FINAL BEAR LAKE COMPREHENSIVE MANAGEMENT PLAN

Prepared for the Utah Department of Natural Resources, Division of Forestry, Fire & State Lands

FEBRUARY 2022

SWCA ENVIRONMENTAL CONSULTANTS | CRSA

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Prepared for

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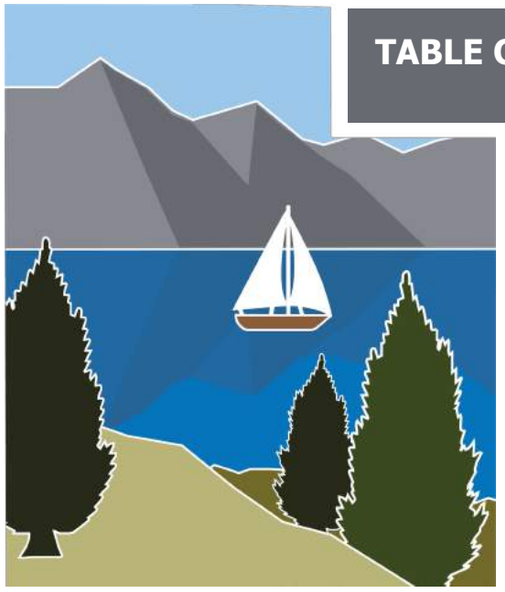


TABLE OF CONTENTS

APPENDICES

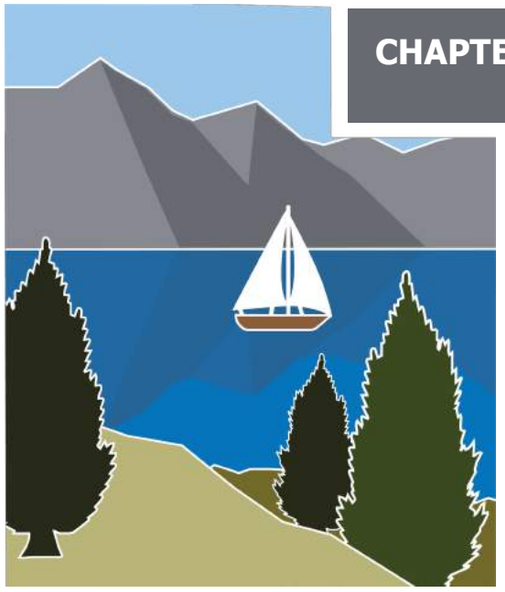
FIGURES

TABLES

ABBREVIATIONS

°F	degrees Fahrenheit
A	Agriculture
AIS	aquatic invasive species
AR	Agricultural Residential
BD	Beach Development
Bear Lake BCT	Bear Lake Bonneville cutthroat trout
Bear Lake CMP	Bear Lake Comprehensive Management Plan
BHCA	Bird Habitat Conservation Area
BLM	U.S. Bureau of Land Management
BLM	Bear Lake Marina
BMP	best management practice
BRAG	Bear River Association of Governments
C	Commercial
CaCO3	calcium carbonate
CBC	Christmas Bird Count
CCP	Bear Lake National Wildlife Refuge and Oxford Slough Waterfowl Production Area Comprehensive Conservation Plan
CCRS	Cheney Creek Rest Stop
cfs	cubic feet per second
Coast Guard	U.S. Coast Guard
CS	species receiving special management under a conservation agreement to preclude the need for federal listing
CWA	Clean Water Act
CWMAs	Cooperative Weed Management Areas
DOGM	Utah Division of Oil, Gas and Mining
DOR	Utah Division of Recreation
DSP	Utah Division of State Parks
DWQ	Utah Division of Water Quality
DWR	Utah Division of Wildlife Resources
DWRe	Utah Division of Water Resources
DWRi	Utah Division of Water Rights
EPA	U.S. Environmental Protection Agency
ES	eastern shoreline
ESA	Endangered Species Act of 1973
FAC	facultative
FACU	facultative upland
FACW	facultative wetland
FEMA	Federal Emergency Management Agency
FERC	Federal Energy Regulatory Commission
FFSL	Utah Department of Natural Resources, Division of Forestry, Fire & State Lands
GCP	Garden City park
GIS	geographic information system
IDL	Idaho Department of Lands
IDPR	Idaho Department of Parks and Recreation
IPaC	Information for Planning and Consultation
km	kilometer
LDS	The Church of Jesus Christ of Latter-day Saints
M	Manufacturing
m	meter
MFP	management framework plan
mg/L	milligrams per liter
MLIDs	monitoring location IDs
msl	mean sea level
NFIP	National Flood Insurance Program

NI	non-indicator
NOAA	National Oceanic and Atmospheric Administration
Northern Paiute	Northern Shoshone and the Bannock
Northwestern Band	The Northwestern Band of the Shoshone Nation
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resources Conservation Service
NWIS	National Water Information System
OBL	obligate
OHV	off-highway vehicle
OHWM	ordinary high water mark
PC	Planned Community
PIF	Partners in Flight
PWC	personal watercraft
R	Residential
R1	Residential
R-1	Single Family Residential
RBSP	Rendezvous Beach State Park
RMP	resource management plan
ROD	record of decision
ROEs	rights-of entry
RV	recreational vehicle
SGCN	species of greatest conservation need
SHPO	Utah State Historic Preservation Office
SITLA	The State of Utah School and Institutional Trust Lands Administration
SPC	species of concern
SR-30	State Route 30
SS	southwestern shoreline
SULAs	special use lease agreements
SWReGAP	Southwest Regional Gap Analysis Project
T-ESA	threatened under the ESA
the Tribes	The Shoshone-Bannock Tribes of Fort Hall
TMDL	total maximum daily load
UDAF	Utah Department of Agriculture and Food
UDOT	Utah Department of Transportation
UDWS	Utah Department of Workforce Services
UGS	Utah Geological Survey
UP&L	Utah Power and Light Company
UPDES	Utah Pollution Discharge Elimination System
UPL	upland
US-89	U.S. Route 89
USACE U.S.	Army Corps of Engineers
USFS	U.S. Forest Service
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
WIA	walk-in-access
WMAs	wildlife management areas
WS	Water Source Protection
WS	western shoreline



CHAPTER 1 – INTRODUCTION

1.1 Project Vision and Goals

The Utah Department of Natural Resources, Division of Forestry, Fire & State Lands (FFSL) has developed the 2022 *Bear Lake Comprehensive Management Plan* (Bear Lake CMP) to replace the existing 2009 Bear Lake CMP (FFSL 2009) and to update management goals and objectives for Bear Lake sovereign lands in Rich County, Utah (Figure 1-1). The Bear Lake CMP is designed to ensure that navigation, fish and wildlife habitat, aquatic beauty, public recreation, and water quality (known as Public Trust resources or values) are given due consideration and balanced against the economic necessity, justification for, or benefit to be derived from any proposed use, pursuant to Utah Administrative Code R652-2-200. Under Utah Code 65A-10-1, management responsibility for the lake's sovereign land resources lies with FFSL. Additionally, Utah Code 65A-2-1, which governs management of all state lands within FFSL's jurisdiction, states that "[t]he division [FFSL] shall administer state lands under comprehensive land management programs using multiple-use, sustained-yield principles."

FFSL recognizes the importance of the Bear Lake ecosystem and its natural, cultural, recreational, and aesthetic amenities, including those resources and uses that extend beyond its shoreline. FFSL considers it imperative that management of Bear Lake sovereign lands includes coordination of planning efforts and management activities with other agencies, partners, and stakeholders, especially because the lake traverses two states. Sustainable management in the context of multiple use of Bear Lake will ensure that the lake's ecological health and Public Trust resources are conserved in perpetuity. FFSL intends to manage Bear Lake with a holistic view—including the use of adaptive management, as necessary—to provide responsible stewardship and a lasting benefit to the Public Trust.

FFSL's primary goal for the Bear Lake CMP is to provide clear and consistent guidance for coordination and management, straightforward permitting requirements, and helpful best management practices (BMPs) for implementing projects that affect Bear Lake sovereign lands (i.e., the planning area). Specifically, the objectives for the Bear Lake CMP planning process were as follows:

- Update and revise the 2009 Bear Lake CMP (FFSL 2009) by providing a current assessment of sovereign land conditions, seeking public input, and integrating new data and research.
- Incorporate changes in state law, rules, and regulations.
- Update lake use classes and clarify allowable uses.
- Integrate a lake level management approach.
- Ensure that sovereign lands management remains consistent with Public Trust obligations.
- Incorporate principles of multiple use while conserving ecosystem, water, and community resources.
- Coordinate with other state and federal agencies, local governments, tribes, stakeholders, and interested parties regarding planning, management, permitting, and research at Bear Lake.

Figure 1-1. Bear Lake sovereign lands (the planning area).

Drafting the Plan

The 2022 Bear Lake CMP incorporates information from the 2009 Bear Lake CMP (FFSL 2009); integrates new data and research; and relies on feedback from the general public, local governments, state agencies, federal agencies, and other stakeholders, per Utah Administrative Code R652-90-600. Appendix A provides a lake level resource matrix, and Appendix B contains a summary of the public outreach process and FFSL's responses to public comments. Individuals from consulting firms were involved in preparing the Bear Lake CMP, including the project manager, resource specialists, graphic designers, technical editors, and formatters. A list of these individuals is provided in Appendix C.

A number of agencies, organizations, and stakeholders contributed to the development of the Bear Lake CMP by providing data, technical information, insight into management and jurisdictional roles, and oversight of content. Representatives from these entities formed the Bear Lake CMP planning team. A list of planning team members involved in the Bear Lake CMP is provided in Table 1-1.

Table 1-1. Bear Lake Comprehensive Management Plan Planning Team

First Name	Last Name	Representing	Title
Mike	Allred	Utah Division of Water Quality	Environmental scientist
Jamie	Barnes	Utah Division of Forestry, Fire & State Lands	Sovereign lands program manager
Gary	Billman	Idaho Department of Lands	Senior resource specialist/geologist
Matt	Coombs	Utah Division of Forestry, Fire & State Lands	Bear River Area sovereign lands coordinator
Claudia	Cottle	Bear Lake Watch	Executive director
David	Cottle	Bear Lake Watch	Executive director
Zac	Covington	Bear River Association of Governments	Senior regional planner
Bill	Cox	Rich County Commission	Commissioner
Richard	Droesbeke	Utah Division of State Parks	Bear Lake State Park manager
Brianne	Emery	Utah Division of Forestry, Fire & State Lands	Division planner
Casey	Florence	Adjacent Landowners	Landowner
Pam	Kramer	Utah Division of Wildlife Resources	Wildlife habitat biologist
Mike	Leonhardt	Town of Garden City	Mayor
Chris	Merritt	Utah Division of State History	State Historic Preservation Office Director, antiquities coordinator
Jon	Nichol	Rich County Sheriff's Office	Chief deputy
Feng	Pan	Utah Division of Water Resources	Planning specialist, Bear River Basin
Mitch	Poulsen	Bear Lake Regional Commission	Executive director
Jake	Serago	Utah Division of Water Resources	Planning specialist, Bear River Basin

First Name	Last Name	Representing	Title
Mark	Smoot	Recreation business owners	Business owner
Wes	Thompson	Adjacent landowners	Landowner
Scott	Tolentino	Utah Division of Wildlife Resources	Fisheries biologist
Laura	Vernon	Utah Division of Forestry, Fire & State Lands	Strategic planner

The Bear Lake CMP is intended to be revised approximately every 10 years. However, the plan can be updated or amended more frequently as issues arise during implementation, as statute or rules change, or to otherwise accommodate new information. In accordance with Utah Administrative Code R652-90-1000, the revision process is open to the public for comment.

How to Use the Plan

Stakeholders can use the Bear Lake CMP to obtain information about Bear Lake sovereign land resources, lake use classes, allowable uses, permitting requirements and processes, and BMPs for planning and implementing projects that affect Bear Lake sovereign lands. The plan can also be used to better understand the ecological systems of Bear Lake, the opportunities the lake offers for public use and enjoyment, and the recreational rules and regulations that must be followed at the lake.

This introductory chapter sets the stage for the remainder of the plan by providing an overview of sovereign landownership and the regulatory and management context, including a description of how Bear Lake is used as a storage reservoir and the Bear Lake CMP's lake level management approach. It also describes other agencies' and entities' management responsibilities at Bear Lake, complementary land management plans, and FFSL's authorization (permitting) processes. The figures at the end of this chapter (Figures 1-10 and 1-11) provide a visual reference of the lake use classes as prescribed in Utah Administrative Code R652-70-200 and an overview of the lake shoreline.

Chapter 2 summarizes the current conditions of the lake and describes the lake's ecosystem, water, socioeconomic, and community resources. In combination with public outreach, Chapter 2 provides the basis for Chapter 3, which discusses desired future conditions, allowable uses, management goals and objectives, and BMPs that may apply to ongoing management and permitting decisions. Information in Chapter 2 also provides the basis for the lake level resource matrix (see Appendix A). Chapter 4 provides a list of literature cited for the plan.

Throughout the Bear Lake CMP, colored boxes called "Further Reading" are used to refer the reader to Bear Lake–related documents or websites that may be helpful or interesting to reference. Unless otherwise stated, all photographs and graphics in the plan are courtesy of FFSL or were provided by the authors of the plan.

Information in the Bear Lake CMP is presented through three online resources: 1) a Bear Lake CMP interactive portable document format (PDF), 2) a Bear Lake CMP Esri story map, and 3) a geographic information system (GIS) spatial data viewer. All three resources are available on the FFSL website and provide alternative formats for interacting with information and visualizing data from the Bear Lake CMP. Both the Esri story map and GIS spatial data viewer can be modified as new data and other information become available for Bear Lake. These three online resources are discussed further below.

- Interactive PDF: This electronic document, viewable in Adobe Reader, is identical to a hard copy of the Bear Lake CMP; however, this format provides navigation links so readers can move easily throughout sections, tables, and figures. Readers can also make their own electronic notes in a personal copy.
- Esri story map: Many of today's readers prefer not to page through a plan, even one with navigation links. This tool combines key text, graphics, and photographs from the plan with geospatial data. The geospatial data are static but allow the user to zoom in to a specific area of interest. The Esri story map is organized by tabs and includes background information, resource information, tables, graphics, management goals and objectives, and BMPs.

- GIS spatial data viewer: All GIS spatial data compiled and catalogued for the Bear Lake CMP can be viewed in this GIS data viewing tool. To better understand current conditions, users can turn data layers (there are more than 65) on and off, which provides a unique perspective and virtual tour of Bear Lake. For example, turning on existing authorizations, local zoning, and lake use class data layers could help municipalities or stakeholders find the right setting for their next project. Similarly, reviewing boat ramp and marina data layers can allow boaters to determine where they can access the lake. GIS data layers are found in colored boxes throughout the plan.

1.2 Ownership, Regulatory, and Management Context

Bear Lake Sovereign Land Boundaries

According to Utah Administrative Code R652-70-2300(1), lands lying below the ordinary high water mark (OHWM) of Bear Lake at the date of statehood are owned by the State of Utah and shall be administered by FFSL as sovereign lands. In the absence of evidence establishing the OHWM at the date of statehood, FFSL administers "all the lands within the bed of Bear Lake and lying below the level of 5,923.65 feet above mean sea level, Utah Power and Light [UP&L] datum, as being sovereign lands" (Utah Administrative Code R652-70-2300(3)). Therefore, the shoreline and bed of Utah's portion of Bear Lake lying below this elevation are considered sovereign lands managed by FFSL. All lands and resources beneath this lake elevation constitute the planning area for the CMP (see Figure 1-1). A datum is a base or standard elevation used as a reference to measure water levels; all water elevations in this document imply the UP&L datum (2.75 feet below mean sea level; Jibson 1971) unless specifically stated otherwise.

Because Bear Lake was navigable at statehood in 1896, the State of Utah claims fee title ownership to the bed and shoreline of the lake lying below the OHWM by virtue of the Equal Footing Doctrine (Slade et al. 1997). However, nothing in the plan is intended to represent an adjudication of ownership of any particular tract or parcel. FFSL recognizes that certain title and boundary questions may have to be addressed on a case-by-case basis.

