alternative would provide long-term beneficial effects to the California NHT because the piping and covering of post-migration period canals would enhance the historic setting and scenery over time.

The NRCS formally submitted their findings of effect with the cultural resources report to the SHPO and the Tribes in May 16, 2025 letters; and to cooperating agencies (USACE, EPA, and Reclamation), USFWS, NPS, and UDWiR in May 27, 2025 letters; to notify them of the delineation of the APE, site eligibility, determinations, and NRCS's role as the lead federal agency for Section 106 consultation, to which they concurred (see letters in Appendix E1). As noted in Section 3.3.7.1, the agencies acknowledged that the NRCS is the lead federal agency for compliance with Section 106 of the NHPA, and they designated the NRCS to act on their behalf in any consultations conducted for compliance with NHPA. SHPO concurred with the delineation of the APE, site eligibility, and finding of effects in a letter dated May 23, 2025.

NRCS notified the ACHP of the finding of adverse effects to historic properties on May 27, 2025.The ACHP responded in a letter dated June 10, 2025, agreeing with the findings and declining to participate in the development of an MOA. In accordance with 36 CFR Part 800.6, NRCS designed mitigation to resolve the adverse effects to the canals through a draft MOA (Appendix A). SHPO, consulting parties, Tribes, Sponsors, and Co-sponsors were invited to participate in the development of the draft MOA (letters/emails in Appendix A). The Utah SHPO, BRWCD, BRCC, and UDWiR are participating in the MOA.

The MOA includes the following stipulations to resolve the adverse effects:

- Aerial video flyovers and additional photographs of contributing features to fully document Sites 42BO1182, 42BO1185, 42BO1507, and 42BO2990.
- Informal Historic American Engineering Record (HAER) documentation of Site 42BO1185 Feature-01 (aqueduct) to include select existing drawings (where available), detailed photographs, and a NPS short form report.
- Creation of a "Story Map" of the ditches to be made available to the public online.
- Historic context of Sites 42BO1182, 42BO1185, 42BO1507, and 42BO2990, as applicable given available data.
- Post-construction updated Utah Archaeology Site Forms for each site, with revised eligibility, to be submitted to SHPO upon review and approval by NRCS.

See Section 7.1.1 for details of ongoing Tribal and agency consultations. All records associated with Section 106 consultation are in Appendix A.

If construction activities uncover any materials of cultural or historic significance (i.e., bone fragments, pottery, stone tools, burial features, etc.), construction would halt, and procedures outlined in the NRCS Prototype Programmatic Agreement with the Utah SHPO would be followed (NRCS and SHPO 2025).

Hammond and West Main Canals Improvements Alternative

Eligible cultural resources located within the APE and the effects of the Hammond and West Main Canals Improvements Alternative are shown in Table 5-4. The Hammond and West Main Canals Improvements Alternative would have an *adverse effect* on four eligible canals and *no adverse effect* on the Union Pacific Railroad, the Bear River Club Dike, the Unnamed Levee, and the Old River Channel Canal. The Hammond and West Main Canals Alternative would provide long-term beneficial effects to the California NHT because the piping and covering of post-migration period canals would enhance the historic setting and scenery over time.

The NRCS formally submitted their findings of effect with the cultural resources report to the SHPO and the Tribes in May 16, 2025 letters; and cooperating agencies (USACE, EPA, and Reclamation), USFWS, NPS, and UDWiR in May 27, 2025 letters; to notify them of the delineation of the APE, site eligibility, determinations, and NRCS's role as the lead federal agency for Section 106 consultation, to which they concurred (see letters in Appendix E1). As noted in Section 3.3.7.1, the agencies acknowledged that the NRCS is the lead federal agency for compliance with Section 106 of the NHPA, and they designated the NRCS to act on their behalf in any consultations conducted for compliance with NHPA. SHPO concurred with the delineation of the APE, site eligibility, and finding of effects in a letter dated May 23, 2025.

NRCS notified the ACHP of the finding of adverse effects to historic properties on May 27, 2025 and the ACHP responded in a letter dated June 10, 2025 agreeing with the findings and declining to participate in the development of an MOA. In accordance with 36 CFR Part 800.6, NRCS designed mitigation to resolve the adverse effects to the canals through a draft MOA (Appendix A). SHPO, consulting parties, Tribes, Sponsors, and Co-sponsors were invited to participate in the development of the draft MOA (letters/emails in Appendix A). The Utah SHPO, BRWCD, BRCC, and UDWiR are participating in the MOA.

The MOA includes the following stipulations to resolve the adverse effects:

- Aerial video flyovers and additional photographs of contributing features to fully document Sites 42BO1182, 42BO1185, 42BO1507, and 42BO2990.
- Informal Historic American Engineering Record (HAER) documentation of Site 42BO1185 Feature-01 (aqueduct) to include select existing drawings (where available), detailed photographs, and a NPS short form report.
- Creation of a "Story Map" of the ditches to be made available to the public online.
- Historic context of Sites 42BO1182, 42BO1185, 42BO1507, and 42BO2990, as applicable given available data.
- Post-construction updated Utah Archaeology Site Forms for each site, with revised eligibility, to be submitted to SHPO upon review and approval by NRCS.

See Section 7.1.1 for details of ongoing Tribal and agency consultations. All records associated with Section 106 consultation are in Appendix A.

If construction activities uncover any materials of cultural or historic significance (i.e., bone fragments, pottery, stone tools, burial features, etc.), construction would halt, and procedures outlined in the NRCS Prototype Programmatic Agreement with the Utah SHPO would be followed (NRCS and SHPO 2025).

5.3.7.2 Scientific Resources

No Action Alternative

Under the No Action Alternative, no ground disturbances would occur. No direct or indirect long or short-term effects to paleontological resources would occur due to the No Action Alternative.

Siphons Installation Alternative

The Project Area is comprised mainly of quaternary and recent alluvial and lacustrine deposits and is unlikely to contain paleontological resources. The Siphons Installation Alternative is not

expected to uncover significant fossils (see UDNR concurrence letter in Appendix A). Unless fossils are discovered as a result of construction activities, the Siphons Installation Alternative would have no direct or indirect effect on paleontological resources. If fossils are discovered during construction activities, work would be halted within 50 feet of the discovery and notification made to UDNR.

Hammond and West Main Canals Improvements Alternative

The Project Area is comprised mainly of quaternary and recent alluvial and lacustrine deposits and is unlikely to contain paleontological resources. The Hammond and West Main Canals Improvements Alternative is not expected to uncover significant fossils (see UDNR concurrence letter in Appendix A). Unless fossils are discovered as a result of construction activities, the Hammond and West Main Canals Improvements Alternative would have no direct or indirect effect on paleontological resources. If fossils are discovered during construction activities, work would be halted within 50 feet of the discovery and notification made to UDNR.

5.3.7.3 Public Health and Safety

No Action Alternative

The No Action Alternative would not implement changes to affect public health and safety. The existing conditions would persist, including continued potential for canal failures in the canyon and flooding in the Project Area and surrounding areas and risks to public safety. The open canals would continue to pose a risk for the public, including flooding hazards from overtopping and debris build-up, as well as safety concerns due to open sources of water near homes. The No Action Alternative would not address these flooding and public safety concerns.

Siphons Installation Alternative

The purpose of the Proposed Project is to provide agricultural water management and watershed protection. Given the history of major canal failures in the BRCC water system, which provides irrigation water to over 65,500 acres of agricultural land, as well as was to nearby cities and towns like Tremonton and Bear River City, and the dangers open canals pose to the public, the Siphons Installation Alternative would provide major long-term beneficial improvements to public health and safety in the Project Area and the Watershed.

The Siphons Installation Alternative would reduce the risks of major canal failures by bypassing/abandoning portions of the Hammond Canal, located in a landslide prone area and constructing a siphon system within the canyon, which would indirectly reduce public safety concerns by lessening the chances of landslides from unstable slopes caused by canal water losses. Additionally, the Siphons Installation Alternative would pipe the Highland Canal and Central Canal systems, which would directly improve public safety concerns by removing sources of open water near residential areas, and reducing the potential for flooding from debris and sediment that enters the canals can cause canals to back up, overtop, and flood surrounding areas.

Standard industry practices required in the specifications to the construction contractor (e.g., traffic control plans, coordination with local emergency responders, limiting work hours to daytime, marking and barricading active construction areas to prevent public access, dust

abatement) would limit any additional effects to health and safety, and these measures are included in the BMPs for the project (Appendix E1).

Hammond and West Main Canals Improvements Alternative

The purpose of the Proposed Project is to provide agricultural water management and watershed protection. Given the history of major canal failures in the BRCC water system, which provides irrigation water to over 65,500 acres of agricultural land, as well as was to nearby cities and towns like Tremonton and Bear River City, and the dangers open canals pose to the public, the Hammond and West Main Canals Improvements Alternative would provide major long-term beneficial improvements to public health and safety in the Project Area and the Watershed Area.

The Hammond and West Main Canals Improvements Alternative would reduce these risks by installing concrete box culverts on the Hammond and West Main Canals to reduce the likelihood of landslides and subsequent canal failures, directly improving public health and safety in the area. Additionally, the Siphons Installation Alternative would pipe the Highland Canal and Central Canal systems, which would directly improve public safety concerns by removing sources of open water near residential areas, providing major long-term beneficial improvements to public health and safety in the Project Area and the Watershed.

Standard industry practices required in the specifications to the construction contractor (e.g., traffic control plans, coordination with local emergency responders, limiting work hours to daytime, marking and barricading active construction areas to prevent public access, dust abatement) would limit any additional effects to health and safety, and these measures are included in the BMPs for the project (Appendix E1).

5.3.7.4 Hazardous Materials

No Action Alternative

The No Action Alternative would have no effects to hazardous material sites or solid waste storage and disposal sites. Facilities that handle, generate, or dispose of hazardous materials have been identified within or adjacent to the Project Area. However, as the existing conditions persist, any ongoing flooding could disturb existing facilities and environmental incidents.

Siphons Installation Alternative

For the Siphons Installation Alternative, one hazardous materials site was identified in the UDEQ database within 15 feet of the project activities. This Tier 2 Facility is located near Tremonton City at the Tremonton irrigation storage agricultural water management improvement. Based on the UDEQ Hazardous Materials Map, underground storage tanks, petroleum hydrocarbon impacted soil, or groundwater would not be encountered (see Hazardous Materials Map in Appendix C).

Ground disturbance from general construction activities has the potential to encounter the hazardous materials site under the Siphons Installation Alternative; however, the likelihood of encountering contaminated soil within the Project Area is minimal because most of the improvements made in Tremonton and Bear River City would be confined to the roadway right-of-way (ROWs).

To ensure the Tier 2 site is not disturbed, construction activities in these areas would be confined to the smallest extent possible. Additionally, BMPs would be implemented to minimize potential effects. These BMPs include minimizing soil disturbance, and if hazardous materials are encountered, notifying UDEQ, and handling site material appropriately.

During construction activities, fuels, oils, lubricants, and other potential environmentally deleterious materials supporting the construction activities may be stored and used on-site. A construction BMP includes containing all work activities, where possible, to upland areas to minimize potential effects to surface water quality. The contractor would be required to follow the UPDES General Construction Permit which manages stormwater runoff during construction. In addition, the contractor would also be required to follow an approved SWPPP and SPCC plan and comply with the plan when fueling, performing cleaning and maintenance, and storing or disposing of hazardous materials.

This alternative is designed to minimize effects to existing hazardous materials and would not introduce new hazardous materials. Additionally, storage, use and disposal of fuels, oils, lubricants, and other construction materials would be subject to all applicable local, state, and federal regulations, ensuring only negligible effects to hazardous materials.

Hammond and West Main Canals Improvements Alternative

For the Hammond and West Main Canals Improvements Alternative, one hazardous materials site was identified in the UDEQ database within 15 feet of the project activities. This Tier 2 Facility is located near Tremonton City at the Tremonton irrigation storage agricultural water management improvement. Based on the UDEQ Hazardous Materials Map, underground storage tanks, petroleum hydrocarbon impacted soil, or groundwater would not be encountered (see Hazardous Materials Map in Appendix C).

Ground disturbance from general construction activities has the potential to encounter the hazardous materials site under the Hammond and West Main Canals Improvements Alternative; however, the likelihood of encountering contaminated soil within the Project Area is minimal because most of the improvements made in Tremonton and Bear River City would be confined to the roadway ROWs.

To ensure the Tier 2 site is not disturbed, construction activities in these areas would be confined to the smallest extent possible. Additionally, BMPs would be implemented to minimize potential effects. These BMPs include minimizing soil disturbance, and if hazardous materials are encountered, notifying UDEQ, and handling site material appropriately.

During construction activities, fuels, oils, lubricants, and other potential environmentally deleterious materials supporting the construction activities may be stored and used on-site. A construction BMP includes containing all work activities, where possible, to upland areas to minimize potential effects to surface water quality. The contractor would be required to follow the UPDES General Construction Permit which manages stormwater runoff during construction. In addition, the contractor would also be required to follow an approved SWPPP and SPCC plan and comply with the plan when fueling, performing cleaning and maintenance, and storing or disposing of hazardous materials.

This alternative is designed to minimize effects to existing hazardous materials and would not introduce new hazardous materials. Additionally, storage, use and disposal of fuels, oils,

lubricants, and other construction materials would be subject to all applicable local, state, and federal regulations, ensuring only negligible effects to hazardous materials.

5.3.7.5 Transportation and Infrastructure

No Action Alternative

Existing infrastructure in the Project Area includes linear transportation facilities, irrigation and secondary water features, residential structures, and existing watershed protection infrastructure. The existing irrigation features, which include the BRCC irrigation system, Tremonton City Pressure Irrigation System, Highland Ditch Company system, and the Central Canal Company system, are aging and require costly maintenance and repairs to maintain reliable water delivery to residents and agricultural users. The existing watershed protection infrastructure, including the Bear River Club, CDC, and Salt Creek WMA levees have deteriorated and no longer function as designed.

Under the No Action Alternative, the existing irrigation systems would not be implemented, and the systems would continue to experience water losses and equipment failures, as well as delivery inefficiencies and reliability. The existing watershed protection infrastructure would not be rehabilitated under the No Action Alternative, meaning levee breach risks and erosion concerns would not be addressed. Road infrastructure, including the major I-15 transportation corridor, and nearby towns and cities would continue to be at risk of damage during flood events and require costly damage repairs and maintenance would continue to accrue. Approximately 24,000 acres of critical wetland habitat would continue to be at risk for dewatering and sedimentation damage.

Siphons Installation Alternative

Under the Siphons Installation Alternative, minor traffic delays would temporarily occur due to construction activities within road ROWs during installation of the Proposed Project. These delays would be temporary and last only during construction. Due to the rural setting of the Project Area, transportation delays would be expected to be minimal, and alternative routes would be available for residents to travel throughout the area. The I-15 and I-84 transportation corridors would not be affected by the project activities. Access to the Project Area would be achieved at numerous locations using existing public roads or site access roads. Contractors would implement traffic control measures and coordinate construction schedules with Tremonton, Bear River City, Box Elder County, and the public as appropriate during construction. The project team would secure all road permits as required from Tremonton, Bear River City, Box Elder County, and the Utah Department of Transportation (UDOT) for any construction in public ROWs, as appropriate. No loss of business or residential access is anticipated for the implementation of the Siphons Installation Alternative.

The Siphons Installation Alternative would provide long-term beneficial effects to transportation and infrastructure by reducing the risk of landslides, canal overtopping, and flood damage from potential canal failure. Numerous interstate, state, and local roads, including a major north-south transportation corridor within the watershed area would be protected.

Hammond and West Main Canals Improvements Alternative

For the Hammond and West Main Canals Improvements Alternative, minor traffic delays would temporarily occur due to construction activities within road ROWs during installation of the Proposed Project. These delays would be temporary and last only during construction. Due to the rural setting of the Project Area, transportation delays would be expected to be minimal, and alternative routes would be available for residents to travel throughout the area. The I-15 and I-84 transportation corridors would not be affected by the project activities. Access to the Project Area would be achieved at numerous locations using existing public roads or site access roads. Contractors would implement traffic control measures and coordinate construction schedules with Tremonton, Bear River City, Box Elder County, and the public as appropriate during construction. The project team would secure all road permits as required from Tremonton, Bear River City, Box Elder County, and the UDOT for any construction in public ROWs, as appropriate. No loss of business or residential access is anticipated for the implementation of the Hammond and West Main Canals Improvements Alternative.

The Hammond and West Main Canals Improvements Alternative would provide long-term beneficial effects to transportation and infrastructure by reducing the risk of landslides, canal overtopping, and flood damage from potential canal failure. Numerous interstate, state, and local roads, including a major north-south transportation corridor within the watershed area would be protected.

5.3.7.6 Noise

No Action Alternative

The Project Area contains agricultural and residential land uses. Numerous noise sensitive receptors are present surrounding the Project Area, including local parks, residential areas, and schools. Frequently traveled roadways intersect the Project Area. Background noise levels are associated with existing traffic and agricultural noise. The No Action Alternative would have no effect on noise levels in the Project Area.

Siphons Installation Alternative

Temporary effects to noise would occur during construction due to the operation of construction equipment and vehicles. BMPs would be implemented to minimize noise during construction, including noise mitigation measures limiting construction work to established daytime working hours and requiring the use of properly functioning equipment mufflers.

Under the Siphons Installation Alternative, the project would install pressure irrigation in both Tremonton City and Bear River City, and proposed pump installation could affect noise levels. The Tremonton pressure irrigation would upgrade two pump stations. Upgrading the two stations in Tremonton would occur in existing pump house structures designed to minimize noise disturbance, and because the pumps would be replacing existing pumps, long-term noise levels would not change from these additions. After construction, noise levels would return to preconstruction conditions.

For the Bear River City pressure irrigation, a new pump station would be installed in the southern part of City Park near the Bear River, which is near a residential area. The pump would be a vertical turbine pump with a recommended power of 44.7 kW. The existing intersection at

W 5900 N and N 4600 W, along with associated traffic and the City Park, contribute to the current noise levels. Although Bear River City and Box Elder County do not have noise ordinances in place, the pump station would be contained in a masonry control house designed to limit noise.

To determine the effects of the new pump to noise, the noise level was calculated using the WKC Pump Noise Calculator by inputting pump power and speed range to return the noise level in dB at 1 meter (WKC 2025). Using the inverse square law, this number was converted to a noise level of 82 dB at 10 feet. The pump would be housed in a masonry building designed to reduce the noise effects, which would reduce the noise level by approximately 25–35 dB (Federal Highway Administration [FHWA] 2018). Considering the masonry noise level reduction, the pump station would produce 47–57 dB at 10 feet. Based on these calculations and combined with the existing noise and the noise attenuating effectiveness of the masonry control house, the long-term noise level increase from the pump station would be minor.

Hammond and West Main Canals Improvements Alternative

Temporary effects to noise would occur during construction due to the operation of construction equipment and vehicles. BMPs would be implemented to minimize noise during construction, including noise mitigation measures limiting construction work to established daytime working hours and requiring the use of properly functioning equipment mufflers.

Under the Hammond and West Main Canals Improvements Alternative, the project would install pressure irrigation in both Tremonton City and Bear River City, and proposed pump installation could affect noise levels.

The Tremonton pressure irrigation would upgrade two pump stations. Upgrading the two stations in Tremonton would occur in existing pump house structures designed to minimize noise disturbance, and because the pumps would be replacing existing pumps, long-term noise levels would not change from these additions. After construction noise levels would return to preconstruction conditions.