Utah Administrative Code R652-70-2300(4) and Utah Code 65A-10-1 and 65A-10-3 give FFSL the authority to settle sovereign land boundaries with affected state agencies and any person owning land adjoining the bed of Bear Lake, as long as the settlements do not set a boundary for sovereign lands below the 5,923.65-foot elevation point (UP&L datum). FFSL suspects this elevation point is based primarily on the maximum volume of water that can be held in the lake. A 1971 report written by Wallace N. Jibson of the Bear River Commission and a memorandum written by Norman E. Stauffer, Jr. of the Utah Division of Wildlife Resources (DWR) discuss Bear Lake water levels and the operation of Bear Lake as a storage reservoir (Jibson 1971; Stauffer 1979). These documents indicate that 5,902.00 feet is the lower limit of the pumps that remove water from the lake, and 5,923.65 feet is the upper limit of storage with the existing facilities. Additionally, as a result of a boundary dispute settlement in 1981, the United States District Court for the District of Utah issued an order and decree stating the State of Utah is the owner of the land lying below the elevation of 5,923.6 feet above mean sea level (*The State of Utah v. Mark P. Hodges,* Civil No. NC-79-0197J). However, this particular decree was specific to the parties and to the particular parcel at issue in the dispute. It was not a settlement establishing the State of Utah's ownership boundary around the entire lake. Therefore, in 1999, FFSL started negotiating with individual adjacent landowners to establish the sovereign land boundary. Since then, FFSL has streamlined the boundary settlement process and plans to continue the process until all boundaries are settled adjacent to the lake.

To begin the boundary settlement process, FFSL notifies the adjacent landowner of its intent to settle the boundary between sovereign lands and the private property. If a survey has not already been completed, the landowner commissions a survey of the parcel and the 5,923.65-foot elevation boundary line. FFSL and the adjacent landowner then agree on the boundary and negotiate a mutually acceptable settlement agreement, and FFSL formalizes the decision to settle the boundary with a record of decision (ROD). The ROD evaluates and finalizes FFSL's settlement with the landowner and memorializes the informal adjudication process. FFSL then notifies adjacent landowners and other interested parties of the settlement. After the expiration of the 20-day notice period, FFSL and the adjacent

landowner execute the settlement agreement and record it with Rich County. The boundary settlement results in the State of Utah quitclaiming its interest to the land upland of the settled boundary and the adjacent landowner quitclaiming its interest to the land lakeward of the settled boundary. The process aims to establish a boundary that is mutually agreeable to both the landowner and FFSL. These settlements provide certainty and clarity for both FFSL and the adjacent landowner by establishing the on-the-ground boundaries of FFSL's management jurisdiction.

The Public Trust Over Sovereign Lands

The Public Trust Doctrine is a legal principle derived from English common law. It provides that certain Public Trust lands, waters, and living resources in a state are held by the state in trust for the benefit of all people (Slade et al. 1997). The doctrine establishes the right of the public to use Public Trust resources and the responsibilities of the states when managing Public Trust resources (Slade et al. 1997). In general, Public Trust waters consist of the navigable waters in a state, whereas Public Trust lands are the lands beneath those waters up to the OHWM at statehood. The living resources (e.g., fish, aquatic plants, and wildlife) inhabiting these lands and water are also subject to the Public Trust Doctrine (Slade et al. 1997).

The roots of the Public Trust Doctrine date back to the Institutes of Justinian and the accompanying Digest, compiled in the sixth century, which collectively formed Roman civil law. Under Roman law, the air, sea, shores, and running waters were held in common by all citizens. The rights of fishing, navigation, and public use of the banks of a river or shore were common to all (Slade et al. 1997). These principals of Roman civil law were adopted, for the most part, by English common law, which recognized public rights in all tidewaters (i.e., navigable waters) and the lands beneath. English common law, in turn, became the law of the 13 original states (Slade et al. 1997).

The Equal Footing Doctrine is the principle of United States constitutional law that mandates that new states be admitted to the Union as equals to the original 13 states. The Equal Footing Doctrine perpetuated the Public Trust Doctrine from the 13 original states to each of the 37 new states. As each new state entered the Union, it received in trust those lands beneath navigable waters for the citizens of the new state (Slade et al. 1997).

The State of Utah has recognized and declared that the bed and banks of navigable waters within the state are owned by the state and are among the basic resources of the state, and that there exists, and has existed since statehood, a Public Trust over and upon these waters (Utah Administrative Code R652-2-200). The Utah portion of Bear Lake is included in this category of navigable waters and is managed by FFSL for the benefit of the public in accordance with the Public Trust Doctrine.

Historically, the common law rights in Public Trust lands and waters were directly related to navigation, fishing, and commerce. As society has evolved, the public's use of trust lands and waters has changed. The Public Trust Doctrine has expanded from preserving the public's right to use trust lands and waters for navigation, fishing, and commerce to include recreation, environmental protection, and the preservation of scenic beauty (Slade et al. 1997). Recognition of this evolution in the Public Trust Doctrine is found in the following text from Utah Administrative Code R652-2: "It is also recognized that the public health, interest, safety, and welfare require that all uses on, beneath or above the beds of navigable lakes and streams of the state be regulated, so that the protection of navigation, fish and wildlife habitat, aquatic beauty, public recreation, and water quality will be given due consideration."

Bear Lake Management and Multiple-Use

The Utah State Legislature has designated FFSL as the executive authority for the management of sovereign lands in Utah, including the Utah portion of Bear Lake. As previously described, FFSL manages the bed and shoreline of the lake up to the 5,923.65-foot elevation mark (Figure 1-2).

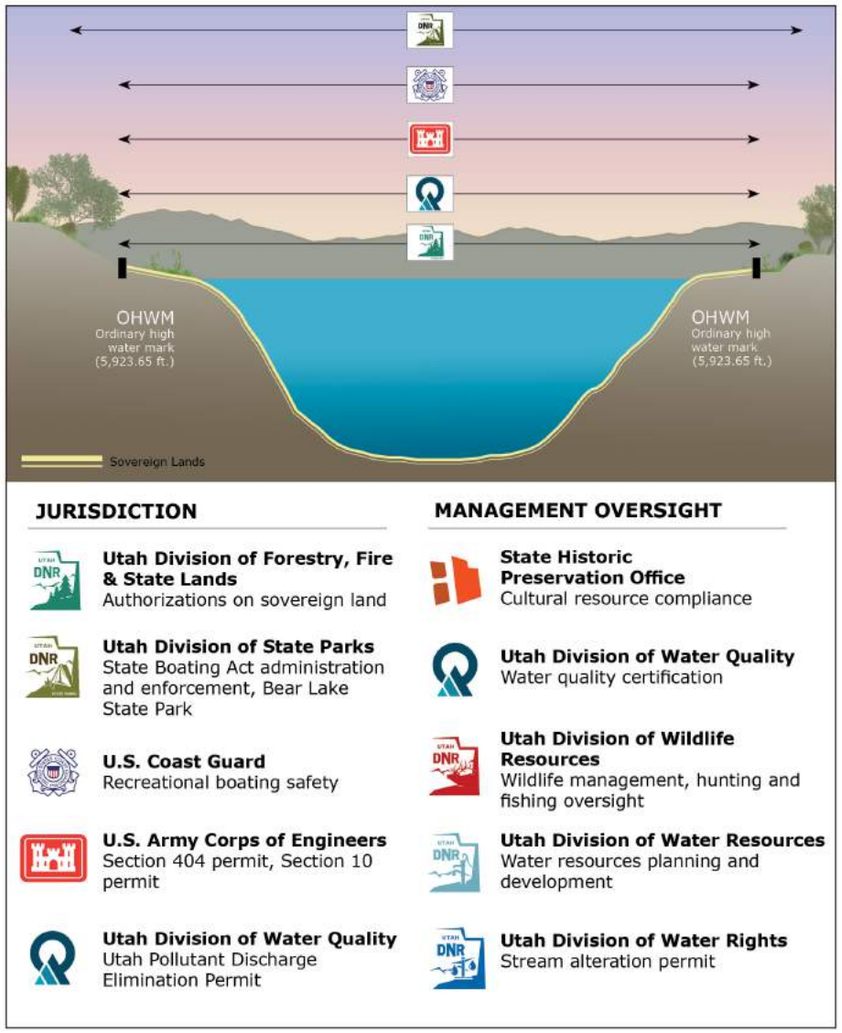


Figure 1-2. Bear Lake cross section showing agency jurisdiction and management oversight for the lake.

FFSL administers sovereign lands under comprehensive land management programs using multiple-use, sustained-yield principles in accordance with Utah Code 65A-2-1 and Utah Administrative Code R652-90-800. Multiple use is defined as "the management of various surface and subsurface resources in a manner that will best meet the present and future needs of the people of this state" and sustained yield is defined as "the achievement and maintenance of high level annual or periodic output of the various renewable resources of land without impairment of the productivity of the land" (Utah Code 65A-1-1). There is no particular hierarchy of uses on sovereign lands. For the planning area, the CMP must consider the following multiple-use factors specified in Utah Administrative Code R652-90-800:

1. The highest and best use of resources
2. Present and future uses of resources
3. Suitability of lands for proposed uses
4. Impact of proposed uses on other sovereign land resources
5. Compatibility of possible proposed uses
6. Uniqueness, special attributes, and availability of resources

The State of Utah recognizes that protection of navigation, fish and wildlife habitat, aquatic beauty, public recreation, and water quality (Public Trust resources) must be balanced with any proposed use (Utah Administrative Code R652-2-200). Implementation of multiple-use policies must avoid substantial impairment of Public Trust values. FFSL strives for an appropriate balance among compatible and competing uses on Bear Lake. Therefore, the overarching management objectives of FFSL are to balance the use of and sustain the Public Trust resources and to provide for reasonable beneficial use of those resources consistent with their long-term protection and conservation.

FFSL supports partnerships and collaborations with other entities that have jurisdiction and/or management authority at Bear Lake (see Figure 1-2 and Sections 1.3 through 1.9), as well as with other interested stakeholders, to improve overall lake management and decision-making.

A Storage Reservoir

Although Bear Lake is a natural lake, its upper portion (the top 21.65 feet), from 5,902 feet of elevation to 5,923.65 feet of elevation (UP&L datum), has been operated as a reservoir since the early 1900s. The use of Bear Lake as a reservoir has a complex history and is governed by a number of legal doctrines.

Background

In the late 1800s, an influx of settlers traveling on the transcontinental railroad into Utah and Idaho sparked an increase in electrical demand in the region (Palacios et al. 2007a). By the early 1900s, a few small hydroelectric plants were constructed on some of the streams in the Bear River Basin to accommodate the increasing demand (Palacios et al. 2007a).

Telluride Power Company, founded in 1900, constructed five power plants by 1912 to serve parts of southeastern Idaho, northern Utah, and western Colorado (McCormick 1990). By 1907, Telluride Power Company had constructed a hydroelectric plant on the Bear River near Grace, Idaho, to provide power to its mining interests. Lucien L. Nunn, principal owner of the company, recognized that the vertical drop of Bear River from Bear Lake to Great Salt Lake was nearly as great as Niagara Falls, which was then the crown jewel of early hydroelectric development. Nunn recognized the potential for additional hydroelectric generation using Bear River water. Telluride Power Company received a permit from the federal government in 1907 for the construction of a project to transport Bear River water into Bear Lake for storage (Bear River has not naturally connected with Bear Lake for thousands of years). The application for the right-of-way for canals and reservoirs on federal lands was made to the U.S. Department of the Interior in March 1902 and was later approved in April 1907 (UP&L 1937). The U.S. Department of the Interior was so supportive that they warned Telluride Power Company they would step in and complete the project if the company did not.

Construction of a small inlet canal from Bear River and an outlet canal from Bear Lake was completed in 1911, which successfully created a small amount of water storage (Iorns 1959). Barely 2 months after UP&L's formation, in November 1912, the company bought Telluride Power Company and several small power companies, establishing control over most of the hydroelectric production in the area (Iorns 1959; McCormick 1990). UP&L and U&I Sugar Company agreed on a perpetual contract to deliver irrigation water in exchange for the right to divert and store water in Bear Lake. On December 31, 1912, an agreement between UP&L and U&I Sugar Company solidified the delivery of water from Bear Lake to U&I Sugar Company's diversion (then Wheelon Dam, close to the border of Cache and Box Elder Counties in Utah) to support their sugar beet crop. This agreement was a foundational contractual obligation that still influences management of Bear River and Bear Lake today.

A natural causeway, or sand bar, built up by wave action extended along the northern shoreline of Bear Lake. On the north side of this causeway was a wetland system, Dingle Marsh, with several open waterbodies. Dingle Marsh is now part of the Bear Lake National Wildlife Refuge. Between 1915 and 1917, UP&L strengthened the natural causeway between Bear Lake and Mud Lake (part of Dingle Marsh) by adding fill material to form a dike between the lakes. Gates were also installed to control water flow, and the causeway became known as the Inlet Causeway (Figure 1-3). UP&L also expanded the inlet and outlet canals originally built by Telluride Power Company, significantly increasing the water storage capacity of Bear Lake for irrigation and hydroelectric use (Iorns 1959). The Lifton Pumping Station (located approximately 0.5 mile west of the Inlet Causeway) (Figure 1-4) was constructed by UP&L in 1915–1916 between the two lakes and is operated when the water level is too low in Bear Lake to gravitationally flow back into Mud Lake. Today, nearly all of Bear River's water is diverted at Stewart Dam into the inlet canal (known as the Rainbow Inlet Canal [Figure 1-5]) through Mud Lake, where it flows through the Inlet Causeway into Bear Lake. Water is diverted out of Bear Lake back into Bear River via the Lifton Pumping Station and the outlet canal (known as the Bear Lake Outlet Canal) that runs through Dingle Marsh (Iorns 1959). When conditions allow, water can bypass Bear Lake through diversion from the Rainbow Inlet Canal directly into the Bear Lake Outlet Canal (Figure 1-6).

Figure 1-3. Inlet Causeway. Photograph by Wes Thompson. Used with permission.

Figure 1-4. Lifton Pumping Station. Photograph by Claudia Conder. Used with permission.

Figure 1-5. Rainbow Inlet Canal. Photograph by Claudia Conder. Used with permission.

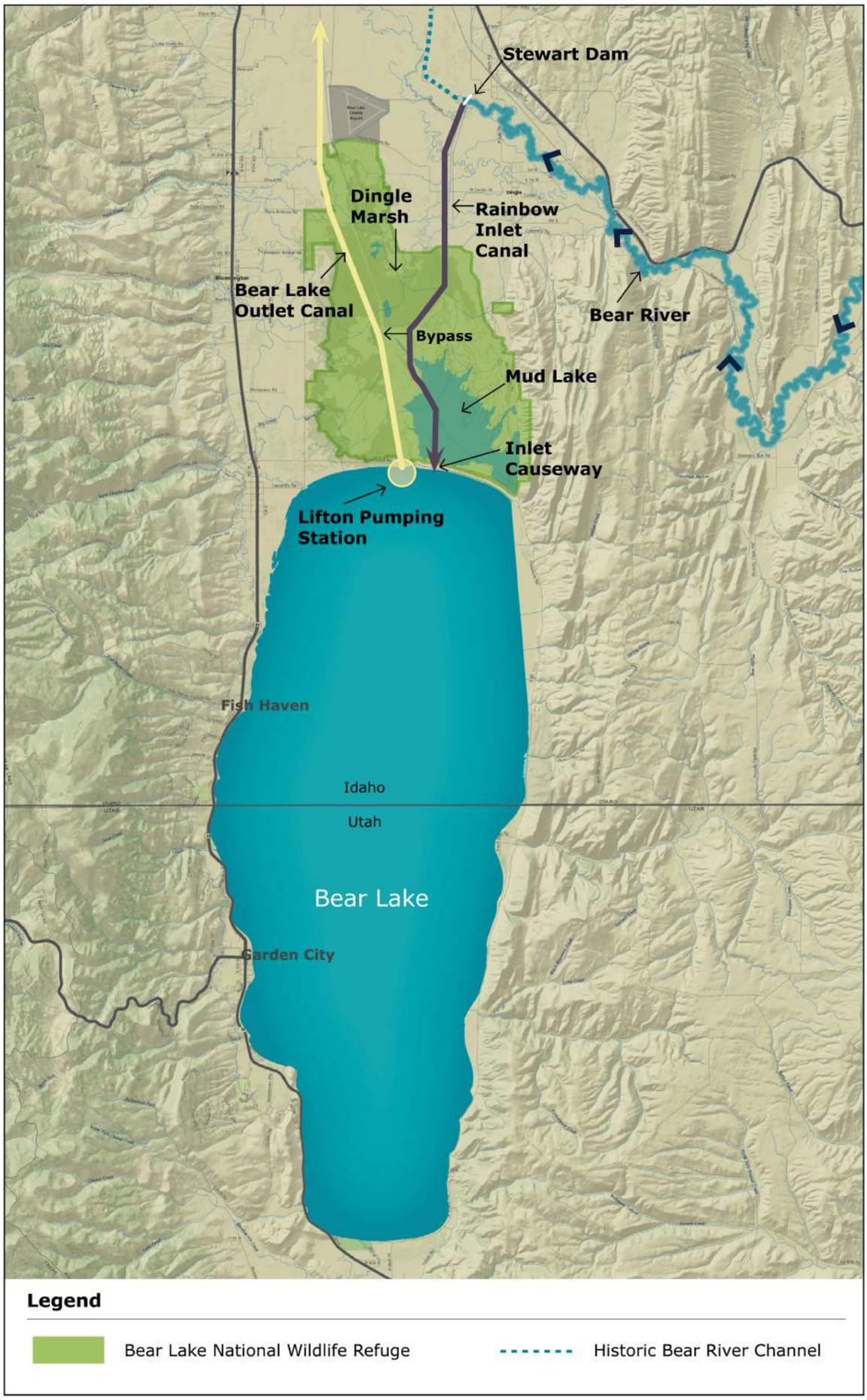


Figure 1-6. The Bear River and Bear Lake water diversion system.