For the Bear River City pressure irrigation, a new pump station would be installed in the southern part of City Park near the Bear River, which is near a residential area. The pump would be a vertical turbine pump with a recommended power of 44.7 kW. The existing intersection at W 5900 N and N 4600 W, along with associated traffic and the City Park, contribute to the current noise levels. Although Bear River City and Box Elder County do not have noise ordinances in place, the pump station would be contained in a masonry control house designed to limit noise.

To determine the effects of the new pump to noise, the noise level was calculated using the WKC Pump Noise Calculator by inputting pump power and speed range to return the noise level in dB at 1 meter (WKC 2025). Using the inverse square law, this number was converted to a noise level of 82 dB at 10 feet. The pump would be housed in a masonry building designed to reduce the noise effects, which would reduce the noise level by approximately 25–35 dB (FHWA 2018). Considering the masonry noise level reduction, the pump station would produce 47–57 dB at 10 feet. Based on these calculations and combined with the existing noise and the noise attenuating effectiveness of the masonry control house, the long-term noise level increase from the pump station would be minor.

5.3.7.7 Visual Resources and Scenic Beauty

No Action Alternative

The No Action Alternative would have no direct effects to visual resources and scenic beauty in the Project Area. However, long-term indirect effects would occur as continued canal overtopping and flooding of nearby cities and towns, as well as nearby agricultural lands would continue, which could cause future changes to visual resources and scenic beauty in the area. Future landslides in the canyon could potentially drastically change the visual resources and scenic beauty of the canyon. Continued levee degradation and sedimentation of the nearby wetlands would also have drastic effects to the scenic beauty of both the wetland areas and downstream critical habitat areas.

Siphons Installation Alternative

Under the Siphons Installation Alternative, temporary localized effects to visual quality would occur as a result of the presence of construction equipment and crews and material stockpiles at staging areas throughout the Project Area, including adjacent to Camp Fife, the Bear River Canyon, the Bear River Migratory Bird Refuge, and the Salt Creek WMA. These effects would cease following the completion of construction activities in the area. Disturbed areas would be restored to pre-construction conditions after construction, as applicable.

Potential visual effects would be minimized by implementing BMPs to protect areas outside the active construction area, encourage the establishment of native vegetation, and preserve existing vegetation. Existing roads would be used to access the Project Area. BMPs are described in Appendix E1.

During the period between installation of the BRCC siphons, box culverts, and piping and successful reclamation, a linear scar attributable to the existing canals and vegetation removal along the canal lines would be visible intermittently along access roads and driveways. These linear features would create only a minor visual change temporarily because they would resemble the current condition of the linear canal features and be strikingly similar to other linear features, such as ditch, power, and fence lines in this rural, agricultural setting.

In the long term, after reclamation and vegetation establishment, the visual changes from the Siphons Installation Alternative would be substantially unnoticeable and not measurably different from current conditions of the surrounding landscape. The Siphons Installation Alternative would have permanent effects to visual resources from installation of eleven manhole access areas for the siphons. The visual effect of these manholes would be negligible, as they would be installed flush with the ground, measuring 3-feet by 3-feet, and spaced 500 feet apart. They would be difficult to notice unless directly over them.

Future canal overtopping and flooding, landslides in the canyon area, and levee degradation and sedimentation would be reduced, preserving the existing scenic beauty of cities, towns, and the canyon and wetland areas. The Siphons Installation Alternative would not change the VRM classifications, nor would it change the visual characteristic of the landscape.

Hammond and West Main Canals Improvements Alternative

Under the Hammond and West Main Canals Improvements Alternative, temporary localized effects to visual quality would occur as a result of the presence of construction equipment and crews and material stockpiles at staging areas throughout the Project Area, including adjacent to the Bear River Canyon, the Bear River Migratory Bird Refuge, and the Salt Creek WMA. These effects would cease following the completion of construction activities in the area. Disturbed areas would be restored to pre-construction conditions after construction, as applicable.

Potential visual effects would be minimized by implementing BMPs to protect areas outside the active construction area, encourage the establishment of native vegetation, and preserve existing vegetation. Existing roads would be used to access the Project Area. BMPs are described in Appendix E1.

During the period between installation of the Red Flume siphon, box culverts, and piping and successful reclamation, a linear scar attributable to the existing canals and vegetation removal along the canal lines would be visible intermittently along access roads and driveways. These linear features would create only a minor visual change in the temporary time frame because they would resemble the current condition of the linear canal features and be strikingly similar to other linear features, such as ditch, power, and fence lines in this rural, agricultural setting.

In the long term, after reclamation and vegetation establishment, the visual changes from the Hammond and West Main Canals Improvements Alternative would be substantially unnoticeable and not measurably different from current conditions of the surrounding landscape. Future canal overtopping and flooding, landslides in the canyon area, and levee degradation and sedimentation would be reduced, preserving the existing scenic beauty of cities, towns, and the canyon and wetland areas. The Hammond and West Main Canals Improvements Alternative would not change the VRM classifications, nor would it change the visual characteristic of the landscape.

5.3.7.8 Recreation

No Action Alternative

Under the No Action Alternative, landslide and flooding risks associated with canal overtopping would remain, allowing potential landslide and flood damage threats to existing recreational facilities in the area to continue. The No Action Alternative would not address failing levee concerns or sedimentation in critical habitat areas, resulting in continued damage and risk to more than 24,000 acres of wetland and wildlife habitat, indirectly affecting recreational opportunities as well. Long-term, existing negative effects to recreational opportunities would persist in the area.

Siphons Installation Alternative

No designated parks or public recreational facilities exist within the Project Area. However, Camp Fife, a designated youth group day camp facility and several natural areas, including the Salt Creek WMA and the Bear River Migratory Bird Refuge, are located on or adjacent to portions of the Project Area. The Siphons Installation Alternative would temporarily preclude some recreational activities during construction. Some undesignated camping and hiking access or fishing areas may temporarily be closed during construction around the BRCC canals. These

recreational opportunities would resume following completion of nearby construction activities. These effects would be negligible because numerous opportunities for hiking, camping, fishing, hunting, and wildlife watching would remain in the nearby communities that would not be disturbed by the Siphons Installation Alternative.

The Siphons Installation Alternative would install 3,320 feet of siphon from the Hammond Canal across the river and through Camp Fife to the West Main Canal. The installation would require trenching work for installation as well as the installation of a manhole for maintenance access every 500 feet. The work across the Bear River and through Camp Fife would be completed in the late summer when river flows are the lowest. Temporary disruptions to recreational activities in these areas would occur during construction. A staging area located adjacent to Camp Fife would also be used. The Camp would likely experience temporary effects from construction equipment, including increased traffic, and noise. These effects would be localized and would cease following completion of construction in these areas. Once the siphon installation is complete, the construction site and staging area would be returned to pre-construction conditions. The siphon would be buried with only the manhole access points visible at ground level. Approximately eleven manholes would be required for the siphons and be permanent disturbances within the area, including two within Camp Fife. Each manhole access area would include a 3-feet-by-3-feet area of disturbance that would be permanently maintained and only visible to passersby when directly over them.

Sidewalks and road shoulders that residents may use for walking, running, and biking may be temporarily affected during the piping portions of the Proposed Project. These effects would be temporary and would cease following the completion of construction.

The rehabilitation of the levees within the Bear River Club, CDC, and Salt Creek WMA would cause temporary effects to recreational opportunities immediately adjacent to work areas. Increased construction traffic and noise would disrupt views and wildlife, which could potentially disrupt wildlife viewing in the area. These effects would be localized and would cease following the completion of construction. As part of the Bear River Club levee improvements, an approximately 6,736 feet access road would need to be improved. This existing access road lies within the Bear River Migratory Bird Refuge and improvements to the access road would be noticeable from the refuge's auto tour loop. While the access road would be maintained post-construction for periodic maintenance, any unnecessary road width would be reclaimed.

Long-term, the Siphons Installation Alternative would provide beneficial effects to recreational opportunities surrounding the BRCC canal by reducing landslide potential and creating a safer canyon area for recreation. The Siphons Installation Alternative would also indirectly benefit recreational opportunities in nearby wetland areas by improving 24,000 acres of wetland and wildlife habitats long-term, allowing for better wildlife and bird viewing, waterfowl hunting and hiking opportunities.

Hammond and West Main Canals Improvements Alternative

The Hammond and West Main Canals Improvements Alternative would temporarily preclude some recreational activities during construction. Some undesignated camping and hiking access or fishing areas may temporarily be closed during construction around the BRCC canals. These recreational opportunities would resume following completion of nearby construction activities.

These effects would be negligible because numerous opportunities for hiking, camping, fishing, hunting, and wildlife watching would remain in the nearby communities that would not be disturbed by the Siphons Installation Alternative.

The Hammond and West Main Canals Improvements Alternative would install 17,300 feet of concrete box culverts in the Hammond Canal and West Main Canal. The box culverts would be installed within the existing canal prism. Temporary disruptions to recreational activities in these areas would occur during construction due to increased traffic, construction equipment, and noise. These effects would be localized and would cease following completion of construction in these areas. Once installation is complete, all disturbance areas would be returned to pre-construction conditions. The work would be completed outside the irrigation season, likely in the late fall or winter. Due to the anticipated construction schedule, no effects are anticipated for Camp Fife.

Sidewalks and road shoulders that residents may use for walking, running, and biking may be temporarily affected during the piping portions of the Proposed Project. These effects would be temporary and would cease following the completion of construction.

The rehabilitation of the levees within the Bear River Club, CDC, and Salt Creek WMA would cause temporary effects to recreational opportunities immediately adjacent to work areas. Increased construction traffic and noise would disrupt views and wildlife, which could potentially disrupt wildlife viewing in the area. These effects would be localized and would cease following the completion of construction. As part of the Bear River Club levee improvements, an approximately 6,736 feet access road would need to be improved. This existing access road lies within the Bear River Migratory Bird Refuge and improvements to the access road would be noticeable from the refuge's auto tour loop. While the access road would be maintained post-construction for periodic maintenance, any unnecessary road width would be reclaimed.

Long-term, the Hammond and West Main Canals Improvements Alternative would provide beneficial effects to recreational opportunities surrounding the BRCC canal by reducing landslide potential and creating a safer canyon area for recreation. The Hammond and West Main Canals Improvements Alternative would also indirectly benefit recreational opportunities in nearby wetland areas by improving 24,000 acres of wetland and wildlife habitats long-term, allowing for better wildlife and bird viewing, waterfowl hunting and hiking opportunities.

5.3.8 Special Land Designations

5.3.8.1 Land Use

No Action Alternative

The Project Area is zoned for a variety of uses, including agricultural, residential, sensitive lands, and public facilities. The No Action Alternative would have no direct effect to land use designations because no changes in land uses would occur. However, the No Action Alternative would have significant long-term indirect effects to existing land uses if canal overtopping and flooding is allowed to continue, potentially damaging homes, structures, and diminishing the effective use of agricultural lands. More than 24,000 acres of wetlands and critical habitat would continue to be at risk of damage from levee failures and sedimentation, which could have long-term negative effects to these areas under the No Action Alternative. Additionally, the No Action

Alternative would not meet the goals and objectives of either the Box Elder County RMP or the State RMP.

Siphons Installation Alternative

Under the Siphons Installation Alternative, private land would be used to construct the BRCC siphons across the canyon. However, above ground disturbances would be temporary and current land use would not change. Public rights-of-way would be used to construct the Tremonton and Bear River Pressure Irrigation systems with private land being used for the equalization ponds. Implementation of this alternative would remain consistent with applicable local zoning designations. Lands used for new pressure irrigation systems would continue to support agricultural water management purposes and would not result in a change in zoning consistency. Approximately 9.0 acres of prime and unique farmland would be permanently converted to water storage uses through construction of equalization ponds; however, these uses would continue to serve agricultural and secondary water management functions. As a result, the Proposed Project would not conflict with existing land use plans or zoning regulations. Other components of the Siphons Installation Alternative would remain in their existing locations.

The closest Water Source Protection area, called Water Source Protection Zone 2, is located approximately 0.28 miles north of the staging area for the Tremonton Irrigation Storage component of the Proposed Project, within Tremonton City (Jones and Associates Consulting Engineers 2016). Based on elevation, land drains away from protection district. No work would take place within or over the Water Source Protection Zone and no land use would change in this area. See Maps 6, 7, and 8 in Appendix C for Tremonton City Zoning, Land Use Protection Areas, and Water Source Protection Zones.

Potential indirect effects to land use under the Siphons Installation Alternative would be minor, albeit permanent. The Siphons Installation Alternative components are designed to provide additional water supply to existing agricultural and secondary water users. The Siphons Installation Alternative is not designed to provide water for a larger than estimated development growth rate in the Project Area or to provide water for additional acres of land not already irrigated through the system.

The Siphons Installation Alternative would meet both the Box Elder County RMP and State of Utah RMP goals in multiple ways, as shown in Table 5-5 below.

Table 5-5. County and State RMP Goals Summary

RMP Goals	Alternative Actions to Meet Goal
Box Elder County RMP	
Encourage activities to have a positive effect on agricultural land	Improve agricultural water management and delivery efficiency through construction of piping systems and rehabilitation of the BRCC canal system to provide a more reliable water source for more than 65,500 acres of agricultural land.
Preserve, maintain, and develop county water resources	Improve agricultural water management and delivery efficiency through construction of piping systems and rehabilitation of the BRCC canal system to provide a more reliable water source for more than 65,500 acres of agricultural land.
Promote and support efforts to improve air quality for NAAQS monitored pollutants	Comply with CAA's General Conformity Regulations and Utah DAQ's regulations to assist the state in attaining and maintaining NAAQS.

RMP Goals	Alternative Actions to Meet Goal
Implement land use and development strategies to protect life and property from geologic hazards	Rehabilitate the BRCC canal system to reduce landslide risks from unstable soils caused by water losses.
Preserve and strengthen the agricultural economy	Improve agricultural water management and delivery efficiency through construction of piping systems and rehabilitation of the BRCC canal system to provide a more reliable water source for more than 65,500 acres of agricultural land.
Support vegetation management within their historic range or variation	Rehabilitate levees and construct a sediment basin to improve more than 24,000 acres of critical wetland habitat, indirectly benefiting county wildfire management by ensuring a range of healthy vegetation habitats.
Support water quality BMPs to improve water quality in the GSL	Reduce sediment in the Salt Creek WMA and indirectly improve water quality in the area wetland system, which ultimately ends up in GSL.
Increase riparian resilience	Rehabilitate levees and construct a sediment basin to improve more than 24,000 acres of critical wetland habitat, indirectly benefiting county wildfire management by ensuring a range of healthy vegetation habitats.
Protect and improve water quality and the watershed	Reduce sediment in the Salt Creek WMA and indirectly improve water quality in the area wetland system.
Maximize water yields to support water for livestock, wildlife, and human uses	Improve agricultural water management and delivery efficiency through construction of piping systems and rehabilitation of the BRCC canal system to provide a more reliable water source for more than 65,500 acres of agricultural land.
Conserve and enhance wetlands	Rehabilitate levees and construct a sediment basin to improve more than 24,000 acres of critical wetland habitat, indirectly benefiting county wildfire management by ensuring a range of healthy vegetation habitats.
Utah State RMP	
Support agricultural development and protect agricultural production	Improve agricultural water management and delivery efficiency through construction of piping systems and rehabilitation of the BRCC canal system to provide a more reliable water source for more than 65,500 acres of agricultural land
Safeguard and improve air quality	Comply with CAA's General Conformity Regulations and Utah DAQ's regulations to assist the state in attaining and maintaining NAAQS.
Provide safe and reliable water conveyance for beneficial uses (including supporting county plans for ditches, canals, and irrigation)	Improve agricultural water management and delivery efficiency through construction of piping systems and rehabilitation of the BRCC canal system to provide a more reliable water source for more than 65,500 acres of agricultural land
Protect and conserve fish and aquatic wildlife habitats	Rehabilitate levees and construct a sediment basin to improve more than 24,000 acres of critical wetland habitat, indirectly benefiting county wildfire management by ensuring a range of healthy vegetation habitats
Support efforts to eradicate noxious weeds (including the use of BMPs to control noxious weeds)	Construction of the Salt Creek WMA sediment basin would decrease the potential for spread and establishment of invasive species, BMPs would be implemented during and post-construction to minimize effects.
Maintain healthy riparian and wetland habitats	Rehabilitate levees and construct a sediment basin to improve more than 24,000 acres of critical wetland habitat, indirectly benefiting county wildfire management by ensuring a range of healthy vegetation habitats.
Improve water quality and water quantity resources	Improve agricultural water management and delivery efficiency through construction of piping systems and rehabilitation of the BRCC canal system to provide a more reliable water source for more than 65,500 acres of agricultural land

Hammond and West Main Canals Improvements Alternative

Under the Hammond and West Main Canals Improvements Alternative, public rights-of-way would be used to construct the Tremonton and Bear River Pressure Irrigation systems with

private land being used for the equalization ponds. Implementation of this alternative would remain consistent with applicable local zoning designations. Lands used for new pressure irrigation systems would continue to support agricultural water management purposes and would not result in a change in zoning consistency. Approximately 9.0 acres of prime and unique farmland would be permanently converted to water storage uses through construction of equalization ponds; however, these uses would continue to serve agricultural and secondary water management functions. As a result, the Proposed Project would not conflict with existing land use plans or zoning regulations. Other components of the Hammond and West Main Canals Improvements would remain in their existing locations.

The closest Water Source Protection area, called Water Source Protection Zone 2, is located approximately 0.28 miles north of the staging area for the Tremonton Irrigation Storage component of the Proposed Project, within Tremonton City (Jones and Associates Consulting Engineers 2016). Based on elevation, land drains away from protection district. No work would take place within or over the Water Source Protection Zone and no land use would change in this area.

Potential indirect effects to land use under the Hammond and West Main Canals Improvements Alternative would be minor, albeit permanent. The Hammond and West Main Canals Improvements components are designed to provide additional water supply to existing agricultural and secondary water users. The Hammond and West Main Canals Improvements Alternative is not designed to provide water for a larger than estimated development growth rate in the Project Area or to provide water for additional acres of land not already irrigated through the system.

Similar to the Siphons Installation Alternative in Table 5-5, the Hammond and West Main Canals Improvements Alternative would meet both the Box Elder County RMP and State of Utah RMP goals in multiple ways.

5.3.8.2 Natural Areas

No Action Alternative

The No Action Alternative would not address failing levee concerns or sedimentation in critical habitat areas, resulting in continued damage and risk to more than 24,000 acres of wetland and wildlife habitat and indirectly affecting recreational opportunities as well. As a result, the No Action Alternative could result in long-term negative effects to natural areas in the area.

Siphons Installation Alternative

The Siphons Installation Alternative would protect more than 24,000 acres of wetlands designated as natural areas by improving the existing levees at the Bear River Club, CDC, and Salt Creek WMA. The Siphons Installation Alternative would also reduce sedimentation into the Salt Creek WMA by constructing a 200 ac-ft debris basin to intercept the sediment before it reaches the wetlands. A temporary, direct increase in sedimentation would occur during construction due to land disturbance activities within the Salt Creek WMA and adjacent to the Bear River Migratory Bird Refuge. Temporary, localized effects would also occur from the presence of construction equipment and crews and material stockpiles at staging areas adjacent to the Bear River Migratory Bird Refuge and the Salt Creek WMA. These effects would cease following the completion of construction activities and site restoration. Minor but permanent

effects would occur because of the construction of the debris basin at the Salt Creek WMA and the improvement of the access road to the Bear River Club levee.

Long-term, the Siphons Installation Alternative would provide permanent, major beneficial effects to the Salt Creek WMA, Bear River Club, CDC, and the Bear River Migratory Bird Refuge areas. The Siphons Installation Alternative would intercept sediment in the Salt Creek WMA debris basin before it arrived in the Salt Creek WMA, reducing excess sediment in 5,000 acres of critical wetland habitat. The debris basin would need to be dredged every 10 years instead of every 3-5 years that the lower wetlands are currently dredged, which would reduce disruptions to the wetland habitat and its occupants. Additionally, the construction of the debris basin would indirectly improve both water quality and wetland habitat in more than 24,000 acres of wetlands in the Salt Creek WMA and downstream areas by reducing excess sediment in the water (thereby minimizing the risks of reduced water oxygenation, increased water temperature, and bacterial and algae blooms which can all negatively affect wetland habitat). This water flows from the Salt Creek WMA through adjacent wetland areas and minor creeks into the Bear River Club, Bear River Migratory Bird Refuge, and out into the GSL. The Siphons Installation Alternative would also repair the Bear River Club and CDC levees, allowing for better management of the water from the Bear River, protecting 18,000 acres of club wetlands and more than 80,000 acres of Bear River Migratory Bird wetlands and their critical wetland habitat.

BMPs implemented during and post-construction would minimize affects to water quality. Overall, the Siphons Installation Alternative would have a positive long-term and permanent effect on designated natural areas as well as a positive long-term indirect effect on water quality and wetland habitat in the area.

Hammond and West Main Canals Improvements Alternative

The Hammond and West Main Canals Improvements Alternative would protect more than 24,000 acres of wetlands designated as natural areas by improving the existing levees at the Bear River Club, CDC, and Salt Creek WMA, as well as reduce sedimentation into the Salt Creek WMA. A temporary, direct increase in sedimentation would occur during construction due to land disturbance activities within the Salt Creek WMA and adjacent to the Bear River Migratory Bird Refuge. Temporary, localized effects would also occur from the presence of construction equipment and crews and material stockpiles at staging areas adjacent to the Bear River Migratory Bird Refuge and the Salt Creek WMA. These effects would cease following the completion of construction activities and site restoration. Minor but permanent effects would occur as a result of the construction of the debris basin at the Salt Creek WMA and the improvement of the access road to the Bear River Club levee.

Long-term, the Hammond and West Main Canals Improvements Alternative would provide permanent, major beneficial effects to the Salt Creek WMA, Bear River Club, CDC, and the Bear River Migratory Bird Refuge areas. The Hammond and West Main Canals Improvements Alternative would intercept sediment in the Salt Creek WMA debris basin before it arrived in the Salt Creek WMA, reducing excess sediment in 5,000 acres of critical wetland habitat. The debris basin would need to be dredged every 10 years instead of every 3 to 5 years that the lower wetlands are currently dredged, which would reduce disruptions to the wetland habitat and its occupants. Additionally, the construction of the debris basin would indirectly improve both water quality and wetland habitat in more than 24,000 acres of wetlands in the Salt Creek WMA and downstream areas by reducing excess sediment in the water (thereby minimizing the risks of

reduced water oxygenation, increased water temperature, and bacterial and algae blooms which can all negatively affect wetland habitat). This water flows from the Salt Creek WMA through adjacent wetland areas and minor creeks into the Bear River Club, Bear River Migratory Bird Refuge, and out into the GSL. The Hammond and West Main Canals Improvements Alternative would also repair the Bear River Club and CDC levees, allowing for better management of the water from the Bear River, protecting 18,000 acres of club wetlands and more than 80,000 acres of Bear River Migratory Bird wetlands and their critical wetland habitat.

BMPs implemented during and post-construction would minimize affects to water quality. Overall, the Hammond and West Main Canals Improvements Alternative would have an overall positive long-term and permanent effect on designated natural areas as well as a positive long-term indirect effect on water quality and wetland habitat in the area.

5.3.8.3 Ecologically Critical Areas

No Action Alternative

The No Action Alternative would not affect ecologically critical areas. However, deteriorating levees along the Bear River and at the Salt Creek WMA and associated bank erosion would continue to threaten failure of the levees and loss of water management, agricultural water, and thousands of acres of high-quality wetland habitat. Additionally, water would continue to be lost in the irrigation system from seepage and evaporation in the Project Area, and the additional water necessary to meet irrigation needs would be removed from the Bear River causing less water to reach the GSL.

Siphons Installation Alternative

Under the Siphons Installation Alternative, an indirect long-term benefit to ecologically critical areas would occur. The Siphons Installation Alternative would address failing infrastructure, which would improve water quality and quantity. This Alternative would reduce seepage in the irrigation system by boxing and piping canals. Outside of an approximately 2.5-week critical period, BRCC generally has sufficient water, and water diversion would be reduced as a result of the water conservation (Trevor Nielson, personal communication, May 15, 2025). When BRCC is able to fully meet its water needs via natural flow from the Bear River, the water saved from boxing or piping would move through the Cutler Dam hydroelectric plant and downstream to the GSL, positively affecting the lake.

Additionally, the thousands of acres of wetlands, including wetlands of the GSL would be preserved by improving the levees at Bear River Club, CDC, and Salt Creek, and constructing the sediment basin at Salt Creek. These wetlands are vital as they provide important habitat for waterfowl, shorebirds, and many other bird species. In addition, effective wetlands can filter water, remove nutrients, trap sediments, and break down pollutants, which collectively contribute to improved water quality as well.

Overall, the water savings and the levee improvements that allow managers to control the water levels in the GSL wetlands would have a positive effect on the ecologically critical GSL.

Hammond and West Main Canals Improvements Alternative

Under the Hammond and West Main Canals Improvements Alternative, there would be an indirect long-term benefit to ecologically critical areas. The Hammond and West Main Canals Improvements Alternative would address failing infrastructure, which would improve water quality and quantity. This alternative would reduce seepage in the irrigation system by boxing and piping canals. Outside of an approximately 2.5-week critical period, BRCC generally has sufficient water, and water diversion would be reduced as a result of the water conservation (Trevor Nielson, personal communication, May 15, 2025). When BRCC is able to fully meet its water needs via natural flow from the Bear River, the water saved from boxing or piping would move through the Cutler Dam hydroelectric plant and downstream to the GSL, positively affecting the lake.

Effective wetlands can filter water, remove nutrients, trap sediments, and break down pollutants, which collectively contribute to improved water quality as well. Thousands of acres of wetlands, including wetlands of the GSL would be preserved by enhancing the levees. These wetlands are vital as they provide important habitat for waterfowl, shorebirds, and many other bird species.

5.3.8.4 Parklands, National Parks, Monuments, & Historic Sites

No Action Alternative

There are no National or State Parks, National Monuments, or Historical Sites within or adjacent to the Project Area. The Salt Lake Cut-off of the California NHT intersects the Project Area in multiple locations; however, no evidence of the trail exists on the ground and no official visitation sites occur within the Project Area. The Salt Lake Cut-off of the California NHT is protected under the National Trails System Act (NTSA) (NPS 2019). The NTSA protects NHTs, among others, and promotes outdoor recreational opportunities, public access, and site care of these designated places (NPS 2019). The NTSA requires consideration of not just the on-the-ground sites, but also the historic setting, recreation, scenery, natural resources, and significant events that contributed to its designation.

The No Action Alternative would not cause any direct effects to Parklands, National Parks, Monuments, or Historical Sites, including the Salt Lake Cut-off of the California NHT because no construction activities would occur. However, indirect long-term effects could be caused by ongoing flooding risks associated with canal overtopping in the Project Area, which could negatively affect surrounding recreational opportunities, affect visual resources, and land use, all of which could have a trickle-down effect on the Salt Lake Cut-off of the California NHT's historic setting, scenery, and recreational abilities.

Siphons Installation Alternative

The Salt Lake Cut-off of the California NHT intersects the Project Area in multiple locations; however, no evidence of the trail exists on the ground and no official visitation sites occur within the Project Area. The NTSA requires consideration of not just the on-the-ground sites, but also the historic setting, recreation, scenery, natural resources, and significant events that contributed to its designation.

The Siphons Installation Alternative would result in temporary, localized effects to the setting during construction of the Proposed Project due to the presence of construction equipment, crews, staging areas, and disturbed lands. The alternative would also have temporary, minor effects to recreational opportunities surrounding the Project Area due to the presence of increased construction traffic. These effects could indirectly affect the Salt Lake Cut-off of the California NHT by temporarily changing the historic setting, scenery, natural resources, and recreation of the trail. These effects would be localized and would cease following construction and site restoration. No direct or permanent effects would occur to the Salt Lake Cut-off of the California NHT itself.

Long-term, the Siphons Installation Alternative would provide beneficial effects to the Salt Lake Cut-off of the California NHT. The piping and covering of post-migration period canals would enhance the historic setting and scenery of the Salt Lake Cut-off of the California NHT over time. Other benefits include enhanced recreational opportunities by reducing sedimentation and improving water quality in the surrounding wetland habitats and the removal of post-period canals.

The NRCS coordinated with the NPS in a participating agency capacity to evaluate potential effects to the Salt Lake Cut-off of the California NHT under the NTSA. See Section 5.3.7.1 and Section 7.2.3.

Hammond and West Main Canals Improvements Alternative

The Salt Lake Cut-off of the California NHT intersects the Project Area in multiple locations, however, there is no evidence of the trail on the ground and no official visitation sites occur within the Project Area. The NTSA requires consideration of not just the on-the-ground sites, but also the historic setting, recreation, scenery, natural resources, and significant events that contributed to its designation. The Hammond and West Main Canals Improvements Alternative would result in temporary, localized effects to visual resources and noise during construction of the Proposed Project due to the presence of construction equipment, crews, staging areas, and disturbed lands. This alternative would also have temporary, minor effects to recreational opportunities surrounding the Project Area due to the presence of increased construction traffic. These effects could indirectly affect the Salt Lake Cut-off of the California NHT by temporarily changing the historic setting, scenery, natural resources, and recreation of the trail. These effects would be localized and would cease following construction and site restoration. No direct or permanent effects would occur to the Salt Lake Cut-off of the California NHT itself.

Long-term, the Hammond and West Main Canals Improvements Alternative would provide beneficial effects to the Salt Lake Cut-off of the California NHT. The piping and covering of post-migration period canals would enhance the historic setting and scenery of the Salt Lake Cut-off of the California NHT over time.

The Hammond and West Main Canals Improvements Alternative would result in temporary, localized effects during construction but provide long-term benefits to the Salt Lake Cut-off of the California NHT. These benefits include enhanced historic setting, scenery, and recreational opportunities by reducing sedimentation and improving water quality in the surrounding wetland habitats and removing post-period canals.

The NRCS coordinated with the NPS in a participating agency capacity to evaluate potential effects to the Salt Lake Cut-off of the California NHT under the NTSA. See Section 5.3.7.1. and Section 7.2.3.

5.3.9 Reasonably Foreseeable and Cumulative Effects

Federal agencies should analyze the reasonably foreseeable effects of the proposed action consistent with Section 102 of NEPA, which does not employ the term "cumulative effects;" NEPA instead requires consideration of "reasonably foreseeable" effects, regardless of whether or not those effects might be characterized as "cumulative" (42 U.S.C. 4332(2)(C)(i)).

The NRCS current PR&G direction requires a determination of cumulative effects for each alternative studied, as part of the evaluation process for Proposed Projects (DM 9500 4.b.(2)(m) [USDA 2017a]).

5.3.9.1 Reasonably Foreseeable Future Actions Considered in the Analysis

Within the Lower Bear River Watershed, numerous factors have contributed to the current conditions of the watershed, including various past activities, such as canal and water system improvements conducted by BRCC and the other project Co-sponsors.

The current conditions of the Lower Bear River Watershed are described in Chapter 3—Affected Environment. Section 3.3 provides an inventory of existing resources potentially affected by each alternative, and Section 5.3 analyzes the potential direct and indirect environmental effects to those existing resources by each alternative. Past cumulative effects are captured under each resource's Affected Environment section, given that past actions and their effects have contributed to the current condition of a resource. The Proposed Project alternatives are described in Chapter 4. Present and ongoing actions have also been incorporated into the Affected Environment for each resource. Reasonably Foreseeable Projects that could contribute effects with the Proposed Project are listed below.

Canal Improvements (BRCC)—BRCC actively manages their extensive canal system and is planning numerous projects.

Reasonably Foreseeable (Funded Projects)

- **2025**: 195HE Spill Pipeline—Canal Enclosure. 600 feet of 24" Pipeline (Location: Hammond East Canal)
- **2025**: 2025 Check and Automation—Installation of 4 Automation Gate Stations (Location: Hammond West, Lateral A, and Iowa String Canals)
- **2026**: 2026 Check and Automation—Installation of 2 Automation Gate Stations (Location: Lateral A Canal)
- **2026**: Crystal Phase 4 Pipeline—Installation of 1150 feet of 60" Pipeline
- **2026**: 195HE Phase 4 Pipeline—Installation of 3360 feet of 36" Pipeline

Pending Funding Application Projects (Active Grant Application under Consideration for Funding the Project)

- **2027**: Crystal Phase 5 Pipeline—Canal Enclosure. 1400 feet of 60" Pipeline (Location: Hammond East Canal)
- **2027**: Crystal Spill Pipeline—Safety Release Point Installation. 1600 feet of 24" Pipeline (Location: Hammond East Canal)

- **2028**: Calls Fort Pipeline—Canal Enclosure. 3200 feet of 48" Pipeline (Location: Hammond East Canal)
- **2028**: Crystal Phase 6 Pipeline—Canal Enclosure. 1400 feet of 60" Pipeline (Location: Hammond East Canal)
- **2029**: Crystal Phase 7 Pipeline—Canal Enclosure. 1400 feet of 60" Pipeline (Location: Hammond East Canal)

Planned Funding Application Projects (Identified the Grants Qualify for and Have Plans to Apply to in the Listed Year to Secure the Resources to Execute the Project)

- **2027**: 2027 Check and Automation—Installation of 19 Automation Gate Stations (Location: West Canal)
- **2028**: 2028 Check and Automation—Installation of 20 Automation Gate Stations (Location: Central, Lateral D, Lateral F, and West Canals)
- **2029**: 2029 Check and Automation—Installation of 17 Automation Gate Stations (Location: Central, Iowa String, and East Canals)
- **2030**: 2030 Check and Automation—Installation of 20 Automation Gate Stations (Location: East Canal)
- **2031**: 2031 Check and Automation—Installation of 16 Automation Gate Stations (Location: Hammond West Canal)
- **2032**: 2032 Check and Automation—Installation of 10 Automation Gate Stations (Location: Hammond West Canal)

Utah's Watershed Restoration Initiative

Lower Bear River Restoration Phase 2 (USFWS)—This past project collaborates with various partners and landowners to improve habitat and manage invasive species across private lands within the Lower Bear River Watershed. This project is located outside of the Project Area, but Bear Creek is within the Lower Bear Basin. The project aims to enhance watershed health, mitigate wildfire risks, increase water quality and quantity, improve fish and wildlife habitat, and boost the resiliency and sustainability of natural resources.

Lower Bear River Restoration Phase 3 (USFWS)—This ongoing multi-year, multi-phase plan is currently implementing Phase 3 in the Lower Bear River Watershed (2023–2026). This project is located outside of the Project Area, but Bear Creek is within the Lower Bear Basin. This phase includes virtual fencing and grazing management, chemical and mechanical treatment of invasive species, installing a riparian fence, and creating a series of wetlands in Corinne.

Proposed treatments would diversify and improve overall health of the vegetation communities, thus improving the watershed resistance and resilience to future disturbance. Restoration areas would include riparian, stream, wetlands, and upland sites. Removing invasive species like *Phragmites* and Tamarisk (*Tamarix ramosissima Ledeb*.) from wetlands, rivers, and lakes can significantly increase water availability for urban, rural, and ecological use, particularly benefiting the GSL. These invasives consume large amounts of water, degrade native habitats, and increase evapotranspiration. Managing them across both public and private lands is essential for restoring native ecosystems and conserving water. Wetland restoration projects, such as using Bear River Canal water to create wetlands and piping ditches to reduce evaporation, improve both water quality and quantity. These efforts help deliver more water to the GSL and enhance irrigation efficiency. Additionally, the Bear River suffers from high phosphorus levels due to pollution from agriculture, livestock, and urban runoff. Installing riparian fencing to exclude

cattle from the river will stabilize streambanks, reduce sedimentation, and prevent pollutants from entering the water, directly improving water quality. See additional *Lower Bear River Restoration Project Phase 3* details at: https://wri.utah.gov/wri/project/justification.html?id=7568.

Salt Creek WMA Restoration Project (Utah Wildlife Resources–Recreation)—Salt Creek WMA is undergoing a large-scale restoration project to enhance wildlife habitat and water flows within the WMA. The project involves dredging more than 6,000 feet of channel, with the excavated materials being used to rebuild eroding islands within the WMA. This effort is managed by Utah Wildlife Resources–Recreation.

Logan River Watershed Plan-EIS (NRCS, PL-566)—NRCS, in cooperation with Reclamation, EPA and the Cache Water District, Logan City, Hyde Park City, North Logan City, and Crockett Avenue Irrigation & Distribution System, Inc., are proposing to improve agricultural water management; prevent flooding; and enhance recreational opportunities in the Logan River Watershed. This project is located outside of the Lower Bear River Watershed, but Logan River is within the greater Lower Bear Basin (https://www.nrcs.usda.gov/state-offices/utah/logan-river-watershed-project).

The action alternatives increase water quantity by conserving 5,390 ac-ft annually and enhancing flows in the Logan River and Little Logan, with long-term benefits supporting wetland health and resilience. The additional flood prevention activities reduce flood risks and improve floodplain functionality, consistent with Executive Order 11988. The project aligns with the Utah State Water Plan by conserving water and improving irrigation efficiency. These improvements would collectively lead to net positive effects on water resources, cumulatively benefiting WOTUS, wetlands, riparian habitats, and wildlife habitats downstream.

Wellsville Canyon Watershed Plan-EIS (NRCS, PL-566)—NRCS, in cooperation with Reclamation, EPA and the Cache Water District, are proposing to examine alternative solutions to provide flood protection and conveyance infrastructure, reduce irrigation water loss, enhance recreational facilities, and reduce erosion and nutrient loading to the Little Bear River in Wellsville and Mendon cities and portions of unincorporated Cache County, Utah. The NOI to prepare an EIS was published May 8, 2024.

The Wellsville Canyon Watershed Project study area is outside the Lower Bear River Watershed, but includes Little Bear River, which is within the greater Lower Bear Basin. The project is funded through authority of the Watershed Protection and Flood Prevention Act (https://www.nrcs.usda.gov/conservation-basics/natural-resource-concerns/watersheds/wellsville-mendon-watershed-sponsor-cache).