The successful completion of the infrastructure to divert water from the Bear River into Bear Lake for storage made it possible to release large quantities of water back into Bear River. This provided additional hydropower for the Grace hydroelectric plant, as well as enough water flow to construct four new hydroelectric plants downstream of the Bear Lake Outlet Canal. These hydroelectric plants were completed by 1927 and are known as Soda (near Soda Springs, Idaho), Cove (below the Grace plant in Idaho; decommissioned in 2006), Oneida (in Oneida Canyon north of Preston, Idaho), and Cutler (west of Logan Utah) (Jibson 1991).

In the early 1900s, UP&L entered into agreements with the Last Chance Canal Company (1919), West Cache Irrigation Company (1919), and Cub River Irrigation Company (1916). These companies, along with the U&I Sugar Company, provided irrigation for more than 150,000 acres of land and used stored Bear Lake water for late-season irrigation when the Bear River's natural flow diminished. Agreements were also executed between UP&L and several small Utah and Idaho irrigators who had been diverting water freely without accounting for its use. Most of these agreements are still in force. UP&L remained a publicly traded company until 1989 when it merged with PacifiCorp, a legal entity that has two operating divisions, Rocky Mountain Power and Pacific Power.

Decreed Water Rights

In the 1910s and early 1920s, Utah and Idaho were actively adjudicating the waters of Bear River and Bear Lake. Because of disagreements over control of the water, several court decrees were issued to more clearly define water rights in the Bear River Basin. The court cases that are most relevant to the water rights of Bear Lake are *Utah Power & Light Company vs. Richmond Irrigation Company, et.al*, dated February 21, 1922 (referred to as the Kimball Decree in Utah) and *Utah Power & Light Company vs The Last Chance Canal Company, Limited, et.al. in Equity No. 203,* dated July 14, 1920 (referred to as the Dietrich Decree in Idaho). Both cases came to the same conclusion, and rights were decreed to UP&L for Bear Lake as follows:

- 5,500 cubic feet per second (cfs) from Bear River
- 300 cfs from tributaries flowing directly into Bear Lake (e.g., Fish Haven Creek, St. Charles Creek, Swan Creek, Indian Creek, Big Creek)
- 200 cfs from Mud Lake

These rights are described as flow rates but can also be converted to volumetric measurements.

Other Governing Doctrines

BEAR RIVER COMPACT

Water in the Bear River Basin is administered not only by states but also by other governing documents and agreements. The Bear River Compact is a federal compact established in 1958 and later amended in 1980. The compact's purpose is to "remove the causes of present and future controversy over the distribution and use of the waters of the Bear River; to provide for efficient use of water for multiple purposes; to permit additional development of the water resources of Bear River; to promote interstate comity; and to accomplish an equitable apportionment of the waters of the Bear River among the compacting states" (Bear River Commission 2020). The Bear River Compact provides the legal framework for division of the Bear River's water resources between Utah, Idaho, and Wyoming.

BEAR LAKE NATIONAL WILDLIFE REFUGE AGREEMENT

In 1968, UP&L and the newly established Bear Lake National Wildlife Refuge entered into an agreement to cooperate in storing and releasing water at the refuge and at Bear Lake (UP&L 1968). The Bear Lake National Wildlife Refuge encompasses Dingle Marsh, which includes Mud Lake. Dingle Marsh was part of a larger prehistoric lake that once filled the valley but now has receded to less than 17,000 acres (USFWS 2014). The agreement allows the refuge to manage its waters for wildlife habitat.

BEAR LAKE SETTLEMENT AGREEMENT

During a period of low lake elevations in the early 1990s, UP&L applied for a permit with the U.S. Army Corps of Engineers (USACE) and the U.S. Environmental Protection Agency (EPA) to dredge sand in front of the Lifton Pumping Station. The permit allowed UP&L to dredge below the elevation of 5,902 feet to facilitate pumping of water from the lake into the Bear Lake Outlet Canal and provide irrigation water to its contract holders downstream.

The USACE and EPA were sued by interests around Bear Lake for issuance of the permit, claiming that UP&L should not be allowed to pump below 5,902 feet.

To avoid litigation, UP&L, contract holders, and Bear Lake interests entered into an agreement known as the Bear Lake Settlement Agreement, which was executed on April 10, 1995. The agreement's purpose was to place limits on water releases based on estimated lake levels while protecting irrigation contract holders. The allocation to contract holders (irrigation allocation) is based on forecasted Bear Lake elevations made by PacifiCorp each year on April 1. The original agreement was amended in 2004 with the availability of improved modeling and data so that specific parameters for releases based on lake elevations could be established. The 2004 agreement remains in effect today (Last Chance Canal Company et al. 2004).

Wet conditions negated the need for the permitted dredging until 2003. Dredging was completed in 2003 but only to 5,902 feet.

THREE STATE AGREEMENT

In the late 1990s, PacifiCorp was acquired by a foreign-owned company, ScottishPower. The three Bear River Compact states (Utah, Idaho, and Wyoming) were concerned that the new owner would bring unwanted changes to the operation of the Bear River and Bear Lake system. ScottishPower, PacifiCorp, Idaho Department of Water Resources, Utah Division of Water Resources (DWRe), and the Wyoming state engineer signed an agreement (commonly called the Three State Agreement) in 1999 essentially stating that ScottishPower would not significantly change historical operational practices (PacifiCorp et al. 1999).

Lake Levels and Irrigation Allocation

The amount of water available in the Bear River Basin is dependent on weather conditions and snowpack. Environmental factors, along with contractual obligations and agreements affecting the use of Bear Lake, present water management challenges.

PacifiCorp is tasked with monitoring and managing Bear Lake water for irrigation and flood control purposes (hydroelectric power is now an incidental use). Throughout the non-irrigation season, PacifiCorp's hydrologist monitors soil moisture, snowpack, weather trends, National Oceanic and Atmospheric Administration (NOAA) information, and other resources to predict the amount of water that will flow into Bear Lake in the spring. The quantity of water to be allocated to contract holders each year is based on PacifiCorp's projected maximum lake levels in accordance with the terms of the Bear Lake Settlement Agreement. If the maximum lake level is predicted to be above 5,914.7 feet, the full allocation of 245,000 acre-feet is given. However, if the lake level is predicted to be at or below 5,914.7 feet, the allocation volume decreases with the lake level. If the lake level is predicted to be at or below 5,904 feet, no allocation is given (Figure 1-7).

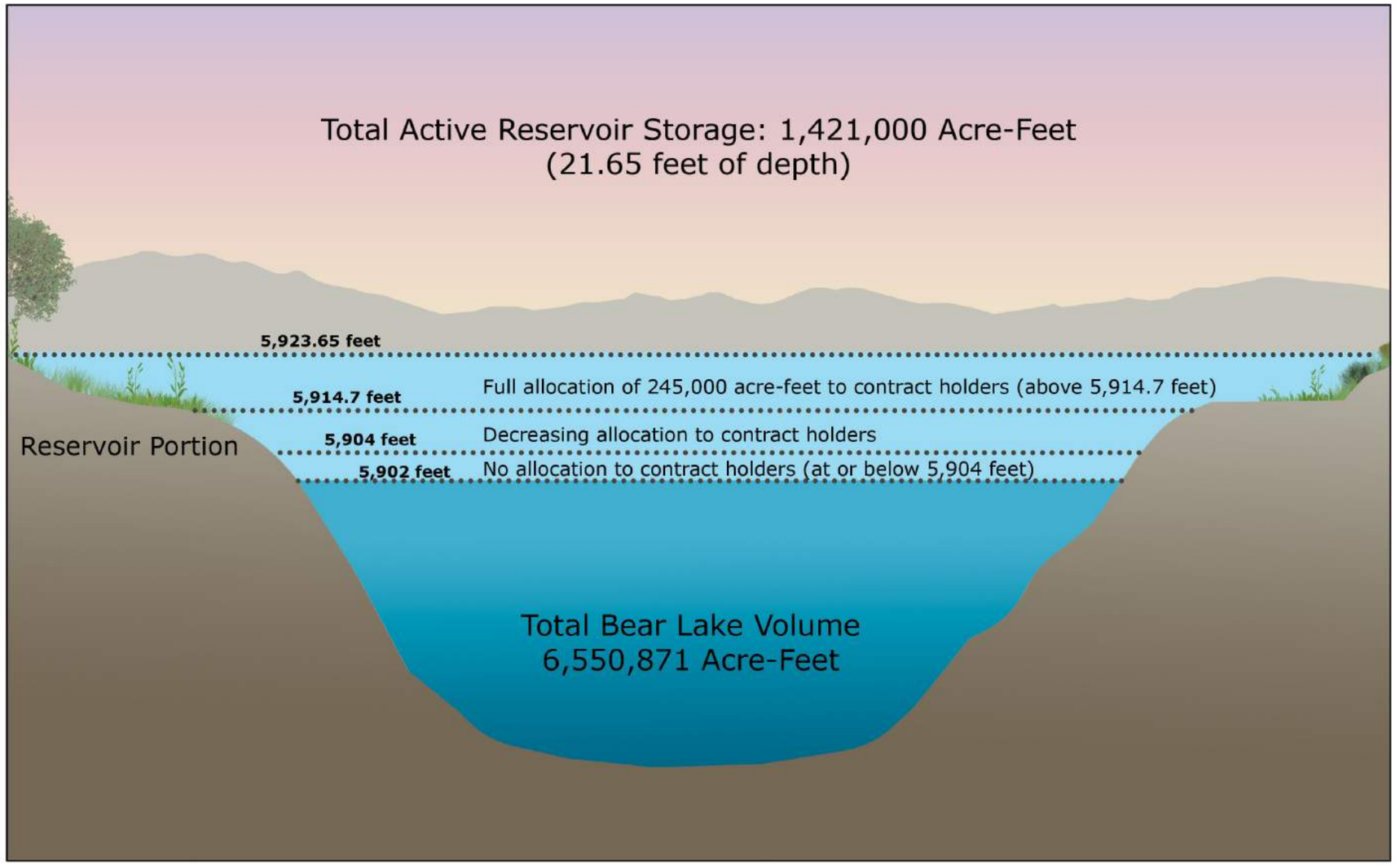


Figure 1-7. Cross section showing Bear Lake's use as a storage reservoir.

An annual meeting of the Bear Lake Preservation Advisory Committee is held in early April, during which PacifiCorp's hydrologist presents the estimate of the lake's high elevation and indicates what the allocation to irrigators will be. This committee was created as a result of the Bear Lake Settlement Agreement. Although parties to the settlement agreement make up the committee, the meeting is open to the public and is usually attended by agency representatives and other interested parties.

Once irrigation season begins, a weekly (sometimes bi-weekly) call is held between the irrigation contract holders, Bear Lake interests, PacifiCorp, the Utah State Engineer's office, and the Idaho Department of Water Resources. The main purpose of the call is to coordinate for the efficient delivery of water as it is needed. This call has resulted in conservation of water and comity among the stakeholders.

Typically, water from the Bear River begins flowing into Bear Lake through the Inlet Causeway at the end of the irrigation season as natural flow increases from autumn rain and snow. Storage continues in Bear Lake throughout the winter and spring. Depending on spring runoff conditions and the amount of natural flow in the Bear River relative to irrigation demand, PacifiCorp's hydrologist will determine when the water is to be released through the Lifton Pumping Station. Since 2002, these release times have varied from April to late July. The Inlet Causeway gates are closed when the pumps at the Lifton Pumping Station are operating to supplement natural flows in the Bear River for downstream irrigation needs. Pumping of Bear Lake water ceases after the irrigation season is over, typically around the end of October. If Bear Lake is relatively full at the end of the irrigation season or large amounts of inflow are predicted, PacifiCorp is tasked with releasing water outside of the irrigation season, as necessary.

Measuring Lake Levels

PacifiCorp historically recorded daily lake elevations for Bear Lake. These elevations were published in the biennial reports of the Bear River Commission. The equivalent elevation of Bear Lake (the Bear Lake Equivalent), which accounts for water in Mud Lake, is calculated according to a Bear Lake Commission–approved procedure and is used to determine when additional storage upstream of Bear Lake is allowed.

Historically, UP&L measured Bear Lake's elevation inside the Lifton Pumping Station. This changed in the 1990s when the elevation was measured from a staff gage approximately 200 yards in front of the Lifton Pumping Station. As time passed, the need for more accurate measurements resulted in the installation of a new staff gage in Utah at the Bear Lake State Park Marina in 2004. This location was chosen because of concerns that there were differences in lake levels between the north and south ends of the lake.

After elevation readings are taken, PacifiCorp's hydrologist calculates the Bear Lake Equivalent. The Bear Lake Equivalent is then shared and published on the Bear River Commission's website (Bear River Commission 2021), along with information from U.S. Geological Survey (USGS) gages on the Bear River system. In October 2019, USGS installed a new electronic gage at the Bear Lake State Park Marina; real-time lake level elevations are now published on the USGS website (USGS 2020).

Lake Level Approach

Bear Lake is a complex system that functions differently at different lake levels. Although FFSL does not have the authority or jurisdiction to determine water levels in Bear Lake, it can adapt management as lake levels rise and fall. The Bear Lake CMP addresses management issues at a range of lake levels, rather than at one lake level. This approach is intended to provide the following:

- A comprehensive look at how ecosystem, infrastructure, recreation, and other resources are impacted at varying lake levels
- Resource-specific management considerations at high, medium, and low lake levels that help mitigate negative impacts associated with changing lake levels

- Areas of concern based on lake level fluctuations
- Coordination and cooperation opportunities with other state agencies that may impact a specific resource

Three lake level management zones have been developed to provide a framework to better understand lake resources: **high, medium, and low**.

Lake Level Resource Matrix and Management Zones

The process through which the three lake level management zones were derived began with the development of the lake level resource matrix for Bear Lake (see Appendix A). The matrix illustrates how resource conditions change with lake level for key resources. The high, medium, and low zones are defined by the notable changes that resources experience at certain elevations; this information was collected from available data and literature and from stakeholder input. The zones were developed to capture the largest number of resource thresholds or changes across a particular zone and are visually apparent in the matrix. Specific elevations are labeled beneficial or sustainable for the resource or adverse for the resource. The lake level management zones are as follows:

- High: 5,918–5,923 feet
- Medium: 5,912–5,917 feet
- Low: 5,903–5,911 feet

1.3 Utah Department of Natural Resources Management Responsibilities

Utah Division of Forestry, Fire & State Lands

FFSL is responsible for promoting forest health, responding to wildland fires, and managing sovereign lands in Utah. The State of Utah claims fee title ownership of the bed and shoreline of Bear Lake as state sovereign land. FFSL manages the lake under the Public Trust Doctrine for use and enjoyment by the public. To effectively implement Utah's required multiple-use approach, FFSL strives to assure public access to and use of Bear Lake sovereign lands for commerce, navigation, hunting, fishing, swimming, and other recreational purposes, while also working to preserve Bear Lake's ecological and cultural values. Other sovereign lands managed by FFSL include Great Salt Lake; Utah Lake; the Jordan River; Moab Exchange Lands; and portions of the Bear, Green, and Colorado Rivers.

Utah Division of Oil, Gas and Mining

The mission of the Utah Division of Oil, Gas and Mining (DOGM) is to regulate the exploration and development of coal, oil and gas, and other minerals while encouraging responsible reclamation and development; protecting correlative rights; preventing waste; and protecting human health and safety, the environment, and the interest of the state and its citizens (DOGM 2021).

Coal and mineral deposits, including oil, gas, and hydrocarbon resources, in state-owned lands are reserved to the state. In general, DOGM may permit the exploration and development of these resources from beneath sovereign lands with permission from FFSL. However, FFSL has withdrawn Bear Lake sovereign lands from mineral leasing since 1978, pursuant to Utah Code 65A-6-5. No mineral leasing has occurred on Bear Lake sovereign lands since the withdrawal has been in place.

Utah Division of State Parks and Utah Division of Recreation[1]

Title 79-4 of the Utah Code establishes the Utah Division of State Parks (DSP) and outlines its responsibilities. DSP is the parks authority for Utah and is required to allow multiple use of state parks for grazing, fishing, hunting, camping, mining, and developing and using water and other natural resources. DSP may lease or rent concessions in state parks and has jurisdiction over and responsibility for state park service roads, parking areas, campground loops, and related facilities. DSP also protects state parks and park property from misuse or damage and preserves peace within state parks. Bear Lake State Park is the only state park at Bear Lake. This park has three distinct areas, which are further discussed in the Recreation section of Chapter 2. DSP also owns upland areas of Bear Lake State Park and has management authority for areas of sovereign land (below 5,923.65 feet of elevation) adjacent to upland Bear Lake State Park parcels. This management authority was established through dedications or permits from FFSL to DSP. FFSL retains fee title ownership and oversight of these sovereign land areas.