Blue Creek-Howell Supplemental Watershed Plan-EIS (NRCS, PL-566)—NRCS, with Howell Town and Blue Creek Irrigation Company, are proposing improvements to modernize the Blue Creek dam and irrigation water delivery systems within the Blue Creek-Howell Watershed in Box Elder County, Utah. The Blue Creek-Howell study area is outside of the Lower Bear River Watershed, but Blue Creek is within the GSL Basin. The project is funded through authority of the Watershed Protection and Flood Prevention Act: (https://www.nrcs.usda.gov/conservation-basics/natural-resource-concerns/watersheds/blue-creek-howell-supplemental-watershed).

Population Growth and Economic Development (General)—Since 2000, Tremonton has grown by 43%, Bear River City by 14%, and Box Elder County by 26%, compared to Utah's overall growth of 32% (see Section 3.3.1.2). The population is anticipated to continue growing and parallel with this population growth there would be an increasing demand for water.

Agricultural Development (General)—Overall, the agricultural trend in Box Elder County appears to be on a downward trajectory, with reductions in land in farms. Approximately 1,176,650 acres are in agricultural production in Box Elder County, down 4% from 2017 (NRCS 2022). Managing water resources effectively remains a critical challenge, especially with the growing demand for agricultural and urban use. The adoption of new technologies and practices can help improve efficiency and productivity in the agricultural sector. However, ongoing challenges such as water management and the need for sustainable practices will continue to shape the future of agriculture in the region.

Programmatic Plans (Various Agencies)—Several plans focus on restoration work around the Lower Bear Watershed. Examples include:

- Utah Division of Water Quality's Lower Bear River Watershed Plan (2018)
- Utah Division of Water Quality Lower Bear Total Maximum Daily Load (TMDL) (2002)
- Utah FFSL's Final Bear River Comprehensive Management Plan
- The Lower Bear River Watershed Action Plan (2022)
- USFWS Land Protection Plan: Bear River Watershed Conservation Area
- USFWS Partners for Fish and Wildlife Strategic Plan.
- Box Elder County Water Master Plan (*Box Elder County and BRWCD*)—Box Elder County is working with the BRWCD to create a County Water Master Plan (CWMP) by December 2025. This plan will help manage water resources sustainably, combining past efforts and best practices while aligning with new state regulations, and is evaluating both public and private water suppliers, analyzing usage and infrastructure, and considering local growth patterns, and will adapt successful strategies from other regions to fit our local conditions.
- Great Salt Lake Basin Integrated Plan (*Utah Division of Water Resources*)—This planning effort is currently conducting a tradeoff analysis to understand how water users throughout the basin are affected and to avoid deterioration of agriculture, industry and ecosystems and performing studies on agricultural, municipal, and industrial conservation with a goal to ensure a resilient water supply for GSL and its watershed. (https://water.utah.gov/gsl-basin-integrated-plan/)

5.3.9.2 Reasonably Foreseeable and Cumulative Effects by Resource

The geographic extent of reasonably foreseeable and cumulative effects varies by the type of resource and effect. The timeframes, or temporal boundaries, for those effects for each resource are temporary (0-3 years); short term (3-10 years); and long term (15+ years).

For the No Action Alternative, reasonably foreseeable effects of taking no action are described in the long-term effects for each resource in Section 5.3. The No Action Alternative would not have cumulative effects, though environmental trends in the Project Area would continue as described in Section 5.3.

Economics/Socioeconomics

For Economics/Socioeconomics, reasonably foreseeable and cumulative effects were evaluated within the Project Area. The Siphons Installation Alternative or the Hammond and West Main Canals Improvements Alternative would contribute beneficial economic and socioeconomic reasonably foreseeable effects with all reasonably foreseeable projects. These projects would result in capital expenditures—either without federal cost share—or with federal cost share in the Siphons Installation or Hammond and West Main Canals Improvements Alternatives—and would directly benefit local labor firms. Contractor expenditures for supplies and labor would increase demand for these goods and services and indirectly benefit suppliers. Local retail and restaurants would experience temporarily increased demand from construction workers in the vicinity of construction sites. Additionally, given the scale of the Siphons Installation and Hammond and West Main Canals Improvements Alternatives, the rippling effects of the economic investments in multiple cities with important retail and commerce would benefit the economies in and around the Project Area, contributing to short- and potentially long-term minor influences on retail and commerce, immigration, emigration, housing availability, or earnings.

Air Quality and Climate

For Air Quality and Climate, reasonably foreseeable and cumulative effects were evaluated within the Salt Lake $PM_{2.5}$ Nonattainment Area. Given the negligible and temporary nature of construction related air quality effects, the implementation of the Siphons Installation and Hammond and West Main Canals Improvements Alternatives would not result in degraded air quality which would contribute to reasonably foreseeable or cumulative effects to air quality in the region.

While pumps in Tremonton and Bear River City would increase $PM_{2.5}$ emissions over time, emissions would remain below the *de minimis* threshold in the EPA General Conformity Analysis. Even with other projects like the Logan River Watershed Project or agricultural developments using pumps, the effect on $PM_{2.5}$ levels would be negligible and would not contribute to deteriorating air quality or the ability to meet NAAQS within the airshed, thus, resulting in no cumulative effects.

Soils and Geology

For Soils and Geology, reasonably foreseeable and cumulative effects were evaluated within the Project Area. Combined with ongoing and future canal projects because the Siphons Installation and Hammond and West Main Canals Improvements Alternatives would replace the canals with pipe and decrease the future canal maintenance, a beneficial cumulative effect of reducing erosion and sedimentation would occur.

Vegetation

The reasonably foreseeable and cumulative effects on vegetation were evaluated within the Watershed. The combined effects of the Siphons Installation Alternative or the Hammond and West Main Canals Improvements Alternative with the Lower Bear River Restoration, and Salt Creek WMA Restoration projects include enhancing wetland habitat and controlling *Phragmites* invasions through improved water controls, potentially cumulatively benefiting thousands of acres of important wetlands adjacent to the GSL.

Water Resources

For Water Resources, reasonably foreseeable and cumulative effects were evaluated within the Project Area. When combining the Siphons Installation Alternative or the Hammond and West Main Canals Improvements Alternative with the other projects, especially the BRCC Canal Improvements, the Lower Bear River Salt Creek WMA Restoration-Phase 3, Logan River, Wellsville Canyon, and Blue Creek-Howell Watershed projects, and agricultural development, cumulative effects on water quality and quantity would occur.

The action alternatives integration with other foreseeable future projects is poised to create significant improvements in water quality within the region. The action alternatives, including canal piping measures, would help mitigate sediment transport and erosion, leading to decreased turbidity in the watershed. Enhanced levee stabilization using rock riprap would reduce pollutant runoff and sediment deposition, thus promoting healthier aquatic habitats and improving wetland functions. Additionally, the installation of the sediment basin at the Salt Creek WMA would have long-term beneficial effects on water quality in adjacent wetlands, further enhancing the overall eco-health of the area. These improvements would collectively lead to net positive effects on water quality, benefiting WOTUS, wetlands, riparian habitats, and wildlife habitats downstream.

Because the net effects to water are beneficial, the combined effects of all these projects would ensure continued compliance with the Utah Surface Water Quality Standards and the CWA. Wetlands would be protected during construction activities by minimizing the destruction, loss, or degradation of wetlands, and preserving and enhancing the natural and beneficial values of wetlands, as required in E.O. 11990, and activities support the priorities of the Utah State Water Plan and meet the E.O. 11988 by not adversely affecting floodplains. All activities would comply with applicable permitting requirements for WOTUS.

Long-term water quality improvements would support designated beneficial uses for Bear River and its tributaries, including recreation, cold water aquatic life, waterfowl and associated food chain organisms, and agricultural uses. This would have a beneficial cumulative effect on water quality with other future foreseeable projects.

The combined efforts of these projects would significantly enhance water quantity management and wetlands in the GSL Basin. By reducing seepage and evaporative losses through siphon installations and canal piping, there would be a substantial increase in water efficiency and availability. The repair of levee systems and the stabilization of critical canal sections would decrease water loss and maintain optimal water conveyance and storage efficiency. The action alternatives would conserve water through improved conveyance which would flow downstream to the GSL, supporting lake levels, enhancing wetland habitat, and reducing airborne dust from exposed lakebed sediments. This would have a beneficial cumulative effect on water quantity with other future foreseeable projects.

The regional trend towards converting open ditches to closed pipes would further control evaporation and seepage losses, improving the efficiency of water rights delivery and enhancing overall water quality in the greater GSL area. The action alternatives, BRCC Canal Improvements, and Lower Bear River and Salt Creek WMA Restoration projects would contribute to increased water availability and reduced flooding risks, thereby supporting long-term water conservation and management goals.

The action alternatives and ongoing and future foreseeable project improvements would collectively contribute to achieving regional goals for sustainable water management, and would result in improved water quality, reduced erosion and sedimentation, enhanced aquatic and wetland habitats, and increased water efficiency and availability, ultimately benefiting agricultural productivity, the rural water supply, and ecological health in the region.

Wildlife

The reasonably foreseeable and cumulative effects to wildlife were examined at the watershed scale, to account for the varying habitat size of different species. The combination of either the action alternative with other reasonably foreseeable projects—including the Lower Bear River and Salt Creek WMA Restoration-Phase 3, Logan River, Wellsville Canyon, and Blue Creek-Howell Watershed projects, and ongoing and future canal projects, would have both positive and negative reasonably foreseeable effects on wildlife.

While temporary habitat disturbances and individual displacement are expected during construction, long-term benefits include improved water management, enhanced wetland ecosystems, and reduced risks of habitat loss due to erosion and infrastructure failures. Mitigation strategies such as seasonal construction timing, buffer zone maintenance, and habitat restoration efforts would help minimize cumulative adverse effects on wildlife.

The construction and implementation of related projects and the action alternatives would result in the loss of wildlife habitat associated with the low-quality, seepage-induced riparian vegetation. However, these projects together would also improve the quality of water in natural rivers and the GSL, in the vicinity, ultimately providing a benefit to wildlife habitat in those areas.

Both action alternatives involve construction activities, including installing siphons and piping canals, which would lead to the permanent removal of approximately 15 acres of riparian fringe and about 50,170 feet of canal/pipe, reducing seasonal open water sources for wildlife. The projects would also eliminate 35 acres of low-quality, seepage-induced riparian vegetation that various wildlife, such as small mammals, waterfowl, and avian species, may use for forage, shelter, and stopover habitat. Combined with other future canal enclosures, the loss of riparian vegetation may produce trends in riparian vegetation loss in the watershed.

Improved water management from the action alternatives, including enhanced levee stabilization and sediment basin installation, would reduce sediment transport and erosion, leading to decreased turbidity and better water quality.

The Lower Bear River and Salt Creek WMA Restoration projects would enhance wetland habitats and improve water controls, benefiting thousands of acres of wetlands adjacent to the GSL. Combined with either action alternative, these improvements would promote healthier aquatic habitats and improve wetland functions, benefiting WOTUS, wetlands, riparian habitats, and wildlife downstream. The repair of levee systems and stabilization of critical canal sections under these projects would decrease water loss and maintain optimal water conveyance and storage efficiency. By reducing seepage and evaporative losses through siphon installations and canal piping, there would be a substantial increase in water efficiency and availability.

Seasonal construction timing, buffer zone maintenance, and habitat restoration efforts would help minimize adverse effects on wildlife.

Although these projects would have individual minor direct effects on riparian vegetation during construction, their combined beneficial effects on water quantity and quality at the basin scale would lead to a net positive effect on wildlife and wildlife habitats, including wetlands. There would be a cumulatively beneficial effect to improve habitat within natural waterbodies in the vicinity, including the Bear River, Malad River and the GSL by reducing pollutant loads, which would overall improve habitat for fish species and, which would then benefit raptors, eagles and other migratory species that use fish as a food source.

Human Environment

The reasonably foreseeable and cumulative effects to the human environment were examined at the Project Area scale. Combined with other reasonably foreseeable projects, the action alternatives would not result in a cumulative effect to cultural resources because the value of the cultural resources related to either action alternatives would be conserved. Because the action alternatives would reduce the risk of canal breaches and reduce the open water, combined with the BRCC canal improvements, the action alternatives would improve public health and safety.

Special Land Designations

Long-term, either action alternative would provide permanent, major beneficial effects to natural areas in the watershed, including the Salt Creek WMA, Bear River Club, CDC, and the Bear River Migratory Bird Refuge areas. The action alternatives, with other foreseeable projects, would have positive long-term and permanent effects on designated natural areas, especially from improved water quality and wetland habitat in the area.

Considered together with other canal improvements, agricultural development, and population growth, the action alternatives would not result in cumulative effects to the Salt Lake Cut-off of the California NHT. No physical trail features or official visitation sites are present within the Project Area, and any indirect effects to the historic setting, scenery, natural resources, or recreational experience would be temporary and localized to the construction period. These short-term effects would not combine with other actions to produce lasting changes to the character or integrity of the trail. Following construction, site restoration and removal of post-period canals would result in long-term beneficial effects to the historic setting and scenic quality of the trail corridor. Therefore, the Proposed Project would not contribute to a cumulative effect on the Salt Lake Cut-off of the California NHT.

Chapter 6 Preferred Alternative

6.1 Rationale for Preferred Alternative Selection

Based on the analysis in Chapter 5, the Hammond and West Main Canals Improvements Alternative was determined to be the Preferred Alternative—and is now considered the Future with Federal Investment (FWFI)—because of its ability to meet the purpose and need for the project, to have the least effects to environmental and social resources, and to have the greatest net economic benefits when considering all quantified and unquantified factors of the available alternatives.

The Hammond and West Main Canals Improvements Alternative is considered the Preferred Alternative and is described in detail in Section 6.2 and displayed in Maps 2–13 in Appendix B. Though the benefit-cost analysis indicates that the economic effects of the Hammond and West Main Canals Improvements and Siphons Installation Alternatives are very similar, ultimately the Hammond and West Main Canals Improvements Alternative was selected as it meets the purpose and need for the project, was the lowest cost for BRCC, did not require property acquisition, and would be easier to permit, construct, and maintain.

The Siphons Installation Alternative annualized cost of installing, operating, and maintaining the various works of improvement is approximately $4,240,300, compared to $4,226,700 for the Hammond and West Main Canals Improvements Alternative. The Siphons Installation Alternative has a higher cost, requires extensive permitting, and added maintenance, and would require a significant capital expenditure in one year, in addition to concerns about environmental considerations—specifically the adverse effect to the yellow-billed cuckoo. Additionally, the Siphons Installation Alternative would require property acquisition. In a future with unknown inflationary trends, these cost savings alone make the Preferred Alternative a more resilient choice. See Section 5.2 for additional information.

6.2 Measures to be Installed

The proposed measures for the Preferred Alternative would be designed to NRCS conservation practice and safety standards. Maps 2–13 in Appendix B display the locations of the measures to be installed for the Preferred Alternative. The 30% design plans for each measure are located in Appendices E2 and E3.

The Preferred Alternative measures to be installed include:

- BRCC Irrigation System Delivery Improvements—Hammond and West Main Canals Improvements
- BRCC Irrigation System Delivery Improvements—Red Siphon Installation
- BRCC Irrigation System Delivery Improvements—Bear River City Pressure Irrigation and Storage
- BRCC Irrigation System Delivery Improvements—Highland Ditch Piping
- BRCC Irrigation System Delivery Improvements—Central Canal Company Piping
- Tremonton Pressure Irrigation and Storage Improvement
- Bear River Club Levee Improvements
- CDC Bear River Levee Improvements

- Salt Creek WMA Levee Improvements
- Salt Creek WMA Salt Creek Sediment Basin

6.2.1 BRCC Irrigation System Delivery Improvements—Hammond and West Main Canal Improvements

Multiple breaches have occurred within the Hammond and West Main Canal over the years and are becoming increasingly more significant over time. BRCC is proposing to construct box culverts along the Hammond Canal and West Main Canal (see Map 3 in Appendix B). The BRCC Bear River Canyon Improvements at Hammond Canal would enhance reliability and safety and reduce potential for future canal failures from unstable hill slopes. Map 4 in Appendix B identifies sections of canal replacement by priority for installation.

- Install 15,300 feet of 8’ X 8’ concrete box culverts along the Hammond East Canal.
- Install 2,000 feet of 12’ X 13’ concrete box culverts along the West Main Canal through the Camp Fife area and along two other key locations on the West Main Canal.

6.2.2 BRCC Irrigation System Delivery Improvements—Red Siphon Installation

BRCC operates a 300-foot suspended flume to transport the flow in the East Canal over the Malad River. The BRCC Red Siphon measure would replace the existing Red Flume with a siphon (Map 5 in Appendix B). This measure would reduce maintenance and improve agricultural water delivery.

- Replace the existing 300-foot suspended flume with a 450-foot siphon and an inlet structure.

6.2.3 BRCC Irrigation System Delivery Improvements—Bear River City Pressure Irrigation and Storage

Bear River City residents and the surrounding cropland currently receive irrigation water from a concrete lined canal. The existing delivery system is in poor condition and is at risk of failure. Bear River City proposes to develop a pressurized secondary irrigation system for residents of the city. This measure would include piping the existing transmission canal, installing a pump station, building an equalization storage pond, and installing a pipe network to deliver the water to each resident. The canal piping would be done with HDPE pipe, and the pressurized network would be done with PVC pipe. This measure would reduce the demand on culinary water, provide residents of Bear River City with access to less expensive water for outdoor use, and increase the reliability of agricultural water delivery and includes the following installations, including water meters (see Map 6 in Appendix B):

- Install 15,700 feet of 48” HDPE pipe.
- Install 2,800 feet of 36” HDPE pipe.
- Install 400 feet of 18” HDPE pipe.
- Install 70 feet of 15” HDPE pipe.
- Install pump station.
- Install 36,750 feet of 4” PVC pipe.

- Install 5,300 feet of 6” PVC pipe.
- Install 3,800 feet of 8” PVC pipe.
- Install 2,300 feet of 10” PVC pipe.
- Install 400 feet of 12” PVC pipe.
- Install 1.7 ac-ft equalization storage pond (558,467 gallons)

6.2.4 BRCC Irrigation System Delivery Improvements—Highland Ditch Piping

The Highland Ditch delivers irrigation water to approximately 3,000 acres of cropland. The existing concrete liner is in poor condition due to its age. The condition is decreasing efficiency of delivery and allowing excess loss. The Highland Ditch Company proposes to pipe the existing concrete lined canal and install two flow measurement devices to replace the existing measurement devices (Map 7 in Appendix B).

- Install 16,600 feet of 36” HDPE pipe.
- Install 1,800 feet of 18” and 24” HDPE pipe.
- Replace two flow measure devices.

6.2.5 BRCC Irrigation System Delivery Improvements—Central Canal Company Piping

The Central Canal Company delivers irrigation water to 1,400 acres of cropland. The water is delivered to users through a concrete lined ditch, which is deteriorating. The Central Canal Company proposes to pipe the concrete lined and earthen sections of the Central Canal with a gravity pipe system to improve reliability and delivery to agricultural users. The existing canal is 24,600 feet and its concrete liner is approaching the end of its useable life. There are some sections of existing pipe that would not be replaced. The Central Canal Company piping measure would improve delivery to users, improve safety, and improve the efficiency of use of irrigation water shares (Map 8 in Appendix B).

- Install 20,700 feet of 36” HDPE pipe with water meters.
- Install 400 feet of 30” HDPE pipe with water meters.
- Install 1,000 feet of 42 Reinforced Concrete Pipe (RCP) with water meters.

6.2.6 Tremonton Pressure Irrigation Improvement (Project 6)

Tremonton City offers its residents access to secondary water for outdoor use through a pressurized irrigation network that the city had been constructing in phases. However, Tremonton is a growing city with a limited water supply. Tremonton proposes to increase the existing pressurized irrigation system to service new development within city limits to meet the current water demands as well as those demands associated with growth of development. This measure would install pipe throughout Tremonton city, upgrade two pumping stations, and install a pressure reducing station at the lower end of the transmission pipeline and includes the following installations, including water meters (Map 9 in Appendix B):

- Install 23,200 feet of 6” pipe.
- Install 8,000 feet of 10” pipe.
- Upgrade two pumping stations.
- Install pressure reducing station.

6.2.7 Tremonton Irrigation Storage (Project 8)

Tremonton proposes to construct two equalization storage ponds. One equalization storage pond is located near Bear River Mountain next to an existing culinary water tank (See Map 7 in Appendix B). The other equalization storage pond is located west of the canal near the intersection of W 10800 N and S 1550 E (See Map 10 in Appendix B). The equalization storage facility would be sized to store enough volume for the peak day water use of the entire area in future development.

- Install 2.24 ac-ft equalization storage pond near Bear River Mountain (729,906 gallons)
- Install 1.85 ac-ft equalization storage pond located west of the canal (602,824 gallons)

6.2.8 Bear River Club Levee Improvements

The Bear River Club uses a levee to maintain 14,000 acres of wetland habitat, but the levee is actively deteriorating. The levee of concern is approximately 6,000 feet and separates the wetlands from the Bear River. The Bear River Club proposes to improve and armor the levee with riprap (Map 11 in Appendix B). To provide access to the site, a road base material would be added to approximately 6,736 feet of the access roadway. This would ensure that equipment and other vehicles can safely travel to and from the job site. The road base would drain better to limit the moisture in the road surface as well as provide structural integrity.

The top surface of the roadway would be improved with the placement of granular material. This granular material would improve the structural integrity of the levee surface to allow for heavy equipment to reach the project location. The added material would also add drainage to the levee surface which would help the site dry out in the case of inclement weather. Widening or other adjustments to the levee are not proposed.

This measure would provide protection to the wetland habitat and improve access for O&M.

- Repair 6,000 feet of the Bear River Club Levee.
- Install riprap.
- Improve 6,736 feet of access road.

6.2.9 CDC Levee Improvements

The CDC has a deteriorating levee along the Bear River. This levee is used to control water levels within 4,000 acres of wetland habitat. The CDC is proposing to improve the levee and install weirs using riprap in the river channel to direct flows away from this section of bank (Map 12 in Appendix B). This measure would protect thousands of acres of wetlands and increase accessibility for O&M.

- Repair 8,700 feet of the CDC Levee.
- Install riprap.

6.2.10 Salt Creek WMA Levee Improvements

The Salt Creek WMA covers approximately 6,000 acres of wetland habitat in Box Elder County. The levee is failing in sections, making it difficult for the UDWiR to manage the wetland to optimize the habitat. The UDWiR is proposing to improve the existing levee with riprap separating a bypass channel from the 6,000-acre wetland area (May 13 in Appendix B).

- Improve 11,000 feet of the Salt Creek WMA Levee.
- Install riprap.

6.2.11 Salt Creek WMA Salt Creek Sediment Basin Installation

The canals and levees that the UDWiR uses to control and maintain the wetland are filled with sediment every year and the lower wetland area needs to be dredged about every 3-5 years. The UDWiR is proposing to construct a sediment basin to trap and intercept sediment before traveling to the Salt Creek wetlands (Map 13 in Appendix B). This measure would decrease the volume of sediment being impounded in the wetland, protecting the health of the wetland ecosystem.

- Construct a 200-acre-foot sediment basin.

6.2.12 General Construction, Access, and Time Frame

Trackhoes, excavators, haul trucks, and other smaller construction vehicles and equipment would be used to implement the proposed activities. Access to the Project Area would be achieved at numerous locations using existing use existing infrastructure and access and transportation routes. The majority of secondary system pipelines would be installed in public roadways or rights-of-way. Access routes and roads would be returned to their current or better conditions following implementation.

As the project advances into early design a preliminary geologic investigation may be warranted to assess excavation feasibility, seepage and erosion risks, and constructability constraints associated with canal and levee improvements, with scope and intensity determined based on site conditions and design objectives.

The Sponsor and Co-sponsors anticipate that construction of each measure would take two years to complete but may extend to five years. Construction activities affecting irrigation deliveries would occur outside of the irrigation season beginning in the fall after the irrigation season with substantial completion by each spring. Installation sequencing would be planned during the design phase to minimize effects to shareholders, stakeholders, and residents.

6.3 Irreversible and Irretrievable Resource Commitments

Pursuant to the requirements of NEPA, environmental analysis must identify "…any irreversible and irretrievable commitments of resources, which could be involved in the Proposed Action should it be implemented." Irreversible can be described as a loss of future options; irreversible resource commitments involve the use of natural and human-made resources like metals, building materials, water, fossil fuels, electricity etc. that cannot be recovered, or take a long time to regenerate. Irretrievable resource commitments generally refer to the alternation or destruction of resources that cannot be restored, such as the extinction of a protected species. Irreversible and irretrievable resource commitments are not mutually exclusive. This section discloses irreversible and irretrievable resource commitments.

Implementing the Hammond and West Main Canals Improvements Alternative would require the immediate and irreversible commitment of natural, physical, capital, and labor resources. Fossil fuels, financial and human resources, and construction materials would be consumed to complete

the Hammond and West Main Canals Improvements Alternative. Generally, such resources are not considered reversible.

Irretrievable resources from the implementation of the Hammond and West Main Canals Improvements Alternative include the adverse effects to the canals. The MOA (*pending*) will outline stipulations designed to conserve the value of eligible cultural resources. Conserving the value of the eligible cultural resources would ensure that piping the canals would not result in the loss of knowledge of early irrigation systems, their design, or reduce the ability to gain knowledge of early irrigation systems in the future. When analyzing the value of saving these irreversible resources compared to the benefit of reduced agricultural damage, reduced farm income damage, reduced operation, maintenance and replacement costs, reduced infrastructure investment costs, reduced rural water treatment costs and reduced damage to wetlands from using these resources to construct the Hammond and West Main Canals Improvements Alternative; the benefits of implementing the alternative outweigh the commitments that would be used in implementation.

6.4 Areas of Controversy

No known areas of controversy or issues exist for this project. During public scoping opportunities, eleven comments were received from the public. The primary comment categories included water management and flood concerns, the effect of infrastructure on climate change, and public land management. No areas of controversy or unresolved issues were raised during the scoping process.

6.5 Permits and Compliance

The following permits, authorizations, and coordination would be required before project implementation (Table 6-1).

Table 6-1. Permits, Authorizations, and Coordination

Authorizing Agency or Authority	Purpose of Permit/Authorization	Entity Responsible for Obtaining Permit/Authorization
Federal		
U.S. Army Corps of Engineers	CWA Section 404 Regional General Permit (RGP) would be required for any dredge and fill work or any construction activities within 30 feet of a WOTUS.	Sponsor
U.S. Fish and Wildlife Service	A BA was completed for the Proposed Project that determined the Proposed Project may affect, not likely to adversely affect the yellow-billed cuckoo. Informal consultation is ongoing with USFWS (Appendix A). A special use permit may be required for use and improvement of the road that accesses the Bear River Club (BRC) levee activities.	Sponsor

Authorizing Agency or Authority	Purpose of Permit/Authorization	Entity Responsible for Obtaining Permit/Authorization
Tribal		
Tribal Historic Preservation Office	Consultation with interested Tribal Historic Preservation Offices is ongoing. An MOA (*pending*) is being prepared with NRCS and federally recognized interested tribes. Mitigation measures are pending.	NRCS
State		
Utah State Historic Preservation Office	Consultation with Utah SHPO is ongoing. Coordination to ensure MOA (*pending*) stipulations are fulfilled (see Appendix A).	NRCS/Sponsor
Utah Department of Transportation	Coordination to implement appropriate traffic control measures during construction to minimize disturbance and reduce effects to local traffic. An Encroachment Permit and Traffic Control Plan would be needed.	Sponsor
Utah Division of Water Quality	• Section 401 Water Quality Certification is required from the UDWQ to ensure federally permitted activities comply with the State of Utah's discharge and water quality requirements. • A UPDES permit from the UDWQ will be required before beginning any construction activities that would disturb more than 1 acre of land. A SWPPP is required as part of the UPDES authorization. • If construction dewatering is required as part of the Proposed Project, a Construction Dewatering Permit would be required from the UDWQ through the EPA's online portal. A Dewatering Plan would also be required.	Contractor
Utah Division of Water Rights	Any change in operations of the Bear River or Malad River would require approval by the Utah Division of Water Rights.	Sponsor
Utah Division of Emergency Management	Coordination during the project design and construction phases to address floodplain changes. A CLOMR would be required during the project design phase, and upon completion, a LOMR would be submitted to formally update FEMA FIRMs, officially recognizing reductions in flood	Sponsor

Authorizing Agency or Authority	Purpose of Permit/Authorization	Entity Responsible for Obtaining Permit/Authorization
	risk achieved by the Preferred Alternative. The Proposed Project will need to be designed for the 100-year (1 percent) event. Flooding for the 100- and 500- year (0.2 percent) events will need to be mapped before construction. Following construction, drawings and documentation are required.	
Local		
Box Elder County	Coordination with Box Elder County Road Department for necessary construction utility clearances, road crossings, and permits.	Contractor
Tremonton City	Coordination with the Tremonton City's Public Works/Utilities Department for necessary construction utility clearances, road crossings, and permits. Coordination with the Tremonton City regarding the city Noise Ordinance.	Contractor
Bear River City	Coordination with Bear River City for necessary construction utility clearances, road crossings, and permits.	Contractor
Local utilities	Utility clearances before construction activities	Contractor

6.6 Mitigation of Potential Effects

6.6.1 Avoidance and Minimization

BMPs and design criteria as described in Appendix E1 would be implemented during and post-construction to avoid and minimize effects to resources in the Project Area when implementing the Preferred Alternative. The majority of practices would be implemented by the contractor and included in construction specifications.

6.6.2 Compensatory Mitigation

The U.S. Army Corps of Engineers (USACE) requires compensatory mitigation when a project's effects on aquatic resources, such as wetlands, streams, or other bodies of water, cannot be avoided or minimized to a sufficient degree. The USACE district engineer determines the need for compensatory mitigation based on the proposed activity and any proposed mitigation measures. Ongoing conversations and coordination with the USACE to determine mitigation needs, including the submittal of the ARD for an Approved Jurisdictional Determination (AJD), are occurring. See Appendix A.

6.7 Costs and Cost Sharing

Table 6-2 describes the estimated cost of the Preferred Alternative (FWFI) and the breakdown of federal funds and Sponsor or Co-sponsor participation. The total estimated construction costs for project measures are $115,568,297. The Sponsors' and Co-sponsor's estimated cost of construction is $26,304,867, and the estimated cost of construction eligible for PL-566 funding is $89,263,430. Construction costs include cultural resource protection (MOA) and CWA Section 404 mitigation costs estimates for mitigation that may be required to comply with NHPA Section 106 and CWA Section 404 permitting and can be cost-shared as a part of the construction. Actual mitigation requirements and costs would be determined during design and permitting. See Table 6-4 for the estimated cost distribution between shareable and non-shareable items.

Table 6-2. Preferred Alternative—Estimated Installation Costs (Dollars)[1]

Works of Improvement	Sponsor or Co-sponsor Funding[1]	Public Law 83-566 Funding[1]	Total[1]
BRCC Irrigation System Delivery Improvements—Hammond and Main Canal Improvements	$12,706,344	$46,181,931	**$58,888,275**
BRCC Irrigation System Delivery Improvements—Red Siphon	$743,641	$2,637,692	**$3,381,333**
BRCC Irrigation System Delivery Improvements—Bear River City Pressure Irrigation and Storage	$3,134,861	$11,341,734	**$14,476,595**
BRCC Irrigation System Delivery Improvements—Highland Ditch Piping	$1,142,633	$4,090,023	**$5,232,656**
BRCC Irrigation System Delivery Improvements—Central Canal Company Piping	$1,357,594	$4,872,481	**$6,230,075**
Tremonton Pressure Irrigation Improvements	$2,160,581	$7,795,356	**$9,955,937**
Tremonton Irrigation Storage	$664,394	$2,349,233	**$3,013,627**
Bear River Club Levee Improvements	$1,233,954	$2,811,751	**$4,045,706**
CDC Levee Improvements	$737,978	$1,663,920	**$2,401,898**
Salt Creek Waterfowl Management Area Levee Improvements and Sediment Removal	$2,422,887	$5,519,309	**$7,942,196**
Total	**$26,304,867**	**$89,263,430**	**$115,568,297**

[1]Price base: 2025 dollars. Prepared October 2025. Note: Totals may not sum due to rounding.

6.8 Ecosystem Services Benefits

The ecosystem services benefits of the Preferred Alternative are shown in Table 5-2 for the Hammond and West Main Canals Improvements Alternative.

6.9 Installation and Financing

6.9.1 Planned Sequence of Installation

Design would begin upon authorization from NRCS. Construction contract procurement would follow final design. The Sponsor and Co-sponsors anticipate that construction would take at least two years to complete but may extend to five years.

6.9.2 Responsibilities

The Sponsor and Co-sponsors and any identified partners would coordinate together as they plan, design, and construct the Preferred Alternative. The Sponsor and Co-sponsors would be responsible for procuring the necessary funds for improvement measure implementation and providing in-kind services.

6.9.3 Contracting, Real Property, and Relocations

All work associated with the Preferred Alternative would be properly procured by the Sponsor and Co-sponsors using awarded contracts. The Sponsor and Co-sponsors, coordinating with NRCS, would oversee and administer the Proposed Project construction as described in the Project Agreement.

No property acquisitions or relocations have been identified through the alternative development.

6.10 Operations, Maintenance, and Replacement

O&M would be managed by the Sponsor and Co-sponsors. Before the start of construction, NRCS and the Sponsor and Co-sponsors would enter into an Operations and Maintenance Agreement (O&M Agreement) lasting for the duration of the planned project life (100 years). An O&M plan included in the agreement would identify the specific responsibilities for each entity. Annual O&M costs for the Preferred Alternative are estimated to be approximately $454,094.

6.10.1 Cultural Resources

If construction activities uncover any materials of cultural or historic significance (i.e., bone fragments, pottery, stone tools, burial features, etc.), construction would halt, and procedures outlined in the NRCS Prototype Programmatic Agreement with the Utah SHPO would be followed (NRCS and SHPO 2025).

6.10.2 Financing and Conditions for Providing Assistance

Potential funding sources include approximately $2,000,000 in Agricultural Water Optimization Grants from the Utah Department of Agriculture and Food toward the capital costs, and potentially another $500,000 from State agencies, such as Utah Department of Water Resources or Utah Department of Water Quality and their various funding sources. Additionally, a loan from the Utah Division of Water Resources could be used. Other funding sources for cost sharing include grants or low-interest loans, state and local agency funds, and donations for labor, material, equipment, services, or money. Lastly, a private market loan with an assumed 4% bonding could also be acquired. The total out of pocket installation cost for the Sponsor and Co-sponsors is estimated to be $26,304,867.

6.11 Economic and Structural Tables

The following tables display the results of the Benefit–Cost Analysis (see Appendix E1). Table 6-3 and Table 6-4 describe the estimated project installation cost of the Preferred Alternative, and how those costs would be shared. The annualized costs and benefits of the Preferred Alternative are presented in Table 6-5 and Table 6-6. Table 6-7 shows a comparison of the average annualized costs, reduced damages, and benefits of the Preferred Alternative.

Table 6-3. National Watershed Program Manual Economic Table 1—Estimated Preferred Alternative Installation Cost, Lower Bear River Watershed, Utah (2025 dollars)

Works of Improvement	Unit	Number			Estimated Costs (Dollars)[1]		
		Federal Land	Non-Federal Land	Total	Public Law 83-566 Funding[1,2] (Non-Federal land)	Other Funds[1] (Non-Federal land)	Total[1]
BRCC Irrigation System Delivery Improvements—Hammond and Main Canal Improvements	Linear Feet	0	17,300	17,300	$46,181,931	$12,706,344	**$58,888,275**
BRCC Irrigation System Delivery Improvements—Red Siphon	Linear Feet	0	450	450	$2,637,692	$743,641	**$3,381,333**
BRCC Irrigation System Delivery Improvements—Bear River City Pressure Irrigation and Storage	Linear Feet	0	67,570	67,570	$11,341,734	$3,134,861	**$14,476,595**
BRCC Irrigation System Delivery Improvements—Highland Ditch Piping	Linear Feet	0	18,341	18,341	$4,090,023	$1,142,633	**$5,232,656**
BRCC Irrigation System Delivery Improvements—Central Canal Company Piping	Linear Feet	0	22,100	22,100	$4,872,481	$1,357,594	**$6,230,075**
Tremonton Pressure Irrigation Improvements	Linear Feet	0	22,750	22,750	$7,795,356	$2,160,581	**$9,955,937**
Tremonton Irrigation Storage	Linear Feet	0	11,500	11,500	$2,349,233	$664,394	**$3,013,627**
Bear River Club Levee Improvements	Linear Feet	0	6,200	6,200	$2,811,751	$1,233,954	**$4,045,706**
CDC Levee Improvements	Linear Feet	0	3,340	3,340	$1,663,920	$737,978	**$2,401,898**
Salt Creek Waterfowl Management Area Levee Improvements and Sediment Removal	Linear Feet	0	11,000	11,000	$5,519,309	$2,422,887	**$7,942,196**
Totals		**0**	**180,551**	**180,551**	**$89,263,430**	**$26,304,867**	**$115,568,297**

[1]Price base: 2025 dollars. Totals may not sum due to rounding. Prepared October 2025.
[2]NRCS is the federal agency responsible for assisting in installation of works of improvement.

Table 6-4. National Watershed Program Manual Economic Table 2—Estimated Cost Distribution-Preferred Alternative, Lower Bear River Watershed, Utah (2025 dollars)

Works of Improvement	Item	Installation Cost						Project Total Cost[1]
		Public Law 83-566[1]			Other Funds[1]			
		Agriculture Water Management	Watershed Protection	Total	Agriculture Water Management	Watershed Protection	Total	
Lower Bear River Watershed Project	Construction	$65,331,140	$8,020,663	$73,351,803	$21,777,048	$4,318,819	$26,095,865	**$99,447,668**
	Engineering	$12,195,148	$1,727,528	$13,922,676	$0	$0	$0	**$13,922,676**
	Permitting	$0	$0	$0	$105,000	$60,000	$165,000	**$165,000**
	Administration	$1,742,166	$246,789	$1,988,955	$28,000	$16,000	$44,000	**$2,032,955**
Total		**$79,268,450**	**$9,994,980**	**$89,263,430**	**$21,910,048**	**$4,394,819**	**$26,304,867**	**$115,568,297**

[1]Price base: 2025 dollars. Totals may not sum due to rounding. Prepared October 2025.