The Utah Division of Recreation (DOR) is the recreation authority for Utah and was created to provide, maintain, and coordinate motorized and non-motorized recreation within the state (Utah Code 79-7-2). DOR may also lease or rent concessions, and it administers and enforces the State Boating Act (Utah Code 73-18). Its duties under the State Boating Act include ensuring the safety of vessels and persons on the water, registering boats, zoning certain waters of the state for non-motorized use, regulating commercial operators, and regulating waterway markers and other permanent objects in waters of the state.

[1] Utah House Bill 346 S01 was signed into law by Governor Spencer Cox on March 17, 2021. This bill bifurcated the Utah Division of State Parks and Recreation into the Utah Division of State Parks (DSP) and the Utah Division of Recreation (DOR).

Utah Division of Water Resources

The mission of the DWRe is to plan, conserve, develop, and protect Utah's water resources, pursuant to Title 73 of the Utah Code. DWRe conducts studies and planning for water use in the state, including the waters of the Bear River Basin. The Bear River Basin is in northern Utah, southeastern Idaho, and western Wyoming, and includes all of Bear Lake and Bear River. DWRe has also developed regional municipal and industrial water conservation goals for nine regions in Utah, including the Bear River conservation region (which contains Bear Lake).

Utah Division of Water Rights

The Utah Division of Water Rights (DWRi) regulates the appropriation and distribution of water in the state of Utah, pursuant to Title 73 of the Utah Code. The State Engineer, who is the director of DWRi, gives approval for the diversion and use of any water (including any diversion from Bear Lake), regulates the alteration of natural streams such as the Bear River, and has the authority to regulate dams to protect public safety. All projects within twice the width of a river's active channel up to 30 feet are regulated by DWRi under the Stream Alteration Program. DWRi would issue stream alteration permits for modifications to streams (e.g., Swan Creek) that enter Bear Lake.

FFSL does not adjudicate water rights in Utah, and nothing in the Bear Lake CMP is intended to, nor shall it be construed to, revoke, cancel, suspend, limit, modify, regulate, affect, or impair any existing appropriated, decreed, contracted, or other water right approved by DWRi that is owned by the holder of a permit issued under the Bear Lake CMP. In addition, nothing in the plan is intended to affect any right or interest of the permittee under any such water right, including the right to impound, store, divert, and use water as authorized under any such regulation or affect any vested water right. When FFSL requests that a person

obtain a permit for a water diversion structure or other encroachment on sovereign land, it is exercising authority only as a property owner where it has jurisdiction.

Utah Division of Wildlife Resources

Title 23 of the Utah Code establishes the Utah Division of Wildlife Resources (DWR) and sets forth its duties and powers. Utah Code 23-14-1 states that "The Division of Wildlife Resources is the wildlife authority for Utah and is vested with the functions, powers, duties, rights and responsibilities provided in this title and other law." As part of its responsibility, DWR manages and protects the state's wildlife (e.g., amphibians, birds, crustaceans, fishes, mammals, mollusks, and reptiles), oversees hunting and fishing opportunities in the state, and implements restoration projects to enhance fish and wildlife habitats and populations. DWR also manages lands and access areas near Bear Lake for the benefit of the public and wildlife (further discussed in the Recreation section of Chapter 3). Finally, DWR operates mandatory watercraft inspection stations for aquatic invasive species in Utah.

1.4 Other State and Local Entities Management Responsibilities

Bear River Association of Governments

The Bear River Association of Governments (BRAG), created in 1971 by Box Elder, Cache, and Rich Counties, is an intergovernmental organization that implements federal, state, and local programs to benefit the region. BRAG uses its combined resources to provide effective planning and development for the three-county area. Its services include regional planning, housing and human services, economic development, rural transportation, aging services, and heritage preservation and tourism. The association is most relevant to Bear Lake in its capacity as a regional planning entity and through heritage preservation and tourism.

Bear River Health Department

The Bear River Health Department is one of 13 local health departments that work to promote and protect the health of Utah residents. It provides public health services to the residents of Box Elder, Cache, and Rich Counties, including counseling, clinical services such as immunizations, classes, emergency and disaster services, and environmental services (e.g., air quality and water sampling). Septic systems at Bear Lake with wastewater flows equal to or less than 5,000 gallons per day are permitted by the Bear River Health Department (flows greater than 5,000 gallons per day are permitted by the Utah Department of Environmental Quality).

State of Utah School and Institutional Trust Lands Administration

The State of Utah School and Institutional Trust Lands Administration (SITLA) manages 3.4 million acres of land in Utah held in trust for 12 state institutions. SITLA works with private businesses to generate revenue from these lands (through surface and subsurface development and real estate transactions), which is deposited into permanent endowments for each beneficiary. SITLA owns land adjacent to Bear Lake State Park and in other locations near the lake.

Utah Department of Agriculture and Food

The Utah Department of Agriculture and Food's (UDAF) mission is to promote the healthy growth of Utah agriculture, conserve natural resources, and protect the food supply. It accomplishes this through the administration of Utah's agricultural laws that mandate a variety of activities such as inspections, rulemaking, loan issuance, marketing and development, pest and disease control, consumer protection, and public information programs. Especially relevant to Bear Lake sovereign lands are UDAF's noxious weed program, environmental stewardship certification, agricultural land preservation programs,

and grazing improvement program. Utah conservation districts, local groups created to improve and protect natural resources for the public benefit, are under the purview of UDAF. Bear Lake is within the Rich Conservation District, based in Randolph, Utah.

Utah Department of Transportation

The Utah Department of Transportation (UDOT) plans, designs, and implements transportation projects (e.g., bridges, roads, bike lanes, and public transit) while adhering to state and federal environmental laws and regulations. The agency is required to prepare environmental analysis and documentation for federally funded and state-funded transportation projects and implement measures to minimize harm to the environment.

UDOT, in collaboration with Garden City and the Bear Lake Regional Commission, conducted the Bear Lake Corridor Study in 2015 to evaluate traffic congestion and safety issues for the U.S. Route 89 (US-89) and State Route 30 (SR-30) corridor through Garden City (Fehr & Peers and H.W. Lochner 2015). The study identified a variety of issues and provided project recommendations to address the issues. As part of UDOT's statewide Recreation Hotspots Study, UDOT then worked with local stakeholders to evaluate the transportation projects identified in the Bear Lake Corridor Study and determine which would best meet the goals of the program and local priorities. The proposed projects are discussed in the Infrastructure section of Chapter 2. UDOT also operates a rest area on the southwest corner of the lake.

Utah Division of Water Quality

The Utah Division of Water Quality (DWQ) and the Utah Water Quality Board are responsible for maintaining, protecting, and enhancing the quality of Utah's surface and groundwater resources. Title 19, Chapter 5 of the Utah Code charges the board and division to develop programs for the prevention and abatement of water pollution. The board is also responsible for establishing water quality standards throughout the state; enforcing technology-based, secondary treatment effluent standards or other more stringent discharge limits to meet instream standards; reviewing plans, specifications, and other data relative to wastewater disposal systems and municipal separate stormwater systems; and establishing and conducting a continuing planning process for control of water pollution. DWQ also administers the Water Quality Certification Program under Section 401 of the Clean Water Act (CWA) and the Nonpoint Source Management Program under Section 319 of the CWA.

The CWA prohibits the discharge of pollutants through point sources such as outfall structures into waters of the United States without a National Pollutant Discharge Elimination System (NPDES) permit. In Utah, the NPDES program is administered by DWQ. DWQ issues Utah Pollutant Discharge Elimination System (UPDES) permits for point source discharges. The permits define discharge limits, monitoring and reporting requirements, and other specified conditions.

Utah State Historic Preservation Office

The Utah State Historic Preservation Office (SHPO) within the Utah Division of State History provides review, comment, and guidance to agencies needing to comply with cultural resource regulations. Utah Code 9-8-404 requires that state agencies consider their actions on historic properties and provide the Utah SHPO with an opportunity to comment on those actions. Section 106 of the National Historic Preservation Act (54 United States Code 300101 et seq.) applies similarly in cases where there is a federal undertaking (money, land, permitting, etc.); the federal agency is required to consult with SHPO. Generally, for both state and federal actions, a historic property is something that is more than 50 years old; retains integrity; and is eligible for, or listed on, the National Register of Historic Places.

Local Governments

Counties and cities with jurisdiction over lands near Bear Lake have important management responsibilities, are lake stakeholders, and are partners with FFSL in ongoing and future projects. Local government performs functions related to public health and safety, education, recreation, tourism, roads, land use and planning, law enforcement, and weed control.

General Public

FFSL manages Bear Lake sovereign lands for the benefit of the general public in accordance with the Public Trust. Public input is always welcome. Community involvement in ongoing sovereign lands management (e.g., projects involving restoration or education) is encouraged, assuming efforts are coordinated with and approved by FFSL.

1.5 Idaho Management Responsibilities

Idaho Department of Lands

The Idaho Department of Lands (IDL) manages Idaho's state endowment trust lands and public trust lands, provides regulatory oversight of forestry practices and some regulation of the mining industry, and houses the Oil and Gas Division. Idaho's public trust lands consist of lands beneath Idaho's navigable waterways, including riverbeds and the beds and banks of navigable lakes. Bear Lake is on Idaho's list of navigable lakes and is managed by IDL as a public trust land for the public's benefit. IDL has statutory authority to administer the leasing of minerals on the beds of navigable waters.

IDL also administers the Idaho Lake Protection Act and regulates encroachments and activities on, in, or above navigable lakes. Encroachments are defined as anything permanently fixed to the lakebed or natural features of the lakebed (e.g., rocks). An encroachment permit from IDL is required for all encroachments on Bear Lake (Idaho Statute 58-13). Examples of encroachments permitted by IDL include docks, marinas, bridges, utility lines, mooring buoys, and float homes.

IDL does not regulate boats, boating safety, or boat traffic. These responsibilities belong to the county government (sheriff), Idaho Department of Parks and Recreation (IDPR) as the administrator of the Idaho Safe Boating Act, or federal entities.

Idaho Department of Parks and Recreation

IDPR manages 30 state parks throughout Idaho and administers the Idaho Safe Boating Act (Idaho Statue 67-70). IDPR provides free education courses for boaters and also administers several outdoor recreation grant programs that provide facilities and services to recreationists and the local organizations that serve them. IDPR manages Bear Lake State Park in Idaho, which consists of North Beach on the north end of the lake and East Beach on the east side of the lake near the Utah border.

Idaho's boating laws are enforced primarily by sheriffs and deputy sheriffs of the county having jurisdiction over the waterway. IDPR trains and provides resources to sheriffs, deputy sheriffs, and others responsible for patrolling Idaho's waterways. All Idaho peace officers have the authority to stop and board vessels to check for compliance with federal and state laws.

Idaho State Department of Agriculture

The Idaho State Department of Agriculture is responsible for controlling noxious and invasive weeds on the bed of Bear Lake and administers an Aquatic Invasive Species Management and Control Program, which provides information to help boaters, fisherman, and hunters prevent the spread of aquatic invasive species. This department also operates watercraft inspection stations on major highways at or near the Utah-Idaho state line to prevent aquatic invasive species movement from one water system to the next. FFSL works closely with the Aquatic Invasive Species Management and Control Program.

Idaho Department of Water Resources

The Idaho Department of Water Resources is responsible for water projects, water allocations (e.g., water rights, adjudication, and dam safety), hydrology and water data, and water compliance (e.g., floodplain management and stream channel protection). Stewart Dam and the Lifton Pumping Station are under the jurisdiction of the Idaho Department of Water Resources.

Other Idaho Agencies

Other Idaho state agencies also have responsibility for resources on the Idaho portion of Bear Lake. The Idaho Department of Environmental Quality, Water Quality Division is responsible for ensuring that Idaho's water resources meet state water quality standards. The Idaho Department of Fish and Game protects and manages Idaho's wildlife resources and offers fishing and hunting licenses. Roads in Idaho are typically managed by the Idaho Department of Transportation. The Idaho State Historic Preservation Office encourages the preservation, documentation, and use of cultural resources.

1.6 Federal Agencies Management Responsibilities

Federal Emergency Management Agency

The Federal Emergency Management Agency (FEMA) administers the National Flood Insurance Program (NFIP), which enables property owners in participating communities to purchase flood insurance as protection against flood losses. Under the NFIP, floodplain management is defined to include all actions that states and communities can take to minimize damage to new and existing buildings and infrastructure. Local officials are responsible for administering and enforcing local floodplain management regulations within their jurisdiction. Laketown, Utah, participates in the NFIP and incorporates NFIP requirements into their planning processes.

Federal Energy Regulatory Commission

The Federal Energy Regulatory Commission (FERC) is an independent agency that regulates the interstate transmission of electricity, natural gas, and oil. Of most relevance to Bear Lake is FERC's responsibility to license and inspect private, municipal, and state hydropower projects. In this capacity, FERC oversees the Soda, Grace-Cove, and Oneida hydroelectric projects on the Bear River in Idaho and the Cutler hydroelectric project on the Bear River in Utah. FERC oversight of these projects does not affect lake levels at Bear Lake because these projects are all located downstream.

Natural Resources Conservation Service

The Natural Resources Conservation Service (NRCS) provides farmers and ranchers with financial and technical assistance to apply conservation practices "on the ground" that not only help the environment but also agricultural operations, including those in the Bear Lake area. In Utah, the NRCS administers Farm Bill programs such as Agricultural Conservation Easement and Small Watershed, as well as Emergency Watershed Protection, which provides technical and financial assistance to communities affected by natural disasters such as floods.

U.S. Army Corps of Engineers

The USACE administers and enforces Section 10 of the Rivers and Harbors Act of 1899 and Section 404 of the CWA. Section 10 requires a USACE permit for the construction of any structure in or over any navigable water of the United States. Structures or work outside the limits defined for navigable waters of the United States require a Section 10 permit if the structure or work affects the course, location, or condition of the waterbody. The law applies to actions such as dredging, disposal of dredged materials, excavation, filling, and re-channelization. It applies to all structures, from the smallest floating dock to the largest commercial undertaking. Under Section 404 of the CWA, USACE is also responsible for regulating placement of fill material in the waters of the United States, including Bear Lake (see Figure 1-2). USACE's management responsibilities under the CWA are to protect the nation's aquatic resources from unnecessary adverse impacts.

Bear Lake in Utah and portions of Bear Lake in Idaho are considered navigable waters by the USACE. Typical activities requiring Section 10 or 404 permits include depositing fill or dredged materials in waters of the United States or adjacent wetlands; construction of dams, levees, dikes, weirs, boat ramps and docks; placement of riprap and road fills; fills for residential, commercial or recreational developments; and mining, channelization, ditching activities, disking, grading, deep ripping, and some excavations.

Bear Lake falls within two USACE districts: the Sacramento District on the Utah side and the Walla Walla District on the Idaho side. In the Sacramento District, the Bountiful Field Office in Bountiful, Utah, has jurisdiction. In the Walla Walla District, the Idaho Falls Field Office in Idaho Falls, Idaho, has jurisdiction.

U.S. Bureau of Land Management

The U.S. Bureau of Land Management (BLM) manages approximately 245 million acres of public surface land and 700 million acres of subsurface mineral estate (BLM 2021). The BLM's mission directs the agency to manage public land for multiple uses while conserving natural, historical, and cultural resources. Multiple uses on BLM lands include renewable energy development (e.g., solar, wind), conventional energy development (e.g., oil and gas, coal), livestock grazing, hard rock mining (e.g., gold, silver), leasable and saleable minerals (e.g., phosphate), timber harvesting, and outdoor recreation. The conservation side of BLM's mission includes preserving specially designated landscapes, such as National Conservation Lands (e.g., national monuments, wilderness areas). BLM lands are located near the south end and southeast corner of Bear Lake, including the Laketown Canyon Area of Critical Environmental Concern.

U.S. Coast Guard

The U.S. Coast Guard (Coast Guard) is the coastal defense, search and rescue, and maritime law enforcement branch of the military. The Coast Guard is also required by federal code to carry out a national recreational boating safety program (46 United States Code 131). The mission of the Coast Guard's Boating Safety Division is to minimize through preventative means loss of life, personal injury, property damage, and environmental impact from the use of recreational boats. The Boating Safety Division has responsibilities in the areas of accident reporting, boater education, vessel safety checks, life jacket safety, other boating safety issues, statistics, equipment recalls and alleged defects, and float plans.