Table 6-5. National Watershed Program Manual Economic Table 4—Estimated Average Annualized Costs, Lower Bear River Watershed, Utah (2025 dollars)

Works of Improvement	Project Outlays (Amortization of Installation Cost)[1]	Other Direct Costs[1,2]	Total Cost[1]
BRCC Irrigation System Delivery Improvements—Hammond and Main Canal Improvements	$1,933,500	$253,700	**$2,187,200**
BRCC Irrigation System Delivery Improvements—Siphons Installation	$1,945,500	$255,300	**$2,200,800**
BRCC Irrigation System Delivery Improvements—Red Siphon	$90,800	$14,500	**$105,300**
BRCC Irrigation System Delivery Improvements—Bear River City Pressure Irrigation	$475,300	$62,300	**$537,600**
BRCC Irrigation System Delivery Improvements—Highland Ditch Piping	$171,800	$3,000	**$174,800**
BRCC Irrigation System Delivery Improvements—Central Canal Company Piping	$204,600	$3,100	**$207,700**
Tremonton Pressure Irrigation Improvements and Storage	$425,800	$54,000	**$479,800**
Bear River Club Levee Improvements	$132,800	$17,400	**$150,200**
Chesapeake Duck Club Levee Improvements	$78,900	$10,300	**$89,200**
Salt Creek Waterfowl Management Area Levee Improvements and Sediment Removal	$260,800	$34,100	**$294,900**
Total—Preferred Alternative (Hammond and West Main Canals Improvements Alternative)	**$3,774,300**	**$452,400**	**$4,226,700**
Total—Siphons Installation Alternative	**$3,786,300**	**$454,000**	**$4,240,300**

Notes: Totals may not sum due to rounding. Prepared October 2025.
[1]Price base: 2025 dollars, amortized over 100 years at a discount rate of 3.25 percent.
[2]Other direct costs include annual O&M associated with each work of improvement based on 0.5 percent of construction costs.

The economic effect of the Preferred Alternative on ecosystem flows and values is shown in Table 6-6. The Preferred Alternative would positively affect both regulating and provisioning services in the watershed. In total, the Preferred Alternative would create average annualized gross benefits of approximately $9,134,600 per year.

Table 6-6. Economic Table 5a—Estimated Average Annualized Benefits and Reduced Damages by Increment, Lower Bear River Watershed Project, Utah (2025 dollars)

Onsite Benefit/Reduced Damage	Agricultural-Related[1]	Non-Agricultural-Related[1]
Reduced farm income damage	$3,375,300	$0
Reduced water treatment costs	$623,200	$0
Reduced damage to wetlands[2]	$5,042,700	$0
Increased farm income	$93,400	$0
Total Quantified Benefits PREFERRED Alternative	**$9,134,600**	

Notes: Totals may not sum due to rounding. Prepared October 2025.
[1]Price base: 2025 dollars amortized over 100 years at a discount rate of 3.25 percent.
[2]Wetland benefits in rural areas are included as agricultural-related per PL 83-566 and NWPM 506.0, Section 2, because these wetlands support agricultural production and rural community sustainability (NRCS 2015).

Using the resulting benefits and costs from the previous two tables, Table 6-7 presents a comparison of the average annualized benefits and average annualized costs for the Preferred Alternative. In total, the Hammond and West Main Canals Improvements Alternative would generate average annualized benefits of $9,134,600 compared to average annualized costs of $4,226,700, for a BCR of approximately 2.2.

Table 6-7. National Watershed Program Manual Economic Table 6—Comparison of Average Annualized Costs, Reduced Damages and Benefits, of the Preferred Alternative Lower Bear River Watershed, Utah (2025 dollars)

Works of Improvement	Agriculture-related[1]				Average Annualized Benefit Total[1]	Average Annualized Cost[1]	Benefit Cost Ratio
	Reduced Farm Income Damage	Reduced Water Treatment Costs	Reduced Damage to Wetlands[2]	Increased Farm Income			
Tremonton Pressure Irrigation Improvements and Storage	$0	$480,600	$0	$0	$480,600	$479,800	1.0
BRCC Irrigation System Delivery Improvements	$3,375,300	$142,600	$0	$93,400	$3,611,300	$3,212,600	1.1
Chesapeake Duck Club Levee Improvements	$0	$0	$177,900	$0	$177,900	$89,200	2.0
Bear River Club Levee Improvements	$0	$0	$864,800	$0	$864,800	$150,200	5.8
Salt Creek Waterfowl Management Area Levee Improvements and Sediment Removal	$0	$0	$4,000,000	$0	$4,000,000	$294,900	13.6
Total[1]	**$3,375,300**	**$623,200**	**$5,042,700**	**$93,400**	**$9,134,600**	**$4,226,700**	**2.2**

Notes: Totals may not sum due to rounding. Prepared October 2025.

[1]Price base: 2025 dollars amortized over 100 years at a discount rate of 3.25 percent.

[2]Wetland benefits in rural areas are included as agricultural-related per PL 83-566 and NWPM 506.0, Section 2, because these wetlands support agricultural production and rural community sustainability (NRCS 2015).

Table 6-8, Table 6-9, and Table 6-10 are the structural tables for the Preferred Alternative (NWPM 506.17 [NRCS 2015]).

Table 6-8. Structural Table 3—Dams with Planned Storage Capacity, Lower Bear River Watershed, Utah

Equalization Storage/Sediment Control Basin	Tremonton Pressure Irrigation Improvements EQ Storage	Tremonton Irrigation Storage	Bear River City Pressure Irrigation EQ Storage	Salt Creek WMA Sediment Control Basin
Maximum Basin Depth	4.0 feet	5.0 feet	8.0 feet	3.0 feet
Embankment Crest Elevation	4325.5	4705.0	4268.5	4266.87
Auxiliary Spillway Crest Elevation	4324.0	4703.5	4268.0	-
Principle Spillway Crest Elevation	4323.5	4703.0	4267.0	-
Basin Invert Elevation	4321.5	4700.0	4260.5	4264.10
Max Depth of Water Above Ground (Auxiliary Spillway–Natural Ground Elevation)	0.0 ft	0.0 feet	3.5 feet	0.0 feet
Basin Capacity at Auxiliary Spillway	1.85 ac-ft	2.25 ac-feet	2.5 ac-ft	6.35 ac-ft
Basin Capacity Above Lowest Natural Ground Elevation	0.0 feet	0.0 feet	1.6 ac-ft	0.0 feet
Basin Capacity Below Natural Ground Elevation	1.85 ac-ft	2.25 ac-ft	0.9 ac-ft	6.35 ac-ft
Sedimentation Capacity	0.0 ac-ft	0.0 ac-ft	0.0 ac-ft	6.35 ac-ft
Flood Control Capacity	0.0 ac-ft	0.0 ac-ft	0.0 ac-ft	0.0 ac-ft
Embankment Crest Length	876 feet	580 feet	464 feet	0.0 feet
Embankment Crest Width	5.0 feet	5.0 feet	5.0 feet	0.0 feet
Upstream Slope of Embankment	3H: 1V	3H: 1V	3H: 1V	3H: 1V
Downstream Slope of Embankment	3H: 1V	3H: 1V	3H: 1V	3H: 1V

Table 6-9. Structural Table 3a—Dikes (Levees), Lower Bear River Watershed, Utah

Levee Name	Stationing	Top Width (ft)	Average Side Slope (H:V)	Average Height of Dike (ft)	100-Year Frequency Velocity (ft/s)	Dike Protection	Volume of Earth Fill (vd^3)
Bear River Club	100+00–161+62	15	2:1	10	10,800	Rip Rap	15,000
Chesapeake Duck Club	100+00–109+18	15	2:1	10	10,800	Rip Rap	2,254
Chesapeake Duck Club	200+00–204+51	15	2:1	10	10,800	Rip Rap	1,107
Chesapeake Duck Club	300+00–319+71	15	2:1	10	10,800	Rip Rap	4,839
Salt Creek WMA	100+00–209+10	15	2:1	10	476	Rip Rap	35,200

Table 6-10. Structural Table 3b—Channel Work, Lower Bear Watershed, Utah

Existing Channel Characteristics											Proposed Piping Characteristics		
Channel Name (reach)	Location Or Stationing	Reach Length (ft)	Maximum Discharge (ft3/sec)	Gradient (ft/ft)	Bottom Width (ft)	Side Slope (H:V)	Average Manning's N	Average Velocity (feet/sec)	Existing Channel Type[1]	Present Flow Condition[2]	Material	Box Or Pipe Size (ft)	Average Velocity (feet/sec)
BRCC Main Canal	65+00–75+00	1,000	725	.0004	35	1:1	.035	2.56	M	I	Concrete	12x13	3.7
BRCC Main Canal	123+00–128+00	500	725	.0004	35	1:1	.035	2.56	M	I	Concrete	12x13	3.7
BRCC Main Canal	160+50–165+50	500	725	.0004	35	1:1	.035	2.56	M	I	Concrete	12x13	3.7
BRCC Hammond Canal	470+00–510+00	4,000	200	.0004	25	1:1	.035	3.85	M	I	Concrete	8x8	5.1
BRCC Hammond Canal	544+32–605+00	6,068	200	.0004	25	1:1	.035	3.85	M	I	Concrete	8x8	5.1
BRCC Hammond Canal	611+50–642+59	3109	200	.0004	25	1:1	.035	3.85	M	I	Concrete	8x8	5.1
BRCC Hammond Canal	661+00–684+08	2308	200	.0004	25	1:1	.035	3.85	M	I	Concrete	8x8	5.1
BRCC Red Siphon	102+75–105+90	315	250	Varies	6	Vertical	.035	Varies	M	I	Welded Steel	7	6.6
BRC Gravity Pipeline	0+00–157+78	15,778	24	.0005	3	1:1	.02	2.0	M	I	HDPE	4	4.2
BRC Gravity Pipeline	200+00–228+16	2,816	14	.0005	3	1:1	.02	1.7	M	I	HDPE	3	3.4
BRC Gravity Pipeline	300+00–302+37	237	7	.0005	3	1:1	.02	1.4	M	I	HDPE	2	.22
BRC Gravity Pipeline	400+00–400+99	99	7	.0005	3	1:1	.02	1.4	M	I	HDPE	1.5	.35
BRC Gravity Pipeline	500+00–500+92	92	5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	HDPE	1.25	4.6
BRCC IDSI-Highland Ditch	0+00–00+65	65	13.72	.0005	2	1:1	.02	1.7	M	I, E	HDPE	4	2.7
Highland Ditch	15+79–27+70	1191	13.72	.0005	2	1:1	.02	1.7	M	I, E	HDPE	3	2.9
Highland Ditch	34+89–188+65	15376	13.72	.0005	2	1:1	.02	1.7	M	I, E	HDPE	3	3.5
Highland Ditch	215+76–221+85	609	13.72	.004	2	1:1	.035	2.4	M	I, E	HDPE	2	14.6
Highland Ditch	221+85–233+29	1144	13.72	.045	2	1:1	.035	5.9	M	I, E	HDPE	1.5	17.8
Central Canal Company	0+00–7+30	730	20	.0014	2	1:1	.02	2.8	M	I	HDPE	3	5.5
Central Canal Company	10+84–21+00	1016	20	.0009	2	1:1	.02	2.8	M	I	RCP	3.5	4.0
Central Canal Company	45+14–244+72	19958	20	.001	2	1:1	.02	1.1	M	I	HDPE	3	4.6
Central Canal Company	244+72–248+78	406	20	.087	2	1:1	.02	12.5	M	I	HDPE	1.5	23.2
BRC Gravity Pipeline	400+00–400+99	99	7	.0005	3	1:1	.02	1.4	M	I	HDPE	1.5	.35
BRC Gravity Pipeline	500+00–500+92	92	5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	HDPE	1.25	4.6
Highland Ditch	0+00–00+65	65	13.72	.0005	2	1:1	.02	1.7	M	I, E	HDPE	4	2.7
Highland Ditch	15+79–27+70	1191	13.72	.0005	2	1:1	.02	1.7	M	I, E	HDPE	3	2.9
Highland Ditch	34+89–188+65	15376	13.72	.0005	2	1:1	.02	1.7	M	I, E	HDPE	3	3.5
Highland Ditch	215+76–221+85	609	13.72	.004	2	1:1	.035	2.4	M	I, E	HDPE	2	14.6
Highland Ditch	221+85–233+29	1144	13.72	.045	2	1:1	.035	5.9	M	I, E	HDPE	1.5	17.8
Central Canal Company	0+00–7+30	730	20	.0014	2	1:1	.02	2.8	M	I	HDPE	3	5.5
Central Canal Company	10+84–21+00	1016	20	.0009	2	1:1	.02	2.8	M	I	RCP	3.5	4.0
Central Canal Company	45+14–244+72	19958	20	.001	2	1:1	.02	1.1	M	I	HDPE	3	4.6
Central Canal Company	244+72–248+78	406	20	.087	2	1:1	.02	12.5	M	I	HDPE	1.5	23.2

[1]N–An unmodified, well-defined natural channel or stream; M–Manmade ditch or previously modified channel or stream (show approximate date of original construction in parenthesis); or O–None or practically no defined channel.

[2]Pr–Perennial—Flows at all times except during extreme drought; I–Intermittent—Continuous flow through some seasons of the year; E–Ephemeral—Flows only during periods of surface runoff, otherwise dry; or S–Ponded water with no noticeable flow—Caused by lack of outlet or high groundwater table.

Chapter 7 Consultation, Coordination and Public Participation

This chapter describes the public and agency coordination efforts for the Proposed Project.

7.1 Consultation

7.1.1 Section 106 Consultation

7.1.1.1 Tribal Consultation

In accordance with 36 CFR 800.2–800.4 and Section 106 of the NHPA, SHPO, and THPOs, federally recognized Tribes, and other consulting parties must be identified and consulted at all steps of the process. NRCS is responsible for assessing the effects of activities, considering tribal interests, and assuring that tribal interests are considered in conjunction with federal activities and undertakings. NRCS recognizes that tribal governments are sovereign nations located within the United States. NRCS has responsibility to help fulfill the U.S. government's responsibilities toward Tribes when considering actions that may affect tribal rights, resources, and assets.

Tribes who hold ancestral land, traditional use, and/or traditional cultural property claims in and near the Project Area were identified using the former NPS Native American Graves Protection and Repatriation Act Native American Consultation Database (NACD), a database through which any federally recognized tribe could identify those counties in Utah where they had consultation interests. The U.S. Department of Housing and Urban Development Tribal Directory Assessment Tool (TDAT), the BIA website, and the Utah Division of Indian Affairs (UDIA) website were used as supplemental sources to identify tribes with consultation interests. The assembled list of tribes identified from the NACD, TDAT, BIA website, and UDIA website are included in Table 7-1.

As part of NEPA scoping, the NRCS provided opportunity for comment and participation in developing the scope of the Proposed Project in coordination and in consultation with tribes, the public, and other stakeholders, including the following tribes: Eastern Shoshone Tribe of the Wind River Reservation, Wyoming, Shoshone-Bannock Tribes of the Fort Hall Reservation, Ute Indian Tribe of the Uintah & Ouray Reservation, Utah, Northwest Band of the Shoshone Nation, Skull Valley Band of Goshute, and the Confederated Tribes of the Goshute Reservation. It was requested that the tribes provide any information regarding historic properties or places of traditional religious and cultural importance near the Project Area that they would like to be considered as part of the analysis. The NRCS provided the Tribes with the opportunity to share their comments, ideas, and concerns regarding actions during the initial scoping stage of the NEPA process. The request for comments was initiated during the scoping period in October of 2023.

The NRCS sent a letter dated June 12, 2024 to the aforementioned tribes initiating formal Section 106 consultation and sharing the NOI information. In a letter dated May 16, 2025, the NRCS submitted their findings of effect with the cultural resources report to the Tribes, to notify them of the delineation of the APE, site eligibility, determinations, finding of effects, request for concurrence, and the invitation to participate in the development of the MOA; and NRCS's role

as the lead federal agency for Section 106 consultation. The NRCS sent follow up emails on June 16, 2025 to the Tribes about the 30-day consultation request for concurrence on the May 16, 2025, letter, and shared the SHPO concurrence and ACHP response. The NRCS included an invitation to the Tribes to participate in the development of the MOA. The NRCS will provide an opportunity for additional comment and participation during the comment period for the Draft Plan-EIS in coordination and consultation with the Tribes. To date, no responses have been received from any Tribes/THPOs. Tribes will be contacted again by forthcoming telephone calls. The Section 106 consultation letters can be found in Appendix A.

7.1.1.2 Agency and Consulting Party Consultation

As detailed in the cooperating agency MOU, pursuant to 50 CFR Part 402.07 and 36 CFR 800.2(a)(2), and through additional documentation for EPA, NPS, USFWS, and UDWiR (Appendix A), the NRCS will serve as the agency official who shall act on behalf of the USACE, Reclamation, EPA, NPS, USFWS, and UDWiR fulfilling their collective responsibilities for compliance with Section 106 of the NHPA. Additionally, NRCS will conduct consultations with the Utah SHPO, as well as the Tribes, on behalf of the USACE, Reclamation, EPA, NPS, USFWS, and UDWiR. The NRCS will inform USACE, Reclamation, EPA, NPS, USFWS, and UDWiR of any consultations conducted for compliance with these laws.

The NRCS coordinated further with the USACE, Reclamation, and EPA in a letter on March 31, 2025, detailing NRCS's role as the lead federal agency for the purposes of Section 106 consultation under 36 CFR 800.2(a)(2), including for the delineation of the APE, identification of historic properties, and finding of effect; and requested review of the Tribal list for subsequent consultation and for any additions. The USACE, Reclamation, and the EPA did not submit any additional Tribes.

The NRCS conferred with NPS because of the presence of the California NHT in the Project Area. The NPS determined they did not need to be a cooperating agency and reviewed the analysis of effects to the California NHT and agreed with the findings. The NRCS also conferred with the USFWS regarding the access road on USFWS-administered land to the Bear River Club levee improvements. The USFWS conducted a site visit on April 17, 2025 with NRCS, the Sponsor, and J-U-B. The USFWS determined they did not need to be a cooperating agency, and they reviewed the draft cultural resources report and agreed with the findings. The NRCS also conferred with the UDWiR because of the activities on the Salt Creek WMA in the Project Area. The UDWiR determined they did not need to be a cooperating agency and reviewed the draft cultural resources report and agreed with the findings.

The NRCS formally submitted their finding of effect with the cultural resources report to the SHPO and the Tribes in May 16, 2025 letters; and to the cooperating agencies (USACE, EPA, and Reclamation), USFWS, NPS, and UDWiR in May 27, 2025 letters to notify them of the delineation of the APE, site eligibility, determinations, and NRCS's role as the lead federal agency for Section 106 consultation, to which they concurred. The NRCS will continue to keep all agencies informed of the project. See Appendix A for other consulting parties communications.

7.1.1.3 Cultural Resources Inventory and Resolution of Effects Consultation

A literature review and Class II and III cultural resources survey were completed by SWCA in October and November 2024. In accordance with 36 CFR 800.4.(b), examination of the area

identified eight new cultural sites, six previously recorded sites, and eleven new isolated finds. Of these sites, eight are eligible for listing on the NRHP, as shown in Table 3-19.