The Coast Guard has formally established a cooperative agreement to work with and coordinate with the National Association of State Boating Law Administrators, a professional association consisting of state, commonwealth, and territorial officials with responsibility for administering and enforcing state boating laws. National Association of State Boating Law Administrators has a Reference Guide to State Boating Laws (National Association of State Boating Law Administrators 2008). The Coast Guard has published a boating safety mobile application, the Boating Safety Mobile app (Coast Guard, Boating Safety Division 2021).

U.S. Environmental Protection Agency

The EPA develops and enforces regulations to protect human health and the environment. The EPA works to ensure that the public has clean air, land, and water, and supports national efforts to reduce environmental risks based on best available scientific information. In addition, the EPA gives grants to state environmental programs, nonprofits, educational institutions, and others. The EPA has partnered with Utah Department of Environmental Quality to implement CWA programs on and around Bear Lake. The EPA jointly administers the CWA Section 404 permit program with USACE.

U.S. Fish and Wildlife Service

The U.S. Fish and Wildlife Service (USFWS) is responsible for protecting flora and fauna, including fish and migratory birds; complying with the Bald and Golden Eagle Protection Act and the Migratory Bird Treaty Act of 1918; and protecting threatened, endangered, and candidate species found in or near Bear Lake as required by the Endangered Species Act of 1973 (ESA). The USFWS also conducts scientific investigations to document and remedy contaminant-related problems for fish and wildlife and monitors long-term contaminant trends, among other services. In addition, the National Wildlife Refuge System is managed by the USFWS, which includes the Bear Lake National Wildlife Refuge adjacent to the north end of Bear Lake in Idaho.

U.S. Geological Survey

The USGS is the nation's largest water science, earth science, biological science, and civilian mapping agency. It collects, monitors, analyzes, and provides science about natural resource conditions, issues, and problems. In cooperation with several local and state organizations and agencies, USGS deploys two water quality platforms each spring on Bear Lake. Water quality data are collected from the lake surface to the bottom of the lake at 3.3- to 6.6-foot intervals during spring, summer, and fall (USGS n.d. [2020]). Additional information on this water quality monitoring can be found in the Water Quality section of Chapter 2.

1.7 Tribal Stakeholders

The tribal stakeholders described here have ancestral interest in the region surrounding Bear Lake.

Northwestern Band of the Shoshone Nation

The Northwestern Band of the Shoshone Nation (Northwestern Band) lives in southern Idaho and northern Utah. The Northwestern Band staffs two offices to serve tribal members: one in Brigham City, Utah, and one in Pocatello, Idaho. In recent years, the Northwestern Band purchased ancestral territory near Preston, Idaho, that includes the Bear River massacre site. They plan to build the Boa Ogoi Cultural and Interpretive Center to tell the story of the massacre and educate visitors about their history and culture. The Northwestern Band is governed by a seven-member tribal council, houses its own library, and has an environmental protection/tribal roads department (Northwestern Band of the Shoshone Nation 2021).

Shoshone-Bannock Tribes of the Fort Hall Reservation

The Shoshone-Bannock Tribes of Fort Hall (the Tribes) comprise the eastern and western bands of the Northern Shoshone and the Bannock (Northern Paiute) and have more than 5,900 tribal members. The Fort Hall Reservation, currently approximately 544,000 acres, was reserved for the Tribes under the Fort Bridger Treaty of 1868 and consists of lands that are north and west of Pocatello, Idaho. The Fort Hall Business Council is the governing body of the Tribes and has authority over all normal business procedures, including the development of lands and resources. The Tribes have several agencies that manage natural resources, including an energy department, land use department, fish and wildlife department, and tribal water resources department (Shoshone-Bannock Tribes 2020).

Ute Indian Tribe of the Uintah and Ouray Reservation

The Ute Indian Tribe (the Tribe) has a membership of 2,970 individuals, more than half of whom live on the Uintah and Ouray Indian Reservation (Ute Indian Tribe 2021). The Tribe is composed of three recognized bands of Utes: the Whiteriver Band, Uncompahgre Band, and Uintah Band. The Uintah and Ouray Indian Reservation covers approximately half of Uintah and Duchesne Counties, and also extends into Carbon, Grand, and Wasatch Counties. The Tribe operates its own tribal government and has several agencies that manage natural resources, including an air quality department, recreation department, and fish and wildlife department.

1.8 County and Municipal Zoning

The Utah portion of Bear Lake is located in Rich County near two different municipalities: Garden City and Laketown. The county and both municipalities have the authority to regulate land uses within their jurisdiction. The Idaho portion of Bear Lake is located in Bear Lake County near the communities of Fish Haven and St. Charles. Bear Lake County, Fish Haven, and St. Charles also have the authority to regulate land uses within their jurisdiction. However, Bear Lake County and the Idaho communities are outside the planning area for the CMP and are not discussed in detail here.

FFSL recognizes that local governments need to provide services to their constituents that may impact the natural environment (e.g., transportation, utilities, and recreation infrastructure). Management decisions made by FFSL for the lake will affect and are affected by the land uses and activities on adjacent lands. For this reason, it is important to understand the types of land uses and projects authorized by each town and county's general

plan and zoning ordinances. Coordination regarding open space and development patterns should be an ongoing discussion for the well-being of local residents and the lake. Population growth and infrastructure development in and around the towns likely will place increasing pressure on the lake and its resources.

FFSL is committed to maintaining environmental quality and minimizing impacts to Public Trust resources on Bear Lake sovereign lands. However, FFSL has no jurisdiction over lands above the OHWM at Bear Lake. The county and towns use their own land use zoning designations and ordinances to indicate permissible uses for properties adjacent to Bear Lake. A summary of the current zoning designations for Rich County, Garden City, and Laketown is provided in the following sections. Please refer to the GIS spatial data viewer on the FFSL website to view the zoning for each entity. Future land use maps and general plans may differ from the current zoning designations and/or existing land uses.

Rich County

Rich County currently has three zoning designations adjacent to Bear Lake:

- Beach Development (BD): Areas along the Bear Lake shoreline for public and private water-oriented recreational and residential activities
- Agriculture (A): Permanent agricultural use
- Residential (R): Residential developments and related services and activities; limited retail and service activities

Most parcels adjacent to the lake fall under the BD and A zones.

Four additional zoning categories exist nearby but are separated from Bear Lake by the previously listed zoning designations: Agricultural Residential (AR; low-density rural lifestyle residential development), Water Source Protection (WS; areas surrounding domestic water sources in which no development or activity is allowed that could pollute water), Commercial (C; areas of convenience shopping for neighborhood residents), and Planned Community (PC; a planned unit development).

Garden City

Garden City currently has one zoning designation adjacent to Bear Lake:

- Beach Development: Areas along the Bear Lake shoreline for public and private water-oriented recreational and residential activities

The Beach Development zone comprises approximately 253 acres or 5% of the city (Envirocentric Design 2014a). Four additional zoning categories exist nearby but are separated from Bear Lake by the Beach Development zone: Commercial (community retail and service activities), Single Family Residential (R-1; low density residential neighborhoods), Recreational Residential (recreational residential developments and related services and activities), and Residential Estate (large lot residential estate neighbors of a rural character).

Laketown

Laketown has no zoning designations adjacent to Bear Lake because its municipal boundary is not directly adjacent to the lake. However, four zoning designations are used in and around the town itself: Commercial (C), Manufacturing (M), and Residential (R1 for 1-acre lots and R5 for 0.5-acre lots).

1.9 Collaborative Management Groups

Bear River Commission

The Bear River Commission was created in 1958 between the states of Idaho, Utah, and Wyoming. It is composed of nine gubernatorial-appointed commissioners, three from each of the states, and one federal commissioner (the chairperson) who carry out the provisions of the Bear River Compact, as follows:

> The major purposes of this Compact are to remove the causes of present and future controversy over the distribution and use of the waters of the Bear River; to provide for efficient use of water for multiple purposes; to permit additional development of the water resources of Bear River; to promote interstate comity; and to accomplish an equitable apportionment of the waters of the Bear River among the compacting States. (Bear River Commission 2020)

The Bear River Commission has four standing committees (Management, Operations, Records and Public Involvement, and Water Quality) as well as a Technical Advisory Committee. With its partners, the Bear River Commission also operates a system of sensors, radios, and computers that monitor water flows and volumes in the Bear River Basin in real time.

Nothing in the Bear Lake CMP is intended to regulate, affect, or otherwise impair any rights or interests inuring to the compacting states and the holders of individual appropriated, decreed, contract, or other water rights approved and recognized by the compacting states.

Bear Lake Regional Commission

In the late 1960s and early 1970s, the public and local elected officials observed increasing recreational demands on Bear Lake and raised concerns about pollution and changes to the lake's character. As a result, the Bear Lake Regional Commission was formed in 1973 to provide long-term direction and guidance for Bear Lake (Bear Lake Regional Commission 2021a). The Bear Lake Regional Commission works to provide responsible planning and coordination across state, county, and municipal boundaries and serves as the planning administrator for both Rich County, Utah, and Bear Lake County, Idaho. Commission membership includes representatives from agencies and local governments in both states. The focus of the Bear Lake Regional Commission is the protection and development of Bear Lake, natural resource planning, coordination and cooperation, local planning and grantsmanship assistance, and public involvement and education.

Examples of projects supported by the Bear Lake Regional Commission include the implementation of BMPs to reduce sediment and nutrients in Thomas Fork Creek in Idaho, the installation of sewer systems around Bear Lake, water quality studies, the development of Rendezvous Beach, and the preparation of comprehensive plans for surrounding communities (Bear Lake Regional Commission 2021b).

1.10 Connected Land Management Plans

Bear Lake Legacy Pathway

The *Bear Lake Legacy Pathway, Pathway Concept Plan* (National Park Service 2012) lays out a vision for a non-motorized pathway system encircling Bear Lake that connects to other trails on public and private lands and provides opportunities for year-round recreation and alternative transportation. The pathway system would be appropriate for a variety of users; competing users would be separated. It would also include interpretive signs with information on the rich historical, cultural, and natural history of the area. The pathway concept plan provides design recommendations, management considerations, a proposed alignment map, implementation phases, and other guidance. Several small segments of the pathway are already in place.

Bear Lake National Wildlife Refuge and Oxford Slough Waterfowl Production Area Comprehensive Conservation Plan

The *Bear Lake National Wildlife Refuge and Oxford Slough Waterfowl Production Area Comprehensive Conservation Plan* (CCP) (USFWS 2013a) specifies management goals, objectives, and strategies for improving conditions on the refuge and in the waterfowl production area. Some of the key conservation plan decisions for the Bear Lake National Wildlife Refuge are as follows:

- Manage the refuge to provide habitat for waterfowl breeding and fall migration while using water level manipulations and other strategies to provide a variety of wetland habitats that benefit a range of priority species. Manage water in individual wetland units to simulate natural hydrologic variability.

- Work with PacifiCorp to manage water levels for wildlife and habitat while abiding by the stipulations of the Bear River Compact and 1968 agreement.
- Protect, restore, and enhance deep marsh, shallow marsh, riparian, instream, and upland habitats.
- Work with PacifiCorp and other stakeholders to study and consult on the effects, desirability, and feasibility of reducing sediment loading in Mud Lake.
- Work with PacifiCorp and the Idaho Department of Fish and Game to study and consult on the effects of fish passage at irrigation diversions and water control structures.

Bear Lake State Park Resource Management Plan

In 2004, Utah Division of State Parks and Recreation (now the DSP) initiated a planning effort with community stakeholders to create recommendations for the future management of Bear Lake State Park. The resulting document, *Bear Lake State Park Resource Management Plan* (Utah Division of State Parks and Recreation 2005), describes the mission of the park: "to provide a variety of desirable water and land-based recreation opportunities and increase community vitality, while protecting and enhancing park resources." The vision statement of the plan charts the ways the park will accomplish its mission, including providing access to the shoreline and lake at all water levels; developing and maintaining facilities; preserving traditional recreation experiences while being open to new activities; protecting and preserving park resources and the greater Bear Lake environment; offering interpretive and educational programs; and cooperating with residents, civic groups, businesses, and agencies to supply a network of recreation sites and communities. Issues such as facility development needs, trails and trail connections, lack of staff and funding for operations, pollution, overuse, concession opportunities, and interpretive and educational opportunities are discussed in the plan and addressed through specific recommendations.

Bear Lake Valley Blueprint

The 2010 *Bear Lake Valley Blueprint and Toolkit* (Envision Utah 2010) was designed to achieve a broadly supported, public created vision of how residents want the Bear Lake area (Rich County, Utah, and Bear Lake County, Idaho) to grow. The resulting vision includes safeguarding natural resources (e.g., water quality, wildlife habitat, and scenic beauty); sustaining agriculture; focusing growth in existing communities; developing job centers; providing a range of housing choices; cultivating mixed-use neighborhoods and town centers; expanding access to and opportunities for recreation; and supporting public transportation, bicycle routes, pedestrian pathways, and limited regional road network expansion. The document's detailed implementation toolkit helps users work to achieve this vision.

Bureau of Land Management Randolph Management Framework Plan

BLM lands are located near the southeast corner of Bear Lake, as well as farther away to the south and southeast. These public lands are managed under the Randolph management framework plan (MFP) decisions document. An MFP is a planning decision document (now replaced by a resource management plan [RMP]) that establishes land use allocations, coordination guidelines for multiple use, and management objectives for a given planning area. The Randolph MFP decisions document (BLM 1980) describes the BLM's final decisions for lands, minerals, range management, areas of critical concern, forestry, recreation, water, air, soil, and wildlife in the planning unit.

Garden City and Laketown Plans

Garden City's general plan guides the city's decision-making about future growth and land use, infrastructure, and transportation (Envirocentric Design 2014a). It identifies areas of the community that would be favorable for certain types of development or land use (e.g., residential, commercial, trails, parks) and that could benefit the community. The general

plan outlines planning considerations and specifies goals, objectives, and policies to be followed during decision-making. Based on the plan, Garden City would like to see balanced, responsible growth; an efficient and environmentally sensitive city-wide transportation system that considers bicycle and pedestrian travel; opportunities for physical, recreational, cultural, and educational activities; an evaluation of whether the city has a need for historic preservation; high quality, well-planned, and aesthetically pleasing residential development; and protection of culinary water quality.

Garden City also has a parks and trails plan that offers a framework to guide future planning, design, and implementation of parks, trails, recreation facilities, and open space areas (Envirocentric Design 2014b). The plan supports the development of new trails and the preservation of passive and natural open space.

Laketown's master plan is designed to be a decision-making tool for guiding growth and development in Laketown (Laketown Planning and Zoning Commission 2007). The plan seeks to allow for organized growth, industry, business, and employment opportunities while ensuring adequate public facilities and services, protecting the rural agricultural quality of life, and preserving natural resources. The master plan encourages coordination with Rich County and other local governments to ensure that the town's goals are met and that development beyond the town's borders is compatible with its rural character. It also seeks to foster concepts of good community design and to strengthen Laketown's rural, agricultural small-town image. Other elements of the master plan include an objective to provide a network of pedestrian, equestrian, and bicycle trails through town; policies that promote the development of recreation facilities and the preservation of parks and open space; and protection of scenic, agricultural, wildlife, water, air, land, and human resources in and around Laketown.

Land Protection Plan—Bear River Watershed Conservation Area

The USFWS has established a conservation area for the Bear River watershed in Idaho, Utah, and Wyoming to work with private landowners to create up to 920,000 acres of voluntary conservation easements. The easements would conserve aquatic, riparian, wetland, and upland habitats; provide habitat connectivity and migration corridors; help maintain healthy wildlife populations; protect water quality; conserve the areas' working landscapes; and increase the watershed's resiliency to climate and land use changes (USFWS 2013b). Staff at three wildlife refuges in the Bear River watershed administer and monitor the program: Bear Lake National Wildlife Refuge (Idaho), Bear River Migratory Bird Refuge (Utah), and Cokeville Meadows National Wildlife Refuge (Wyoming). These efforts are described in the *Land Protection Plan—Bear River Watershed Conservation Area*, which provides a project description and resource data, identifies the threats to resources, and outlines implementation of the project (USFWS 2013b).

Rich County Resource Management Plan

Utah House Bill 323 (2015 General Session) requires counties to develop an RMP as part of their general plan to provide for the protection, conservation, development, and management of resources (State of Utah 2015). Rich County's RMP addresses a variety of agricultural, water, economic, and wildlife resources, as well as land use (Poulsen 2017). The RMP describes desired future states for each resource, as well as management objectives and associated policies and guidelines. Some of the desired future states in Rich County's RMP that relate to the Bear Lake CMP include the following (Poulsen 2017):

- Placing a high priority on prevention and control of noxious weed infestations on public lands.
- Promoting a healthy hydrological system that encourages efficient flood control and water conveyance, while providing clean water, wildlife habitat, and recreational uses.