Per the Section 106 process at 36 CFR 800.3 through 800.5, the NRCS initiated consultation with the Utah SHPO and continued consultation with the applicable Tribes, cooperating agencies (USACE, EPA, and Reclamation) and other consulting parties (NPS, USFWS, and UDWiR) on the delineation of the APE, site eligibility, and findings of Adverse Effects to Historic Properties, and to inform them that NRCS would be the lead federal agency in a letter dated May 16, 2025. For NRCS-Utah standard consultation procedures, per the State Prototype Programmatic Agreement Section V.c.1 with the Utah SHPO, "NRCS may provide its proposed APE, identification of historic properties and/or scope of identification efforts, and assessment of effects in a single transmittal to the Utah SHPO and Indian Tribes, provided this documentation meets the substantive standards in 36 CFR Part 800.4-5 and 800.11" (NRCS and SHPO 2025).

A complete summary of additional follow-up consultation with Tribes is provided in Table 7-1. Consultation is ongoing and will include follow-up telephone calls and be documented in Table 7-1. To date, no response has been received from any Tribes/THPOs. SHPO concurrence was received on May 23, 2025 SHPO concurrence is located in Appendix A.

NRCS notified the ACHP on May 27, 2025 of the adverse effects to four historic properties (historic ditches/canals) as a result of the Proposed Project. The ACHP responded in a letter, dated June 10, 2025, agreeing with the findings and declining participation in consultation to resolve adverse effects in the development of an MOA.

In accordance with 36 CFR Part 800.6, NRCS designed mitigation to resolve the adverse effects to the canals through a draft MOA (Appendix A). Consulting parties, Tribes, Sponsors, and Co-sponsors and SHPO were invited to participate in the development of the draft MOA (May 16, 2025 letters/emails). The Utah SHPO, BRWCD, BRCC, and UDWiR are participating in the MOA. The MOA includes the stipulations to resolve the adverse effects as described in Section 5.3.7.1 and in the draft MOA in Appendix A.

Table 7-1. NRCS Record of Tribal Consultation

NRCS Record of Tribal Consultation **Project/Reason for Initiating Consultation:** Lower Bear River Watershed Draft Plan-EIS (NEPA) **Program:** NRCS Watershed and Flood Prevention Operations Program											
Eastern Shoshone Tribe of the Wind River Reservation, Wyoming	Mr. John St. Clair, Chairman	P.O. Box 538 Fort Washakie, WY 82514	June 12, 2024								
	Joshua Mann, THPO		June 12, 2024	May 16, 2025			June 16, 2025				
	Mr. Wayland Large, Chairman			May 16, 2025			June 16, 2025				
Shoshone-Bannock Tribes of the Fort Hall Reservation	Mr. Lee Juan Tyler, Chairman	P.O. Box 306 Fort Hall, ID 83203	June 12, 2024	May 16, 2025			June 16, 2025				
	Louise E. Dixey, Cultural Resource Director		June 12, 2024								
	Carolyn Smith, Cultural Resources Coordinator		June 12, 2024	May 16, 2025			June 16, 2025				
Ute Indian Tribe of the Uintah & Ouray Reservation, Utah	Mr. Julius Murray, Chairman	P.O. Box 190 Fort Duchesne, UT 84026	June 12, 2024	May 16, 2025			June 16, 2025				
	Ms. Betsy Chapoose, THPO		June 12, 2024	May 16, 2025			June 16, 2025				
	Ms. Luana Thompson, Natural Resource Director		June 12, 2024				June 16, 2025				
Northwest Band of the Shoshone Nation	Dennis Alex, Chairman	2575 Commerce Way Ogden, UT 84401	June 12, 2024	May 16, 2025			June 16, 2025				
	Mr. Brad Parry, Vice Chairman		June 12, 2024	May 16, 2025			June 16, 2025				
	Ms. Patti Timbimboo-Madsen, Cultural Resources		June 12, 2024	May 16, 2025			June 16, 2025				
Skull Valley Band of Goshute*	Mr. Daniel Moon, Chairman	P.O. Box 448 Grantsville, UT 84029	June 12, 2024								
	Kyle Craig, Vice Chairman			May 16, 2025			June 16, 2025				
	Lillith Court, Tribal Secretary	407 Skull Valley Road Skull Valley, UT 84029	June 12, 2024								
Confederated Tribes of the Goshute Reservation	Mr. Amos Murphy, Chairman	HC 61 Box 6104 195 Tribal Center Road Ibapah, UT 84034	June 12, 2024	May 16, 2025			June 16, 2025				
	Mr. Clell Pete, Environmental Protection Department		June 12, 2024	May 16, 2025			June 16, 2025				

*For the Skull Valley Band of Goshute, all consultation letters are only to be sent to the Vice Chairman per Tribal request effective March 2025.
Notes: Cons = Consultation, THPO = Tribal Historic Preservation Officer
[1]Tribe Consultation was initiated separately and during scoping and is documented in the Scoping Report included in Appendix A.
[2]Documentation in included in Appendix A.
[3]Date of receipt of mail delivery to Tribe.

7.1.2 United States Army Corps of Engineers

The USACE has jurisdiction over work in WOTUS or within 30 feet of a WOTUS channel under Section 404 of the CWA. Based on the findings of the ARD, approximately 41.9 acres of wetlands and 77.2 acres of linear features were delineated within the Study Area. Findings concluded that all features have a surface water connection with either the Bear River, Malad River, or the GSL, all of which are known WOTUS, and are jurisdictional. Coordination with the USACE regarding Section 404 permitting is pending (Appendix A). The ARD is included in Appendix E1.

NRCS requested that USACE be a Cooperating Agency for the Proposed Project on October 19, 2023; USACE accepted on January 30, 2024. A MOU between NRCS, Reclamation, the EPA, and the USACE was prepared and signed on November 30, 2024. Copies of agency correspondence are included in Appendix A.

The USACE was invited to comment on the project during comments periods in November 2023, June 2024, and March 2025. The USACE was invited to attend a virtual agency scoping meeting on November 1, 2023, and attend agency meetings on January 18, 2024, and November 18, 2024, and regularly participates in monthly NRCS-Sponsor meetings. Additionally, as detailed in Section 7.1.1, the USACE has played an active role in the Section 106 process.

7.1.3 United States Environmental Protection Agency

NRCS requested that EPA be a Cooperating Agency for the Proposed Project on October 19, 2023; the EPA accepted on November 13, 2023. A MOU between NRCS, Reclamation, the EPA, and the USACE was prepared and signed on November 30, 2024.

The EPA was invited to comment on the project during comments periods in November 2023, June 2024, and March 2025. The EPA was invited to attend a virtual agency scoping meeting on November 1, 2023, attend agency meetings on January 18, 2024 and November 18, 2024, and regularly participates in monthly NRCS-Sponsor meetings and review of analysis. Additionally, as detailed in Section 7.1.1, the EPA has played an active role in the Section 106 process. Copies of agency correspondence are included in Appendix A.

7.1.4 United States Department of the Interior, Fish and Wildlife Service

NRCS requested that the USFWS be a Cooperating Agency for the Proposed Project on October 19, 2023; the USFWS declined cooperating agency status but is participating as a consulting party for both ESA and the Section 106 processes.

If ESA listed species and/or DCH may be affected by the Proposed Project, the NRCS is required to consult with the USFWS pursuant to 50 CFR 402. In the Action Area, two species are listed under the ESA as threatened, and two species are proposed for listing as threatened and endangered, with no critical habitats identified (USFWS 2025a; see Section 3.3.4.1 and 3.3.6.2). Coordination with the USFWS Utah Ecological Services Field Office about potentially suitable habitat and effects to the Yellow-billed cuckoo within the Project Area occurred on February 5, 2025. A BA has been prepared and informal consultation with the USFWS has been completed (See Section 5.3.6.2, Appendix A, and Appendix E1).

A Section 12 letter was sent to the USFWS from NRCS on May 17, 2024. The USFWS was invited to comment on the project during comments periods in November 2023 and June 2024. The USFWS was invited to attend a virtual agency scoping meeting on November 1, 2023, and attend agency meetings on January 18, 2024 and November 18, 2024. The USFWS concurred with the determination that the proposed action may affect and is not likely to adversely affect the western YBCU on July 25, 2025, concluding informal consultation. Additionally, as detailed in Section 7.1.1, the USFWS has played an active role in the Section 106 process. Copies of agency correspondence are included in Appendix A.

7.2 Coordination

7.2.1 United States Department of the Interior, Bureau of Reclamation

NRCS requested that Reclamation be a Cooperating Agency for the Proposed Project on October 19, 2023; Reclamation accepted on November 7, 2023. A MOU between NRCS, Reclamation, the EPA, and the USACE was prepared and signed on November 30, 2024.

Reclamation was invited to comment on the project during comments periods in November 2023, June 2024, and March 2025. Reclamation was invited to attend a virtual agency scoping meeting on November 1, 2023, and attend agency meetings on January 18, 2024 and November 18, 2024. Additionally, as detailed in Section 7.1.1, Reclamation has played a role in the Section 106 process. Copies of agency correspondence are included in Appendix A.

7.2.2 United States Department of the Interior, Bureau of Land Management

NRCS requested that BLM be a Cooperating Agency for the Proposed Project on October 19, 2023; the BLM replied in July 2024.

The BLM was invited to comment on the project during comments periods in November 2023 and June 2024. The BLM was invited to attend a virtual agency scoping meeting on November 1, 2023, and attend agency meetings on January 18, 2024 and November 18, 2024. Copies of agency correspondence are included in Appendix A.

7.2.3 United States Department of the Interior, National Park Service

The NRCS coordinated with the NPS in a participating agency capacity, which allows NPS to provide comments and data relevant to the Proposed Project as a subject matter expert. Per an email on March 3, 2025, NPS declined to be a Cooperating Agency. The NPS evaluated potential effects to the Salt Lake Cut-off of the California NHT under the NTSA and participated in a March 24, 2025 NRCS-Sponsor meeting to discuss effects to the California Trail. Additionally, as detailed in Section 7.1.1, the NPS has played an active role in the Section 106 process.

7.2.4 United States Department of Agriculture, Forest Service

NRCS requested that USFS, Uinta-Wasatch-Cache National Forest, be a Cooperating Agency for the Proposed Project on October 19, 2023; the USFS declined on January 18, 2024.

The USFS was invited to comment on the project during the comment periods in November 2023 and June 2024. The USFS was invited to attend a virtual agency scoping meeting on November 1, 2023, and attend agency meetings on January 18, 2024 and November 18, 2024. Copies of agency correspondence are included in Appendix A.

7.2.5 Utah Department of Transportation

The Utah Department of Transportation was invited to comment on the project during comment periods in November 2023 and June 2024, and attend an agency meeting on January 18, 2024, and November 18, 2024. Coordination with UDOT is ongoing. If necessary, an Encroachment Permit would be obtained, and a Traffic Control Plan would be prepared before beginning construction activities within UDOT's ROW.

7.2.6 Utah Department of Public Safety—Division of Emergency Management

The Utah Division of Emergency Management was invited to comment on the project during the scoping periods in November 2023 and June 2024 and attend agency meetings on January 18, 2024 and November 18, 2024. Utah Division of Emergency Management manages floodplain development permitting in Utah. The Proposed Project would have direct and indirect effects on the floodplains. Further coordination with Division will occur to make a final determination if a CLOMR and/or LOMR would be required for the Proposed Project. Coordination with the Division for the Proposed Project is ongoing.

7.2.7 Utah Department of Natural Resources

The UDNR was invited to comment on the project during the scoping periods in November 2023 and June 2024 and attend agency meetings on January 18, 2024 and November 18, 2024.

The Utah Department of Natural Resource, with the Public Land Policy Coordinating Office, provided comments on the NOI. The State supports the project for its benefits in water management, flood mitigation, wildlife habitat, and recreation. They emphasize the importance of coordination between State and Federal agencies. The State asks that the project is consistent with the Utah State Resource Management Plan (see Sections 3.3.8.1 and 5.3.8.1 for analysis).

7.2.7.1 Division of Water Quality

The Utah Division of Water Quality was invited to comment on the project during the scoping periods in November 2023 and June 2024 and attend agency meetings on January 18, 2024 and November 18, 2024. A UPDES permit from the Utah Division of Water Quality will be required before beginning any construction activities that would disturb more than 1 acre of land. Coordination with the UDWQ is pending.

7.2.7.2 Division of Water Rights

The Utah Division of Water Rights was invited to comment on the project during the scoping periods in November 2023 and June 2024 and attend agency meetings on January 18, 2024 and November 18, 2024. Utah Division of Water Rights will be consulted to ensure the project complies with water rights regulations. Any change in operations of the Bear River is subject to approval by the Utah Division of Water Rights. Coordination with the Utah Division of Water Rights is pending.

7.2.7.3 Division of Wildlife Resources

A state sensitive species list was obtained as part of the biological resource analysis. Coordination with the UDWiR is ongoing, as UDWiR is a Co-sponsor of the Proposed Project

and manages the Salt Creek WMA. UDWiR proposes to use federal funds to implement the Proposed Project.

The UDWiR was invited to comment on the project during the scoping periods in November 2023 and June 2024 and attend agency meetings on January 18, 2024 and November 18, 2024.

Additionally, the NRCS coordinated with UDWiR on Section 106 consultation. See Section 7.1.1.2.

Coordination with UDWiR is ongoing, as they are a Co-sponsor of the Proposed Project.

7.2.8 Box Elder County

Coordination with Box Elder County is ongoing. If necessary, an encroachment permit would be obtained from the Box Elder Public Works Road Division before beginning construction activities within Box Elder's ROW. Box Elder County and the Sheriff's Department would be notified if traffic or access would be delayed due to construction activities.

The County asks that the project is consistent with Box Elder County Resource Management Plan (see Sections 3.3.8.1 and 5.3.8.1 for analysis).

7.2.9 Tremonton City

Coordination with Tremonton City is ongoing, as the city is a Co-sponsor of the Proposed Project. Tremonton City proposes to use federal funds to implement the Proposed Project. Coordination with the city on permitting requirements for the Proposed Project is ongoing.

7.2.10 Bear River City

Coordination with Bear River City is ongoing, as the city is a Co-sponsor of the Proposed Project. Bear River City proposes to use federal funds to implement the Proposed Project. Coordination with the city on permitting requirements for the Proposed Project is ongoing.

7.2.11 Bear River Canal Company

Coordination with BRCC is ongoing, as BRCC is a Co-sponsor of the Proposed Project. BRCC proposes to use federal funds to implement the Proposed Project.

7.2.12 Highland Canal Company

Coordination with Highland Canal Company is ongoing, as they are a Co-sponsor of the Proposed Project. Highland Canal Company proposes to use federal funds to implement the Proposed Project.

7.2.13 Central Canal Company

Coordination with Central Canal Company is ongoing, as they are a Co-sponsor of the Proposed Project. Central Canal Company proposes to use federal funds to implement the Proposed Project.

7.2.14 Bear River Club Company

Coordination with Bear River Club is ongoing, as they are a Co-sponsor of the Proposed Project. Bear River Club proposes to use federal funds to implement the Proposed Project.

7.2.15 Chesapeake Duck Club

Coordination with CDC is ongoing, as they are a Co-sponsor of the Proposed Project. CDC proposes to use federal funds to implement the Proposed Project.

7.3 Public Involvement

7.3.1 Public Participation

The main goal of public participation is to involve diverse groups of the public, Tribes, and government agency representatives to solicit input and provide relevant and timely information throughout the NEPA review process. Public participation is meant to engage all demographics of the public in the NEPA review process who may be potentially affected by the Proposed Project. Outreach methods are described in the following section. Table 7-2 lists the project's completed and pending public outreach activities. In Appendix A, the Lower Bear River Watershed Plan Scoping Report includes the detailed scoping process, including letters, meetings, and comments from the public, stakeholders, agencies, and Tribes.

The NRCS regularly updates the Lower Bear River Watershed Project webpage throughout the planning process at: https://www.nrcs.usda.gov/conservation-basics/conservation-by-state/utah/lower-bear-river-watershed-sponsor-bear-river-water.

Table 7-2. Public Outreach Activities

Date	Activity	Type
April 21, 2023	Preliminary Sponsor Kick-off Meeting	Meeting
September 25, 2023	Agency Scoping Meeting Notice Emailed	Mailing
October 25 and November 1, 2023	Public Scoping Meeting Notice Published in the Box Elder News Journal	Newspaper Publication
October 25, 2023	Public Scoping Postcards Mailed	Mailing
October 30, 2023	NRCS website updated	Online Notification
November 1, 2023	Virtual Agency Scoping Meeting	Virtual Meeting
November 9, 2023	Public Scoping Meeting	Meeting at Box Elder County Fairground Museum Building, Tremonton
June 14, 2024	NRCS website updated	Online Notification
June 14, 2024	NOI to prepare EIS and Proposed Action published in the Federal Register	Federal Register Notice
January 18, 2024	Agency Meeting	Meeting
June 19, 2024	NOI Published in the Box Elder Journal	Newspaper Publication
June 17, 2024	NOI Emailed to Public/Agency Stakeholders	Mailing
June 17, 2024	NOI Scoping Public Mailer Sent	Mailing

Date	Activity	Type
July 14, 2024	NOI Scoping Period Closed	Federal Register Noice, Newspaper Publication, Agency and Tribal Letters, and Email
November 18, 2024	Agency Meeting	Meeting
TBD	NRCS website updated	Online Notification
TBD	Notice of Availability (NOA) of Lower Bear River Watershed Draft Plan–EIS published in the Federal Register. Beginning of the 45-day comment period.	Federal Register Notice
TBD	Draft Plan–EIS Meetings	Meeting
TBD	Draft Plan–EIS Public Comment Period Closed	Date
TBD	Notice of Availability of Lower Bear River Watershed Final Plan–EIS published in Federal Register. Starts 30-day waiting period.	Federal Register Notice; Mailing, Newspaper and Online Notification
TBD	State Conservationist signs Record of Decision	Date
TBD	Notice of Availability (NOA) of Lower Bear River Watershed Record of Decision (ROD) published in the Federal Register.	Federal Register Notice
TBD	Lower Bear River Watershed Final Plan watershed agreement signed by sponsors and USDA NRCS State Conservationist (STC).	Date

7.3.2 Project Scoping

Chapter 1 describes the scoping process for the Proposed Project in detail. The scoping procedure for the formulation of this Draft Plan–EIS followed the general procedures outlined in the NRCS NWPH (NRCS 2014) and the NRCS NWPM (NRCS 2015). NRCS procedures require that the NRCS use a scoping process early in the planning phase to identify issues, concerns, and potential effects that require analysis.

7.3.3 Public Outreach

Scoping notices were prepared and sent to interested parties, Tribes, and regulatory agencies on September 25, 2023. A public scoping meeting was conducted on November 9, 2023. The purpose of the meeting was to present the Proposed Project and to request preliminary comments on the proposal. Forty-three public attendees, five project team members from J-U-B, four NRCS representatives, and two project sponsor representatives attended the public scoping meeting. A meeting summary, including a list of attendees, meeting presentation and submitted comments, is in the Scoping Report in Appendix A.

The NOI to prepare an EIS was published in the Federal Register on June 14, 2024 (FR 2024). Participants were invited to submit comments in writing by mail or email during the scoping

comment period. The scoping period officially opened on June 14, 2024, and ended on July 14, 2024, a total of 30 days.