- Protecting and restoring functioning aquatic and terrestrial riparian habitats to support wildlife, fisheries, floodplains, and water quality.
- Preserving and enhancing instream flows on public lands to benefit aquatic habitats and sensitive species, while recognizing existing water rights.
- Maintaining and improving watersheds and water quality to protect public water supplies and to provide productive riparian ecosystems, aquatic ecosystems, and groundwater resources on public lands. Reducing pollutant loads entering waterways to improve water quality. Coordinating activities among local, state, and federal agencies and organizations to protect water quality.
- Maintaining and improving wetlands on public lands, or mitigating impacts where infrastructure is needed.
- Protecting recreation opportunities, as well as maintaining water quality, air quality, and wildlife (prioritized over extractive and consumptive uses).
- Maintaining a comprehensive recreation system on public lands providing diverse year-round recreation opportunities. Avoiding user group conflicts through use separation where practical. Including a diverse range of stakeholders and local user groups during planning processes.
- Restoring riparian and instream habitats (where degraded) to support native fish, sport fishing, and tourism. Improving water quality and aquatic habitat. Preventing the establishment of aquatic invasive species and working to remove them where they already occur on public lands. Supporting public education on the transmission and impacts of aquatic invasive species, the impacts of aquatic diseases, and proper equipment cleaning protocols.
- Maintaining healthy native wildlife populations. Protecting and enhancing natural landscapes, ecosystems, and biodiversity to support healthy wildlife populations.
- Preserving historical, cultural, and prehistoric resources, where they exist on public lands.
- Maintaining or improving visual resources in the county.
- Coordinated law enforcement should continue to play a critical role in maintaining law and order on public lands to protect public health and safety, including rule and regulation enforcement, private property trespass, and search and rescue operations.

Rich County also has a trails plan for motorized and non-motorized trails (Bear Lake Regional Commission and BRAG 2018). The plan envisions a county-wide connected trail system for all users between communities and public and private lands. It recommends 78 miles of new trail, many of which are near Bear Lake. Near-term projects would include trails in Garden City Canyon, Hodges Canyon, Richardson Canyon, Cisco Run, and Swan Creek. The plan includes trail design guidelines.

1.11 Legal Resolutions

House Concurrent Resolution 18 (2019 General Session) concerning Bear Lake was signed by the Utah governor on March 27, 2019. The resolution

- recognizes the special characteristics, benefits, and uses of Bear Lake;
- urges solutions to address challenges at the lake (e.g., water quality, invasive species, recreation, lakebed management and preservation, low lake levels);
- urges cooperation with Idaho to develop joint expectations for the continued health, beauty, and enjoyment of the lake; and
- encourages opportunities for stakeholder participation to develop recommendations to protect and enhance existing beneficial uses, maintain a healthy and sustainable lake, encourage economic development, protect irrigation water storage, enhance recreation, and protect Bear Lake for the future. (State of Utah 2019)

Idaho issued the complementary Senate Joint Memorial Number 105 in 2019 (State of Idaho 2019). The joint memorial urges the States of Utah and Idaho to work together in seeking solutions to challenges at Bear Lake; to develop joint expectations for the continued health, beauty, and enjoyment of Bear Lake; and to develop opportunities for stakeholder participation.

1.12 Utah Division of Forestry, Fire & State Lands Authorization Process

As the executive authority for the management of sovereign lands, FFSL is required to prescribe standards and conditions for the authorization and development of resources on sovereign lands. Any structure that is on, over, or beneath sovereign lands requires an authorization from FFSL. Authorizations issued by FFSL must comply with state law, administrative rules, and the principles of the Public Trust Doctrine. Common authorizations at Bear Lake include easements, general permits, special use lease agreements (SULAs), rights-of-entry (ROEs), and beach launching permits. Each authorization must also comply with the Bear Lake CMP. Unauthorized activities on sovereign lands violate state laws and are subject to criminal and/or civil penalties (Utah Administrative Code R652-70-2200 and Utah Code 65A-3-1). Authorizations issued for Bear Lake sovereign lands apply only to the Utah portion of Bear Lake (permitting processes for the Idaho portion of Bear Lake are different).

Types of Authorizations

The general types of authorizations issued by FFSL are described below. Additional information on authorizations (e.g., boat ramp and dock requirements) can be found in the Infrastructure section of Chapter 2. FFSL's boating and recreational use regulations for Bear Lake can be found in the Recreation section of Chapter 2.

Easements

An easement at Bear Lake may be issued by FFSL for exclusive or non-exclusive uses on, through, or over sovereign lands (Utah Administrative Code R652-40). Easements may be issued for uses such as the following:

- Electric, telephone, or cable lines
- Pipelines
- Roadways
- Canals

Easements are granted for no more than a term of 30 years.

General Permits

General permits at Bear Lake are issued for public or private use of sovereign lands (Utah Administrative Code R652-70-300) such as the following:

- Roads, bridges, recreation areas, and wildlife refuges (public use)
- Dikes, breakwaters, and flood-control structures (public use)
- Boat launching, mooring, and docking facilities (e.g., mooring buoys, floating docks, piers, and boat ramps) constructed for the use of the adjacent upland owner (private use)
- Irrigation pumps, irrigation pump structures, and stormwater outfall drains installed for the use of the adjacent upland owner (private use)

For the purposes of this CMP, an *adjacent upland owner* is defined as any person who owns adjacent upland property which is improved with, and used solely for, a single-family dwelling. General permits are issued for terms of one to 30 years.

Special Use Lease Agreements

SULAs at Bear Lake are issued for commercial, agricultural, recreational, industrial, residential, or governmental use of sovereign lands (Utah Administrative Code R652-70-300) such as the following:

- Commercial income-producing uses such as marinas, recreation piers or facilities, docks, moorings, restaurants, or gas service facilities
- Industrial uses such as oil terminals, piers, wharves, or mooring

- Agricultural/aquacultural uses that grow or harvest any plant or animal on the bed of a navigable lake or stream
- Private non-income-producing uses such as piers, buoys, boathouses, docks, water-ski facilities, houseboats, and moorings not qualifying for a general permit

SULAs are generally issued for terms of 1 to 51 years.

Rights-of-Entry

An ROE permit at Bear Lake allows non-exclusive, non-permanent, or occasional commercial or non-commercial use of sovereign lands for a short period of generally no more than 1 year (Utah Administrative Code R652-41). ROEs are generally issued for filming, commercial recreation ventures, research, organized events, and non-commercial ventures lasting more than 15 days. Examples of activities for which ROEs are issued include the following:

- Access for annual brine shrimp harvesting (Great Salt Lake)
- Access for commercial river running (Green and Colorado Rivers)
- Organized events that require temporary access to or use of state lands

Beach Launching Permit (Bear Lake only)

Utah Code 65A-2-6 states that FFSL shall issue permits for launching or retrieving motorboats on sovereign lands surrounding Bear Lake (Utah portion only). Permits authorize a person to launch or retrieve a motorboat if 1) the person owns private property adjacent to state lands surrounding Bear Lake, or has the legal right to occupy or use such private property, and the person accesses the water from that private property, or 2) the person accesses the water from a recorded point of public access that allows motorized vehicle traffic.

FFSL currently has a memorandum of understanding (MOU) with DSP that authorizes Bear Lake State Park to accept applications and issue beach launching permits from the marina office (FFSL and Utah Division of State Parks and Recreation 2018). To obtain a beach launching permit, the online DWR Mussel-Aware Boater Program course must be completed and an annual decontamination certification form must be received (required by DWR as part of the Aquatic Invasive Species Program). A person may only purchase one beach launching permit annually, and the permit is valid for the calendar year in which it is issued. Beach launching permits are non-transferable and cannot be shared by multiple people. Beach launching permits are not required if launching occurs at a Bear Lake State Park facility; however, aquatic invasive species rules apply, and annual decontamination certifications are required.

Authorization Renewals

For easements, general permits, SULAs, and ROEs, the permittee should submit a written request to FFSL to be considered for a permit renewal. This should be done at least 3 months prior to the expiration date of the current permit, unless otherwise directed. It is recommended the procedures outlined in R652-70-900 be followed for applications as well as renewals. Permit renewals are then evaluated by FFSL based on current use and regulations.

1.13 Lake Use Class System and Map

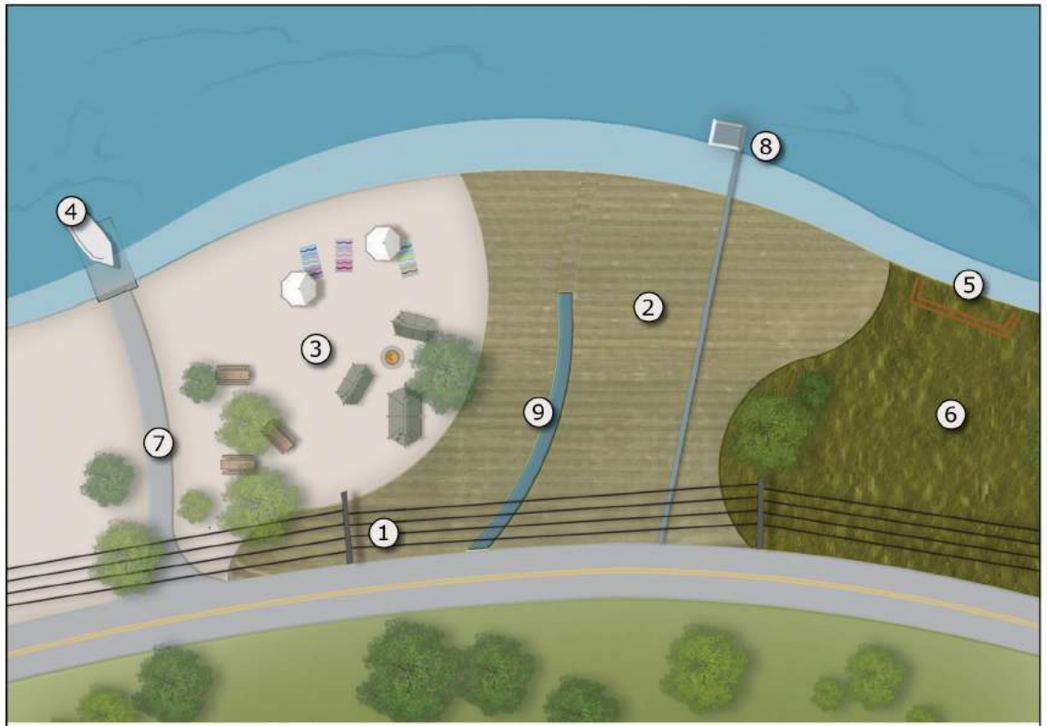
According to Utah Administrative Code R652-70-200, sovereign lands should be classified based on their current and planned uses. Table 1-2 lists and describes the lake use classes that guide management and use on Utah's sovereign lands and identifies which classes are applicable to Bear Lake. Lake use classes are applied to specific locations around Bear Lake based on considerations such as adjacent landownership, land uses, adjacent county and municipal zoning, existing authorizations, environmental attributes, and established deed restrictions or conservation easements. Note that Class 3 is not applied to the Bear Lake CMP planning area because the lake is intensively used and has no areas open for consideration of any use. Class 4 is also not applied to the Bear Lake CMP planning area because previous resource inventory and analysis at Bear Lake provides adequate information to classify all Bear Lake sovereign lands. Table 1-2 also describes the specific parameters used to designate lake use classes around Bear Lake.

Table 1-2. Lake Use Classes of Bear Lake Sovereign Lands

Lake Use Class	Description*	Example at Bear Lake	Percentage Based on Acreage of Each Class	Key Parameters
Class 1	Manage to protect existing resource development uses	Bear Lake State Park Marina	2%	Shoreline with existing authorizations, existing development, and adjacent to developed private land
Class 2	Manage to protect potential resource development options	Garden City shoreline	7%	Shoreline appropriate for future development, adjacent to existing development, adjacent to areas zoned for development, and adjacent to developed private land
Class 3	Manage as open for consideration of any use	Not applicable (N/A)	N/A	N/A
Class 4	Manage for resource inventory and analysis	N/A	N/A	N/A
Class 5	Manage to protect potential resource preservation options	Bear Lake	89%	Bear Lake's waters
Class 6	Manage to protect existing resource preservation uses	Cisco Beach	3%	Key riparian areas, shoreline with important resource values, and shoreline adjacent to agricultural lands and open space

* Data from Utah Administrative Code R652-70-200.

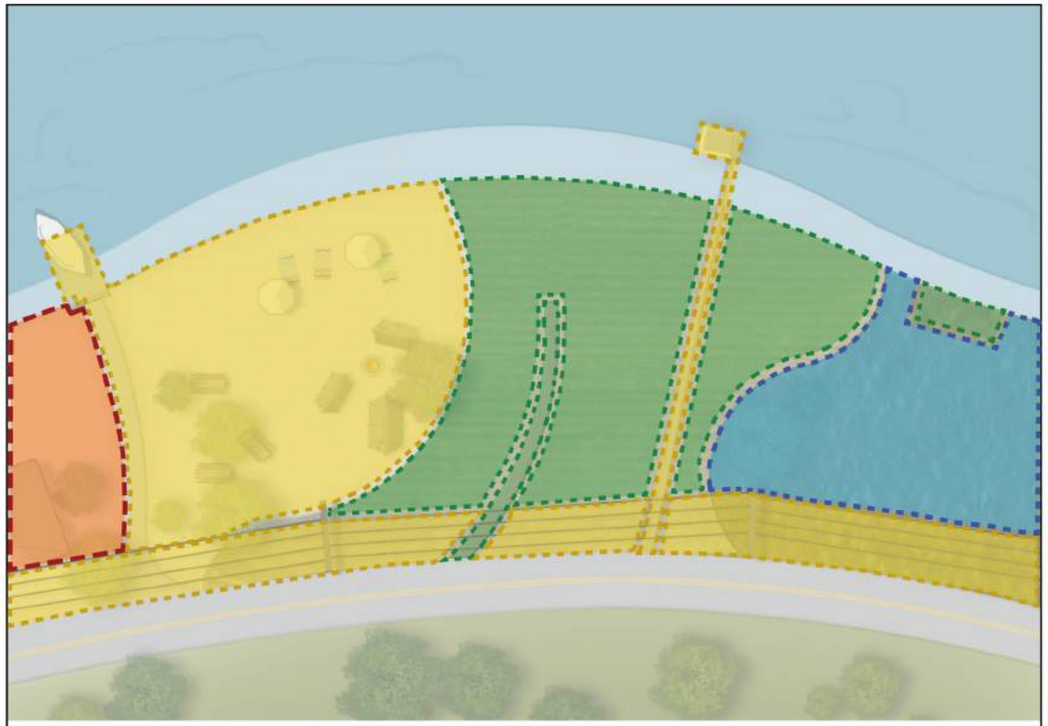
Examples of how specific classes were assigned to the lake shoreline based on current and potential use are found on Figures 1-8 and 1-9. Areas along the lake with existing, permitted utilities, state park facilities, boat ramps, roads, or pumps (items 1, 3, 4, 7, and 8 on Figure 1-8) are considered Class 1 areas. Some areas along the lake adjacent to existing Class 1 areas are designated as Class 2 areas to allow for additional resource development. Areas of the lake associated with agricultural uses, restoration, and that warrant protection of cultural resources (items 2, 5, and 9 on Figure 1-8) or are afforded legal conservation protection (item 6 on Figure 1-8) are considered Class 5 and Class 6 areas, respectively. For the purposes of illustration, Figures 1-8 and 1-9 show multiple lake classes and uses in a small area. In practice, lake classes and uses are usually not this condensed.



Legend

1. Above-ground and below-ground utilities
2. Agricultural use
3. State park
4. Boat ramp
5. Erosion mitigation
6. Wetland
7. Road
8. Pump
9. Historic canal

Figure 1-8. Bear Lake plan view showing conceptual lake uses.



Legend

Class 1
Manage to protect existing resource development

Class 5
Manage to protect potential resource preservation

Class 2
Manage to protect potential resource development

Class 6
Manage to protect existing resource preservation

Figure 1-9. Bear Lake plan view showing conceptual lake use classes.

Utah Code 65A-2-7 states that FFSL shall designate state lands along SR-30 from EPIC Recreation RV Park and Marina (Spinnaker Marina) southward for approximately 4 miles to Rendezvous Beach as an area for the ongoing development of facilities for boating, fishing, beach going, swimming, parking, picnicking, and other recreational activities. This area has been classified as Class 2.

Where Table 1-2 lists the lake use classes, Figure 1-10 shows the reader the specific locations of these lake use classes at Bear Lake. Note: Some lake use class locations, e.g., Class 1, can be difficult to see because of their limited spatial extent and the scale at which the figure has been made. For the most accurate view of all lake use class locations, please use the GIS spatial data viewer available on the FFSL website.

1.14 Lake Shoreline Overview

FFSL administers the shoreline and bed of Utah's portion of Bear Lake lying below 5,923.65 feet. Because lake levels fluctuate and the exposed shoreline increases or decreases, it is a key area of focus for management within Bear Lake sovereign lands.

Figure 1-11 shows a way of understanding different types of shoreline areas of Bear Lake. Deep water represents areas that have historically always been inundated. Open water indicates those areas that generally become exposed at lower lake levels. Open shoreline represents those areas with a sandy unconsolidated bottom or shoreline areas that become exposed more often. Wetlands generally consist of palustrine emergent (rooted) or scrub-shrub wetlands that are closer to upland areas. Finally, rocky substrates indicate those areas with rocky shores or vegetated unconsolidated shores.

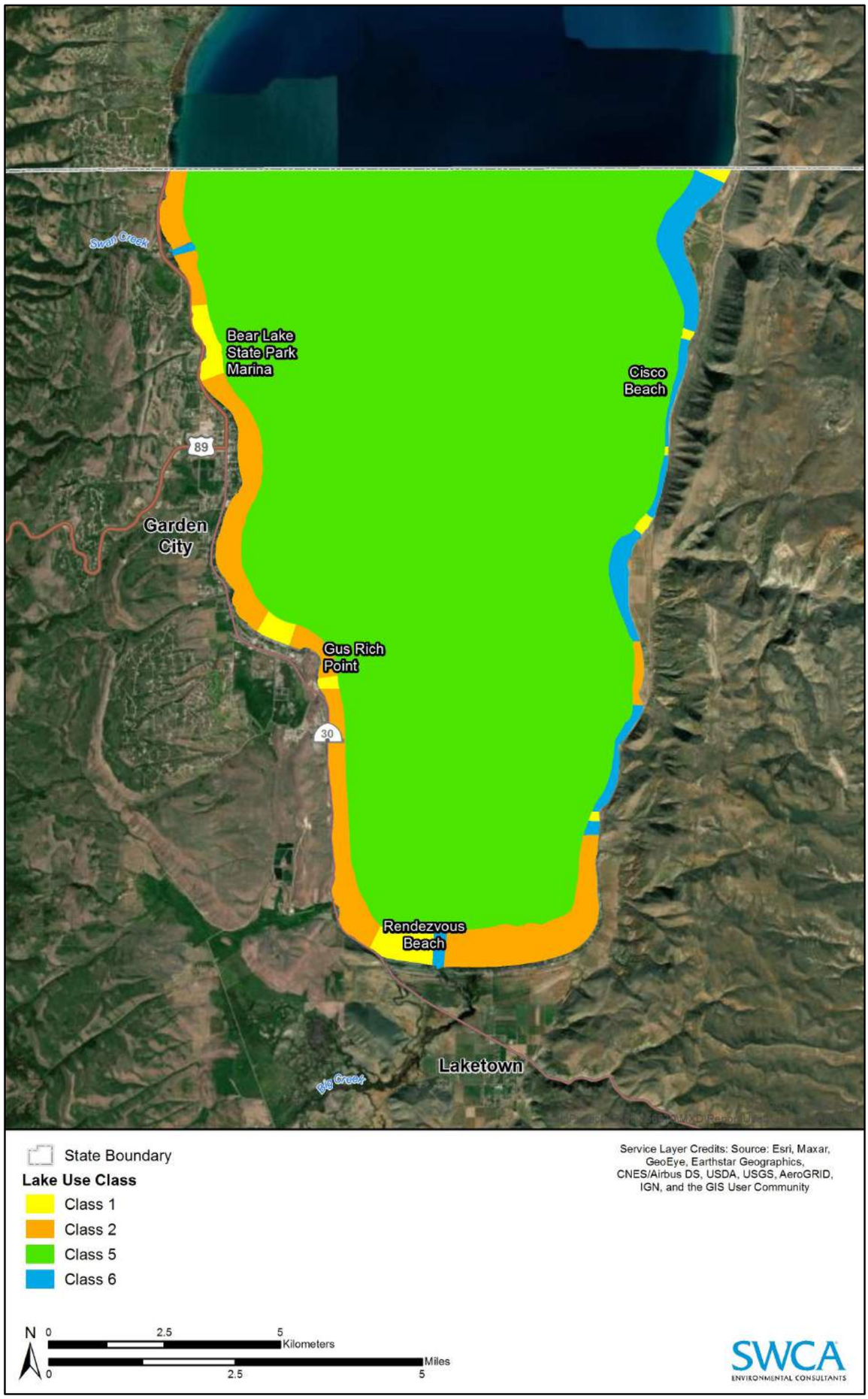


Figure 1-10. Lake use classes for Bear Lake sovereign lands.

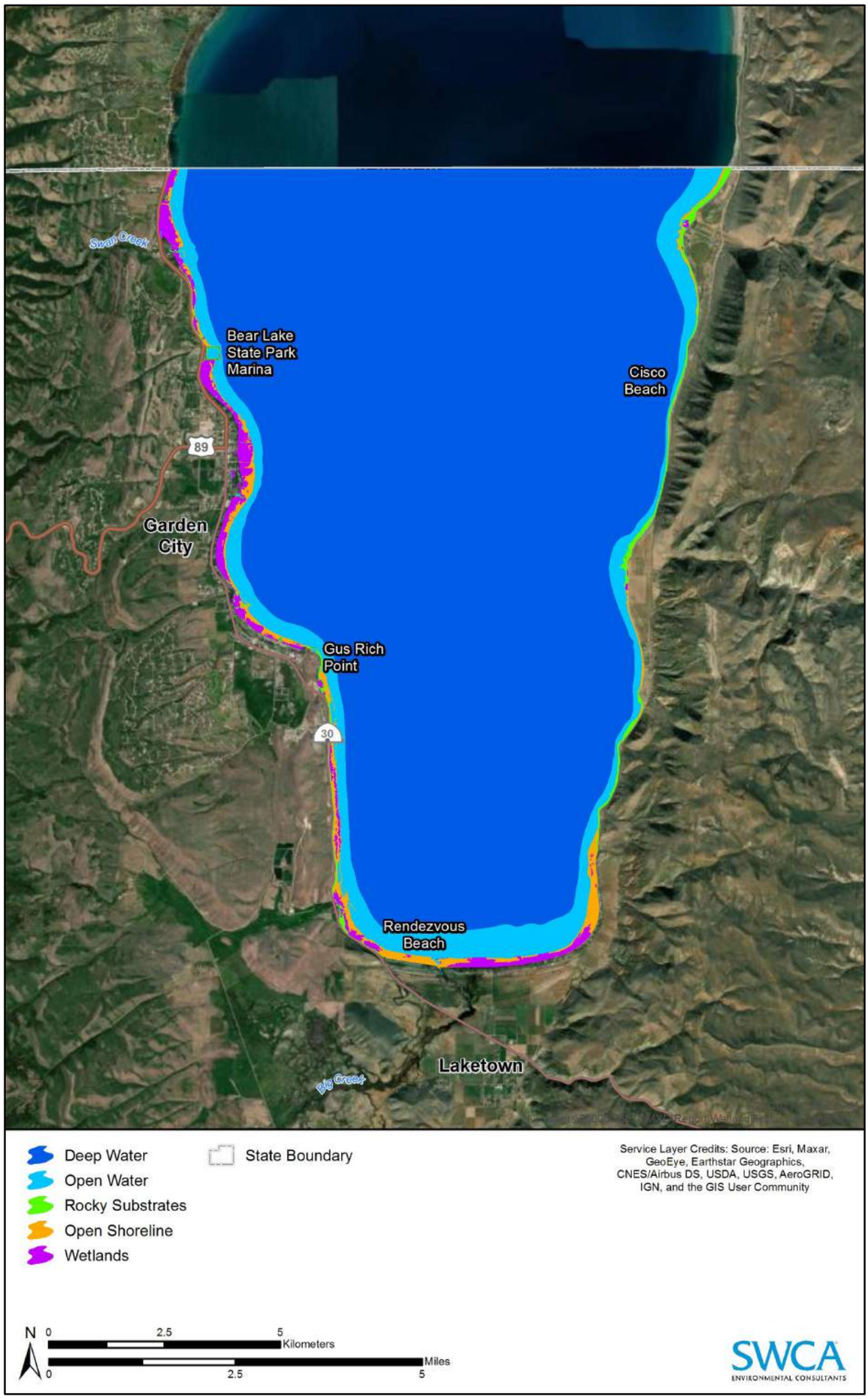


Figure 1-11. Shoreline areas of Bear Lake sovereign lands.

Further Reading

Alternative Futures for the Bear River Watershed (Toth 2005)

Bear River Basin: Planning for the Future (Utah Division of Water Resources 2004)

Bear River Compact, As Amended (Bear River Commission 1978)

Bear River Watershed Historical Collection (Utah State University 2011)

Putting the Public Trust Doctrine to Work: The Application of the Public Trust Doctrine to the Management of Lands, Waters and Living Resources of the Coastal States (Slade et al. 1997)

Utah's Regional M&I Water Conservation Goals (Hansen, Allen & Luce, Inc. and Bowen Collins & Associates, Inc. 2019)

GIS Data Layers

ACEC, Bear Lake Sovereign Lands, FFSL Authorizations, Lake Shoreline Overview, Lake Use Classes, Landownership, Political Boundaries, UPDES Permits, UPDES Stormwater Permits, Water Rights Regions, Zoning

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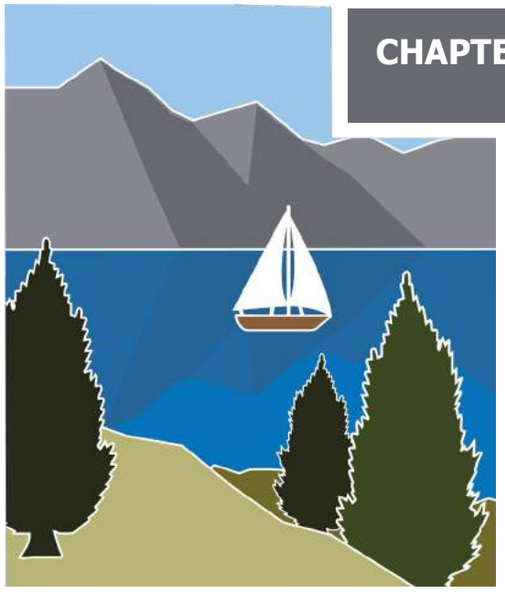


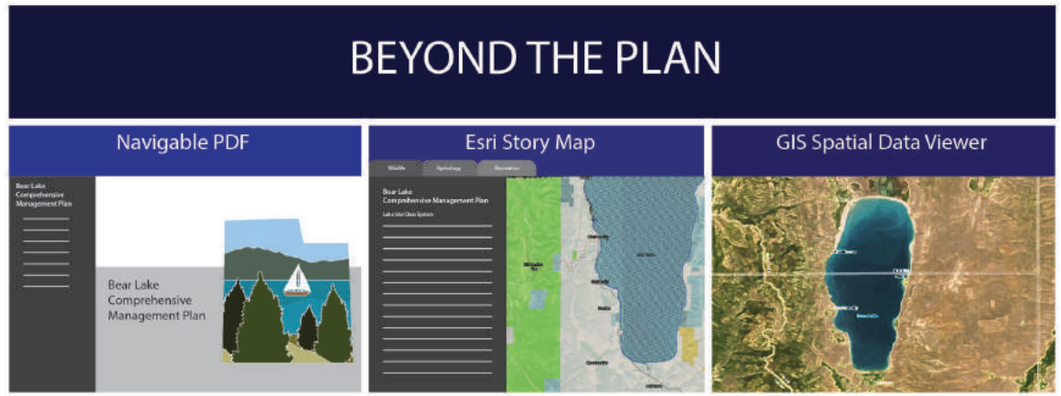
CHAPTER 2 – CURRENT CONDITIONS

2.1 Background

The Bear Lake CMP focuses specifically on FFSL's management of Bear Lake sovereign lands, but it implicitly includes recognition of the regional value of the larger Bear River Basin. This chapter provides a description of current conditions and lake level effects on Bear Lake sovereign lands and is divided into four resource sections: Ecosystem Resources, Water Resources, Socioeconomics, and Community Resources. The current conditions reported here are based on best available data. FFSL recognizes that a management document cannot be a complete inventory of all information and that there are still gaps in our understanding of Bear Lake.

Daily historical lake level data from January 1, 1990, to October 12, 2020, were used as a framework for the lake level effects analysis. High, third quartile (75th percentile), second quartile (median), first quartile (25th percentile), and low elevations were calculated from the daily data to further inform the analysis. The period 1990–2020 was chosen because it represents current conditions at Bear Lake. Data up to and including October 12, 2020, were used because they were approved by USGS and not subject to revisions. The period also generally reflects use of the lake as a storage reservoir since the implementation of governing doctrines discussed in Chapter 1. When reading the lake level effects analyses in the Ecosystem Resources, Water Resources, Socioeconomics, and Community Resources sections, refer to the lake level resource matrix in Appendix A for additional information.

Information in this chapter offers a framework for developing management goals and objectives. As new data appear and management strategies change, the Bear Lake CMP can be updated accordingly. Data for the Bear Lake CMP are included in two online formats on the FFSL website: 1) an Esri story map and 2) a GIS spatial data viewer. Both formats are discussed in detail in Chapter 1.



Further Reading

Bear Lake Basin: History, Geology, Biology, People (Palacios et al. 2007a)
Bear Lake Valley Blueprint and Toolkit (Envision Utah 2010)

GIS Data Layers

Bear Lake Sovereign Lands, Lake Level Contours, Landownership, Political Boundaries

2.2 Introduction

Physical Setting

Bear Lake is a large, deep, natural lake on the border of Utah and Idaho (see Figures 1-1 and 1-6). Approximately 19 miles long, more than 7 miles wide, and up to 208 feet deep, it is often called the "Caribbean of the Rockies" because of the turquoise-blue color of its water. Geologist F.V. Hayden described the lake in 1871 as being "set like an emerald among the mountains" (Parson 1996). Hayden, who had seen much of the western United States, said that "Not even the waters of Yellowstone Lake present such vivid coloring" as Bear Lake (Parson 1996).

Bear Lake has roughly 48 miles of shoreline and is a popular recreation spot. Its waters are often quite clear, with water transparency ranging from 7 to 39 feet deep and averaging approximately 16 feet deep. The annual water temperature ranges from approximately 32 degrees Fahrenheit (°F) to 69°F (Davis and Milligan 2011). The lake is in the south half of the approximately 50-mile-long and 5- to 10-mile-wide Bear Lake Valley, which is bordered by the Preuss Range and Bear Lake Plateau on the east and by the Bear River Range on the west. The Bear Lake Valley's west side ascends gently to the Bear River Range, but its east side rises sharply to the Preuss Range and Bear Lake Plateau. The bed of Bear Lake echoes this topography, with the steepest and deepest part being on its eastern edge (Davis and Milligan 2011).

Recurring fault movements and earthquakes created the basin that holds Bear Lake. Over the last 10 million years or more, tectonic forces in the Earth's crust have stretched the Bear Lake Valley in an east–west direction. Fault movement along the eastern Bear Lake fault and along other faults of less magnitude release this tensional stress. The eastern Bear Lake fault has the potential to generate earthquakes as large as magnitude 7.4 (Davis and Milligan 2011).

Bear Lake is one of the oldest lakes in North America. Although the longest sediment core extracted from the lake bottom indicated the lake is at least 250,000 years old, it is probably at least twice that old and could be several million years old. Most lakes are short-lived in geologic time because they fill with sediment, become wetlands, and eventually dry up. With Bear Lake, the underlying basin has deepened at a rate faster than sediments have accumulated. The Bear Lake Valley drops with each ground-displacing earthquake on the eastern Bear Lake fault. The lake may have formed when the valley began to drop ca. 10 million years ago. In addition, a lake needs a regular source of water to persist. Bear Lake has alternately connected to and been disconnected from Bear River, retracting and separating from the river for relatively short time intervals over the past 220,000 years. The lake did not dry up during these times of disconnection, indicating there was a significant inflow of groundwater that enabled it to last through major climatic and hydrologic changes (Davis and Milligan 2011).

Limestone and other carbonate rocks are common in the Bear River Range. Consequently, the area has characteristic karst features such as caves, sinkholes, underground drainages, and disappearing and reappearing streams. *Karst* is defined as terrain with distinctive landforms and hydrology arising from rainfall, surface runoff, and groundwater-dissolving soluble rocks. The Bear River Range limestones also contribute to unusual water chemistry at Bear Lake and to sustaining lake water levels and nearby springs. Water from underground karst drainages reaches the lake through groundwater and spring-fed streams. Underground water flow is further conveyed by numerous faults and fractures in the Bear River Range (Davis and Milligan 2011).