Eleven scoping comments were received during the scoping comment period and full comments are included in Section 3 of the Scoping Report in Appendix A. The comments reflect a range of concerns and suggestions related to water management, flooding, environmental effect, and coordination with existing plans and projects. Comments received on the NOI included the following topics:

- Inclusion in the Watershed Plan
- Flooding and Drainage Issues
- Water Supply Impact
- Environmental Concerns
- Coordination and Consistency with existing plans such as: Box Elder County and State Resource Management Plans.
- Effects on Existing Projects
- Property Effects
- General Environmental Concerns.
- Specific comments regarding: PacifiCorp, Central Canal Company, Garland Secondary Water, and West Corinne

7.3.4 Agency Involvement

The NRCS coordinated with local, state, and federal agencies regarding subjects pertinent to their jurisdiction, authority, and expertise. Federal, state, and local agencies participated in the project formulation and were given the opportunity to comment on the Proposed Project. Agency coordination occurred via telephone, email, and in a virtual meeting. A project scoping letter was emailed on September 25, 2023, to 65 government agencies as detailed in the Scoping Report (Appendix A).

An agency scoping meeting was conducted virtually on November 1, 2023. The purpose of the scoping email and virtual meeting was to inform agencies of the Proposed Project and to request preliminary comments on the proposal. Sixteen agency stakeholders, five project team members from J-U-B, four NRCS representatives, and two project sponsor representatives attended the agency scoping meeting. A meeting summary, including the list of attendees, is located in the Scoping Report in Appendix A. An agency meeting was also held on January 18, 2024.

Similar to the request for comment on the Proposed Project scoping letter, federal, state, and local agencies participated in the project formulation and were given the opportunity to comment on the NOI to prepare an EIS that was published in the Federal Register on June 14, 2024. A project letter was mailed to government agencies as detailed in the Scoping Report (Appendix A).

Formal coordination and consultation with Tribes and SHPO were initiated and will be completed by NRCS; see Section 7.1.1.

Additionally, consistent with E.O. 12372, letters were mailed to the Utah Governor's office with project information on September 25, 2023.

The following agencies received a project scoping letter and/or NOI:

- Federal
    - USACE, Nevada-Utah Regulatory Branch *(Cooperating Agency),*
    - USFS, Uinta-Wasatch-Cache National Forest, Logan Ranger District
    - BLM, Salt Lake Field Office, West Desert District
    - Reclamation, Provo Area Office (*Cooperating Agency*)
    - USFWS, Utah Field Office
    - EPA, Region 8 *(Cooperating Agency)*
- State & Local
    - Utah Governor's Office
    - Utah Governor's Office of Planning and Budget
    - Utah Department of Agriculture
    - Utah Department of Natural Resources (UDNR)
    - Utah Department of Transportation (UDOT), Region One
    - Utah Department of Public Safety, Division of Emergency Management
    - Utah Division of Environmental Quality
    - Utah Division of Forestry, Fire and State Lands
    - Utah Division of Indian Affairs
    - Utah Division of Water Quality
    - Utah Division of Water Resources (UDWR)
    - Utah Division of Water Rights, Northern Regional Office
    - Utah Division of Wildlife Resources (UDWiR)
    - Utah Public Lands Policy Coordinating Office
    - Utah Soil Healthy Program
    - Utah State Historic Preservation Office (SHPO)
    - Utah Trust Lands Administration (UTLA)
    - Box Elder County
    - Bear River City
    - Bothwell
    - Brigham City
    - Corrine City
    - Town of Deweyville
    - Elwood City
    - Fielding Town
    - Garland City
    - Honeyville City
    - Plymouth
    - Thatcher
    - Tremonton City
    - Bear River Canal Company
    - Bear River Club Company
    - Central Canal Company
    - Chesapeake Duck Club
    - Highland Canal Company
    - West Corrine Water Company
    - Local organizations
    - Individuals

7.4 Plan Development and Reviews

USACE, Reclamation, and EPA reviewed and commented on the Draft Plan–EIS before issuing it for public review. Agency comments on the Draft Plan–EIS were addressed before it was issued to the public.

7.4.1 Draft Plan–EIS Public Comment Period

A Notice of Availability (NOA) of the Draft Plan–EIS will be published in the Federal Register. A 45-day comment period will begin on the date that EPA publishes the NOA. The Draft Plan-EIS will be distributed to Tribes, other federal agencies, state and local agencies, organizations, groups, and individuals. All public comments will be included in Appendix A of the Final Plan–EIS.

7.4.2 Final Plan–EIS Public Comment Period

[*Pending*] An NOA of the Final Plan–EIS will be published in the Federal Register by the NRCS, and EPA will commence a 30-day period for administrative action. There will be no public comment period on the Final Plan–EIS. The Final Plan–EIS will be distributed to tribes, other federal agencies, state and local agencies, organizations, groups, and individuals. Appendix A of the Final Plan–EIS will include comments received on the Draft Plan-EIS and the responses to those comments.

7.5 Distribution List

A notice of availability for the Draft Plan–EIS will be distributed to the following Tribes, federal and state agencies, and local governments and organizations (Table 7-3). The names and addresses of individuals who will receive notice of the Plan–EIS are not listed in this chapter for privacy purposes.

Table 7-3. Draft Plan–EIS Distribution List

Type of Agency or Organization	Name of Agency or Organization
Tribe	Eastern Shoshone Tribe of the Wind River Reservation, Wyoming
Tribe	Shoshone-Bannock Tribes of the Fort Hall Reservation
Tribe	Ute Indian Tribe of the Uintah & Ouray Reservation, Utah
Tribe	Northwest Band of the Shoshone Nation
Tribe	Skull Valley Band of Goshute
Tribe	Confederated Tribes of the Goshute Reservation
Federal	USACE, Nevada-Utah Regulatory Branch (*Cooperating Agency*)
Federal	USFS, Uinta-Wasatch-Cache National Forest, Logan Ranger District
Federal	BLM, Salt Lake Field Office, West Desert District
Federal	Reclamation, Provo Area Office (*Cooperating Agency*)
Federal	National Park Service (NPS)
Federal	USFWS, Utah Field Office
Federal	EPA, Region 8 (*Cooperating Agency*)
Federal	NRCS
State	Utah Governor's Office

Type of Agency or Organization	Name of Agency or Organization
State	Utah Governor's Office of Planning and Budget
State	Utah Department of Agriculture
State	Utah Department of Transportation (UDOT), Region One
State	Utah Department of Natural Resources (UDNR)
State	Utah Department of Public Safety, Division of Emergency Management
State	Utah Division of Environmental Quality
State	Utah Division of Forestry, Fire and State Lands
State	Utah Division of Indian Affairs
State	Utah Division of Water Quality
State	Utah Division of Water Resources
State	Utah Division of Water Rights, Northern Regional Office
State	Utah Division of Wildlife Resources (UDWiR) (*Co-sponsor*)
State	Utah Public Lands Policy Coordinating Office
State	Utah Soil Healthy Program
State	Utah State Historic Preservation Office (SHPO)
State	Utah Trust Lands Administration (UTLA)
County	Box Elder County
City	Bear River City (*Co-sponsor*)
City	Bothwell
City	Brigham City
City	Corrine City
City	Town of Deweyville
City	Elwood City
City	Fielding Town
City	Garland City
City	Honeyville City
City	Plymouth
City	Thatcher
City	Tremonton City (*Co-sponsor*)
Local	Bear River Canal Company (*Co-sponsor*)
Local	Bear River Club Company (*Co-sponsor*)
Local	Bear River Water Conservancy District (*Sponsor*)
Local	Central Canal Company (*Co-sponsor*)
Local	Chesapeake Duck Club (*Co-sponsor*)
Local	Highland Canal Company (*Co-sponsor*)
Local	West Corrine Water Company
Local	Center for Biological Diversity
Local	Ducks Unlimited
Local	Friends of the Great Salt Lake
Local	National Audubon Society
Local	Nature Conservancy
Local	PacifiCorp
Local	Sierra Club

Type of Agency or Organization	Name of Agency or Organization
Local	Utah Physicians for a Healthy Environment
Local	Utah Rivers Council
Individuals	List in Scoping Report in Appendix A

Chapter 8 References

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Chapter 9 List of Preparers and Reviewers

The Draft Plan–EIS was reviewed and concurred with by State staff specialists having responsibility for engineering, conservation partnerships, and cultural resources. This review was followed by a review by the National Water Management Center (NWMC). Table 9-1 lists the individuals who assisted in preparing and the NRCS State and agency staff specialists who assisted in reviewing this Plan–EIS.

Table 9-1. List of Preparers and Reviewers

Name	Title & Organization (Years Experience)	Education & Licenses/Certifications
Reviewers		
Derek Hamilton	Water Resources Coordinator USDA-NRCS *(25 years' experience)*	M.S. Environmental Science B.S. Geography
Connor Benfield	Field Watershed Coordinator/Planner USDA-NRCS (*10 years' experience*)	B.S. Ecosystems Science
Tara Hoffmann	State Watershed Cultural Resources Specialist USDA-NRCS *(17 years' experience)*	B.S. Interdisciplinary Studies M.A. Anthropology State of Utah Principal Investigator Permit
Nicole Steiff	Civil Engineer USDA-NRCS (11 *years' experience*)	B.S. Civil Engineering
Joshua Bregger	Geologist USDA-NRCS (*2 years' experience*)	M.S. Geology B.S. Geology
Stephen Lira	Utah State Economist USDA-NRCS *(7 years' experience)*	M.S. Agricultural Economics
Trevor Nielson	General Manager Bear River Canal Company (*8 years' experience*)	Master of Applied Economics B.S. Agribusiness B.S. Business
Amanda Jensen	Lead NEPA Reviewer EPA *(10+ years' experience)*	M.A. Ecology and Evolutionary Biology B.S. Ecology, Evolution, and Marine Biology
Nicole Fresard	Senior Project Manager USACE *(10+ years' experience)*	B.S. Environmental Science
Wyatt Carter	Fish and Wildlife Biologist Reclamation (*8 years' experience*)	B.S. Biology/Zoology

Name	Title & Organization (Years Experience)	Education & Licenses/Certifications
Preparers		
Chris Slater	Project Engineer J-U-B ENGINEERS, Inc. (*23 years' experience*)	Bachelor of Science (B.S) Civil Engineering Professional Engineer (P.E.)
Colton Smith	Project Engineer J-U-B ENGINEERS, Inc. (*11 years' experience*)	B.S. Civil Engineering Master of Science (M.S.) Civil and Environmental Engineering P.E., Certified Floodplain Manager (C.F.M.)
Parker Achenbach	Project Designer J-U-B ENGINEERS, Inc. (*1 years' experience*)	B.S. Civil Engineering and Master of Engineering (M.E.) Civil and Environmental Engineering
John De Leon	Project Engineer J-U-B ENGINEERS, Inc. (*7 years' experience*)	B.S. Civil Engineering, M.S. Civil Engineering, P.E., C.F.M.
Suzanne Acton	Environmental Planning/ NEPA Technical Lead J-U-B ENGINEERS, Inc. *(28 years' experience)*	M.S. Forestry—Fire Science and Ecology Emphasis B.S. Biology
Jennie Fischer	Senior Environmental Specialist J-U-B ENGINEERS, Inc. *(32 years' experience)*	B.S. Watershed Sciences
Kira Coff	Environmental Specialist J-U-B ENGINEERS, Inc. *(16 years' experience)*	Master of Applied Science (M.A.S.) Natural Resource Management—Environmental Health and Safety
Jason Lewis	Environmental Specialist/ Biologist J-U-B ENGINEERS, Inc. *(12 years' experience)*	B.S. Ecology
Rebecca Hendricks Miller	Environmental Specialist/ Biologist J-U-B ENGINEERS, Inc. *(15 years' experience)*	M.S. Organismal Biology, Ecology & Conservation B.A. Environmental Studies and Biology
Jamie Vandagriff	Senior Archaeologist J-U-B ENGINEERS, Inc. (*17 years' experience*)	B.A. Anthropology Master of Arts (M.A.) Archaeology Registered Professional Archaeologist (RPA)
Sydney Allen	Assistant Environmental Specialist J-U-B ENGINEERS, Inc. *(1 years' experience)*	B.S. Environmental and Sustainability Studies
Michael Verdone	Economist BBC Research & Consulting *(15+ years' experience)*	Ph.D. Natural Resource Economics M.S. Economics

Name	Title & Organization (Years Experience)	Education & Licenses/Certifications
Suzanne Eskenazi	Principal Investigator Cultural Resources Cultural Resources SWCA Environmental Consultants (*25 years' experience*)	M.A., Anthropology B.A., Anthropology, emphasis in Archaeology Utah Public Lands Policy Coordinating Office (PLPCO) Principal Investigator Permit (no. 318) BLM-Permitted Project Director/Principal Investigator, Utah Statewide Meets the Secretary of the Interior's Standards for the Treatment of Historic Properties (SOI Qualified)
Rachael Fisher	Project Manager Cultural Resources SWCA Environmental Consultants (*16 years' experience*)	B.S. Geography BLM-Permitted Crew Lead Great Basin, Utah

Chapter 10 Acronyms, Abbreviations, and Short Forms

The following table lists the acronyms, abbreviations, or short forms used in this Plan–EIS and the terms they represent (Table 10-1).

Table 10-1. Acronyms, Abbreviations, and Short Forms Used in this Document

Acronym or Abbreviation	Term
ac-ft	acre-feet
ACHP	Advisory Council on Historic Preservation
ACS	American Community Survey
AHA	American Heritage Association
AJD	Approved Jurisdictional Determination
AMSL	above mean sea level
APE	area of potential effects
AQD	Air Quality Division
ARD	Aquatic Resources Delineation
BA	Biological Assessment
BACT	Best Available Control Technology
BCR	benefit-cost ratio
BGEPA	Bald and Golden Eagle Protection Act
BRCC	Bear River Canal Company
Bear River Club	Bear River Club Company
BRWCD	Bear River Water Conservancy District
BLM	U.S. Department of the Interior, Bureau of Land Management
BMP	best management practices
B.S.	Bachelor of Science
CAA	Clean Air Act
CDC	Chesapeake Duck Club
Census	U.S. Census Bureau
CEQ	Council on Environmental Quality
C.F.M.	Certified Floodplain Manager
CFR	Code of Federal Regulation
cfs	cubic feet per second
CGP	Construction General Permit
CH_4	methane
CO	carbon monoxide
CO_2	carbon dioxide
CLOMR	Conditional Letter of Map Revision
CWA	Clean Water Act
CWMP	County Water Master Plan
dB	decibels

Acronym or Abbreviation	Term
DCH	designated critical habitat
DM	Departmental Manual
DR	Departmental Regulation
EFH	Essential Fish Habitat
EHR	Erosion Hazard Rating
EIS	Environmental Impact Statement
E.O.	Executive Order
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
FEMA	Federal Emergency Management Agency
FHWA	Federal Highway Administration
FIRM	Flood Insurance Rate Map
FPPA	Federal Farmland Protection Policy Act
FR	Federal Register
FWFI	Future with Federal Investment
FWOFI	Future without Federal Investment
FWOP	Future Without Project
GHG	greenhouse gases
GPCD	gallons per capita per day
GSL	Great Salt Lake
HAER	Historic American Engineering Record
HFC	hydrofluorocarbons
HP	Horsepower
HUC	Hydrologic Unit Code
IPaC	Information for Planning and Consultation
I&A	Investigations and Analyses Report
J-U-B	J-U-B ENGINEERS, Inc.
LF	Linear feet
LOMR	Letter of Map Revision
MANLAA	May affect, not likely to adversely affect
M.A.	Master of Arts
M.A.S.	Master of Applied Science
M&I	municipal and industrial
M.S.	Master of Science
MBTA	Migratory Bird Treaty Act
MOA	Memorandum of Agreement
MOU	Memorandum of Understanding
M.S.	Master of Science
N_2O	nitrous oxide
NACD	Native American Consultation Database
NAAQS	National Ambient Air Quality Standards
NASS	National Agricultural Statistics Service
NECH	National Environmental Compliance Handbook

Acronym or Abbreviation	Term
NEE	national economic efficiency
NEM	National Engineering Manual
NEPA	National Environmental Policy Act
NH_3	ammonia
NHPA	National Historic Preservation Act
NHT	National Historic Trail
NO_2	nitrogen dioxide
NOx	nitrogen oxides
NOAA	National Oceanic and Atmospheric Administration
NOI	Notice of Intent
NPDES	National Pollution Discharge Elimination System
NPS	U.S. Department of the Interior, National Park Service
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NTSA	National Trails System Act
NWMC	National Water Management Center
NWPH	National Watershed Program Handbook
NWPM	National Watershed Program Manual
O_3	ozone
O&M	Operations and Maintenance
O&M Agreement	Operation and Maintenance Agreement
OM&R	Operations, Maintenance, and Replacement
Pb	lead
P&R	Principles and Requirements for Federal Investments in Water Resources (CEQ 2013)
PFC	perfluorocarbons
PFYC	Potential Fossil Yield Classification
Ph.D.	Doctor of Philosophy
PL	public law
PL-566	Watershed Protection and Flood Prevention Act; Public Law 83-566
Plan	Watershed Plan
Plan–EIS	Watershed Plan–Environmental Impact Statement
PM	particulate matter
PR&G	Principles, Requirements & Guidelines (Principles and Requirements for Federal Investments in Water Resources [P&R] (CEQ 2013), USDA DM 9500-13 (USDA 2017a) and USDA DR 9500-13 [USDA 2017b], and the corresponding Interagency Guidelines [CEQ 2014], together referenced as the Principles, Requirements and Guidelines [PR&G])
Project Area	Proposed Project Area
Proposed Project	Lower Bear River Watershed Project
PRPA	Paleontological Resources Preservation Act of 2009

Acronym or Abbreviation	Term
RACT	Reasonably Available Control Technology
RCP	Reinforced Concrete Pipe
RCRA	Resource Conservation and Recovery Act
Reclamation	U.S. Department of the Interior, Bureau of Reclamation
RGP	Regional General Permit
RMP	Resource Management Plan
ROW	right-of-way
RPA	Registered Professional Archaeologist
Scoping Report	Scoping Report for the Lower Bear River Watershed Plan-EIS
SF_6	sulfur hexafluoride
SGCN	Species of Greatest Conservation Need
SHPO	State Historic Preservation Office/Officer
SIP	State Implementation Plan
SO_2	sulfur dioxide
SPCC	Spill Prevention, Control, and Countermeasure
SWCA	Steven W. Carothers & Associates Environmental Consultants
SWPPP	Storm Water Pollution Prevention Plan
THPO	Tribal Historic Preservation Officer
TM	Technical memorandum
TMDL	Total Maximum Daily Load
tpy	tons per year
UAC	Utah Administrative Code
UDEQ	Utah Department of Environmental Quality
UDNR	Utah Department of Natural Resources
UDOT	Utah Department of Transportation
UDWR	Utah Division of Water Resources
UDWiR	Utah Division of Wildlife Resources
UGS	Utah Geological Survey
ULT	Ute Ladies'-tresses (*Spiranthes diluvialis*)
UPDES	Utah Pollutant Discharge Elimination System
USACE	U.S. Army Corps of Engineers
USDA	U.S. Department of Agriculture
USFWS	U.S. Department of the Interior, Fish and Wildlife Service
USGS	U.S. Department of the Interior, Geological Survey
USFS	U.S. Department of Agriculture, Forest Service
UTLA	Utah Trust Lands Administration
UWAP	Utah Wildlife Action Plan
VOC	volatile organic compounds
VRM	Visual Resource Management
WETS	Wetlands Climate Analysis Tables
WFPO	Watershed and Flood Prevention Operations
WMA	Waterfowl Management Area

Acronym or Abbreviation	Term
WOTUS	Waters of the United States
YBCU	Yellow-billed cuckoo