Climate

In Laketown, Utah, near the south end of Bear Lake, the monthly highest maximum temperature was 94°F, and the monthly lowest minimum temperature was -20°F for the period 2000–2020 (NOAA 2021). This wide range of temperatures, which also can occur on a daily basis, is a result of high elevation and a dry, semi-arid climate (Davis and Milligan 2011). Summer precipitation is created by moist air masses coming from the south, and scattered thunderstorms are common. In winter, eastward-moving snowstorms drop snow in the Bear River Range, with lesser amounts reaching the Bear Lake Valley. Bear Lake's surface has frozen 67% of the time since 1923; however, it has frozen only 47% of the time from 1990 to 2020 (Figure 2-1) (Tolentino 2020a). Average annual precipitation at Bear Lake near Garden City, Utah, is 14.17 inches with an average total snowfall of 42.5 inches. Snow stays on the ground for an average of 64 days per year. Prevailing winds are usually from the southwest at 8 to 10 miles per hour; winter winds typically come from the west (Envirocentric Design 2014a).

Figure 2-1. Ice pile on Bear Lake, 2016. Photograph by Wes Thompson. Used with permission.

The USGS National Climate Change Viewer provides information on climate change impacts at local to regional scales and enhances understanding of future climate patterns and impacts (USGS 2021). Climate and water balance projections for Rich County are shown in Table 2-1.

Table 2-1. U.S. Geological Survey National Climate Change Viewer Projections for Rich County

Parameter	Rich County Climate and Water Balance Projections*		
	1981–2010 (historical period)	2025–2049 (future period)	Change
Annual maximum temperature	54.65°F	58.34°F	3.69°F (significant)
Annual minimum temperature	27.03°F	30.81°F	3.78°F (significant)
Annual precipitation	1.5 inches/month	1.58 inches/month	0.08 inch/month (significant)
Annual runoff†	0.5 inch/month	0.5 inch/month	0.0 inch/month (not significant)
Annual snow‡	1.31 inches	0.79 inch	-0.52 inch (significant)
Annual soil storage§	2.29 inches	2.22 inches	-0.06 inch/month (significant)
Annual evaporative deficit¶	0.61 inch/month	0.8 inch/month	0.19 inch/month (significant)

Source: USGS (2021).

* Projections are based on the mean model (the average of 20 climate models) and the Representative Concentration Pathway 8.5 simulation (the most aggressive emissions scenario).

† Runoff: sum of direct runoff occurring from precipitation and snowmelt and surplus runoff, which occurs when soil moisture is at 100% capacity.

‡ Snow water equivalent: the liquid water stored in the snowpack.

§ Soil water storage: the water stored in the soil column.

¶ Evaporative deficit: the difference between potential evapotranspiration (amount of evaporation that would occur with unlimited water availability) and actual evapotranspiration; a measure of aridity.

Based on these data, Rich County is projected to see maximum and minimum temperature increases of more than 3.6°F between 2025 and 2049, along with an increase in precipitation, a reduction in liquid water stored in the snowpack, a decrease in water stored in the soil column, and an increase in the annual evaporative deficit (USGS 2021). These changes are not projected to impact annual runoff.

Land Use

The prehistory and history of the Bear Lake region are discussed in the Cultural Resources section of this chapter. Figures 2-2 through 2-5 show some of the land use and conditions at Bear Lake in the second half of the nineteenth century and early twentieth century. Figures 2-2 and 2-3 show relatively undeveloped lake shorelines. Figure 2-4 illustrates some of the earliest recreational use of the lake, and Figure 2-5 shows early agricultural use along the lake shoreline.

Current land use around Bear Lake consists primarily of agriculture, residences, vacation homes, short-term vacation rentals, commercial businesses, and recreational facilities (Figures 2-6 and 2-7). Human modifications to the lake have occurred over time, with the most impactful modification being the conversion of the top 21.65 feet of the lake to a water storage reservoir, as described in Chapter 1. Changes to the lake ecosystem have been documented in scientific studies, including increases in sediment and nutrient accumulation (Smoak and Swarzenski 2004), transitions in vegetation and shoreline dynamics (Belmont et al. 2018), and a reduction in the availability of littoral cobble habitat to fishes at lower lake elevations (Glassic and Gaeta 2018). Other lake stressors include development around the lake, increases in recreational use, introduction of nonnative species, increases in drought frequency and intensity, habitat loss, hydrologic modifications, and point and non-point source pollution (e.g., septic systems, agricultural runoff, stormwater runoff).

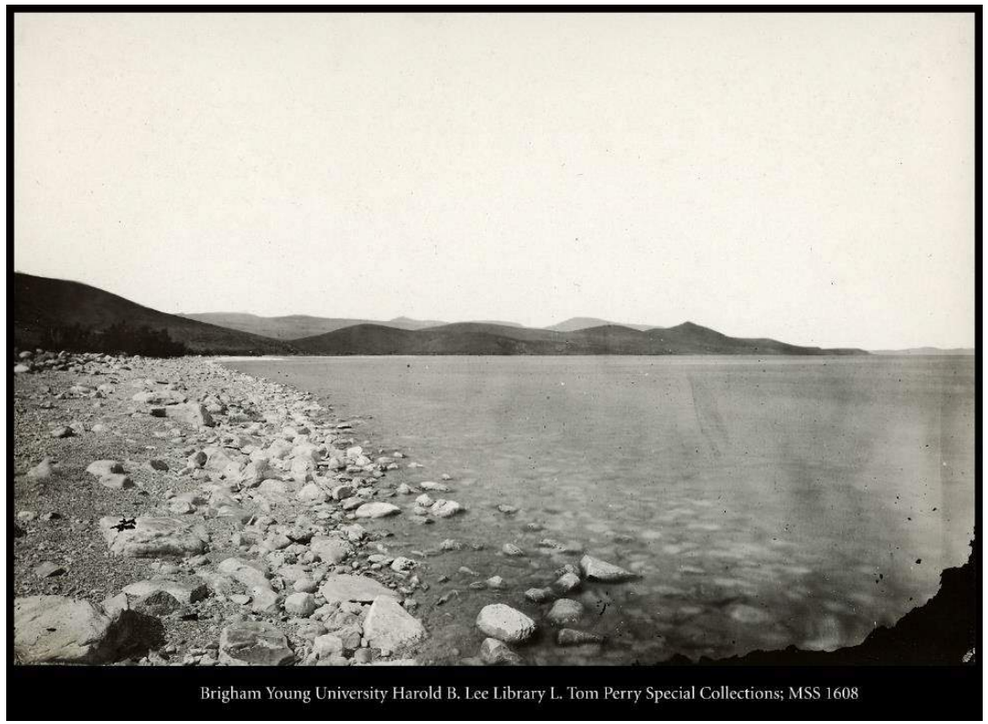


Figure 2-2. Bear Lake, Idaho, 1869–1870. L. Tom Perry Special Collections, Harold B. Lee Library, Brigham Young University, Provo, Utah (MSS 1608, 76a).

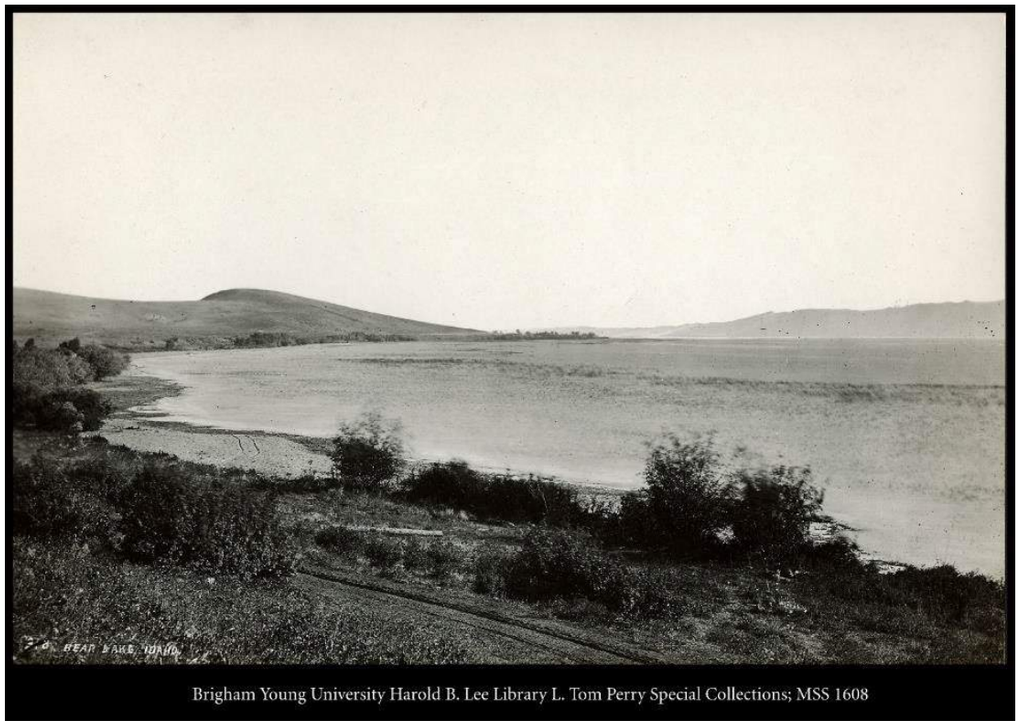


Figure 2-3. Bear Lake, Idaho, 1871–1873. L. Tom Perry Special Collections, Harold B. Lee Library, Brigham Young University, Provo, Utah (MSS 1608, 69a).

Figure 2-4. Stock Family boating on Bear Lake, Utah and Idaho, in 1908. Photograph courtesy of Special Collections & Archives, Merrill-Cazier Library, Utah State University.

Figure 2-5. Farmland in 1910, Bear Lake, Idaho. Utah State University. Used with permission.

Figure 2-6. Lakefront houses along Bear Lake Boulevard in Garden City; view facing west-southwest.

Figure 2-7. Looking toward lakefront and hillside development at Bear Lake; view facing southwest.

Uniqueness and Community Values

Bear Lake's uniqueness stems from a number of characteristics, including the fact that it is a very old, large, natural lake. It is known for its distinctive water chemistry that contributes to its turquoise blue waters and water transparency. Bear Lake also has four endemic species of fish that occur nowhere else (discussed in Section 2.3), and it is historically and economically important because of its use as a water storage reservoir and for recreation. In addition, Bear Lake is generally recognized as being special among lakes for its beauty and for its valuable scientific attributes. It has been intensely studied because it is one of the oldest lakes in North America, has not dried up during extended warm and dry climates, and is in an area sensitive to regional climate patterns. Research on Bear Lake helps us understand past climates and environments in this area and in the intermountain region (Davis and Milligan 2011).

In a survey conducted for the *Bear Lake Valley Blueprint and Toolkit* (Envision Utah 2010), community members identified values that were important or very important to their future quality of life. Figure 2-8 shows several of the highly ranked values.

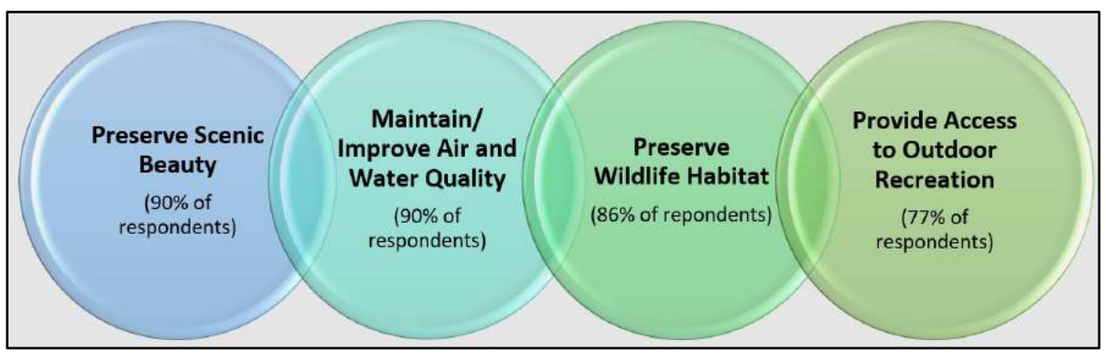


Figure 2-8. High-ranking Bear Lake Valley community values.
Source: Envision Utah (2010)

Two of the vision principles in the *Bear Lake Valley Blueprint and Toolkit* that highlight community values for Bear Lake are 1) preserve and protect water quality, wildlife habitat, and the scenic beauty of Bear Lake and the Bear Lake Valley, and 2) expand access to and opportunities for recreation for local residents and occupants of second homes, and to support the growing tourism industry (Envision Utah 2010).

Further Reading

Bear Lake Basin: History, Geology, Biology, People (Palacios et al. 2007a)
Bear Lake Valley Blueprint and Toolkit (Envision Utah 2010)
Why is Bear Lake so Blue? and other commonly asked questions (Davis and Milligan 2011)

GIS Data Layers

Bear Lake Sovereign Lands, Landownership, Political Boundaries, Zoning

2.3 Ecosystem Resources

Ecosystem resources in the Bear Lake CMP planning area are discussed in two sections: Fish and Wildlife Habitat and Fish and Wildlife Species. The Fish and Wildlife Habitat section provides information on the fish and wildlife habitat types in the planning area; bird habitat conservation areas; and vegetation, including native plant species and introduced, invasive, and noxious weed species. Vegetation is a critical element of wildlife habitat because healthy plant communities support the ecological integrity of habitats. The Fish and Wildlife species section discusses federally listed wildlife, species of greatest conservation need (SGCN), and avian focal species; aquatic invasive species; fish species (endemic, native, and introduced); big game species; and bird species.

Fish and Wildlife Habitat

Introduction

For the purposes of the Bear Lake CMP, the term *habitat* refers to fish and wildlife habitat. Fish and wildlife habitat is a complex system of plant and animal communities, water, geography, elevation, and other environmental components that provide food and cover for individual species. Bear Lake and its adjacent lands and tributaries provide fish and wildlife species with food and cover and facilitate their movement through the landscape.

Habitats

The *Utah Wildlife Action Plan* was created to manage native fish and wildlife species in Utah and their habitats to help prevent them from being listed under the ESA (Utah Wildlife Action Plan Joint Team 2015). The Bear Lake CMP planning area contains five DWR high-priority key habitats that support SGCN according to the *Utah Wildlife Action Plan* (Utah Wildlife Action Plan Joint Team 2015). These key habitats are aquatic-forested, aquatic-scrub/shrub, emergent, riverine, and open water. Identification of these key habitats allows managers and stakeholders to prioritize conservation and management focus areas. However, to create a broader understanding of the landscape context and potential threats to different habitats, the Bear Lake CMP uses Southwest Regional Gap Analysis Project (SWReGAP) data (USGS 2005) and Utah Geological Survey (UGS) local wetland data (UGS 2014), both shown on the GIS data viewer, to define the variety of cover types in and adjacent to Bear Lake. SWReGAP data are intended to be used at a scale of 1:100,000 and may be less accurate for landscape features with varying lake levels like Bear Lake. With this spatial data, vegetation was classified using the major land cover types predicted to occur in the planning area. Land cover types are defined as recurring groups of biological communities found in similar physical environments and influenced by similar ecological processes, such as drought, fire, and flooding (USGS 2005). Local wetland types and similar land cover types have been grouped together into more generic habitats, resulting in eight fish and wildlife habitats in the planning area. The eight habitats and the acreages of each habitat in the planning area when the lake is at a high lake level (plus a 50-foot buffer) are provided in Table 2-2. Acreages were calculated based on the cumulative acreage of each habitat type on Bear Lake sovereign lands.

Table 2-2. Fish and Wildlife Habitat in the Planning Area (at a lake level of 5,923 feet)

Habitat Type	Acres in Planning Area	Percentage in Planning Area
Aquatic (DWR key habitat)*	34,497	97%
Wetland (DWR key habitat)†	950	3%
Agriculture	30	Less than 1%
Developed (open space to low intensity and medium to high intensity)‡	109	Less than 1%
Grassland	4	Less than 1%
Riparian (DWR key habitat)§	4	Less than 1%
Shrubland	25	Less than 1%
Woodland	27	Less than 1%

Note: Acres of fish and wildlife habitat were calculated at a lake elevation of 5,923 feet plus a 50-foot buffer.

* Aquatic habitat constitutes Bear Lake and adjacent tributaries and is comparable to DWR's open water and riverine key habitats. Riverine habitat captures areas where streamflow enters the lake.

† Wetland habitat is comparable to DWR's emergent key habitat.

‡ The developed open space to low intensity habitat type most commonly includes large-lot single-family housing units, parks, golf courses, and vegetation planted in developed settings. The developed medium to high intensity habitat type most commonly includes single-family housing units and highly developed areas where people reside or work in high numbers (e.g., apartment complexes, commercial/industrial development).

§ Riparian habitat is comparable to DWR's aquatic-forested and aquatic-scrub/shrub key habitats.

Physical features and characteristic species of the eight fish and wildlife habitats in the planning area are described and illustrated in Figures 2-9 through 2-16. Characteristic species were developed with assistance from the Bear Lake CMP planning team and are sorted alphabetically by common name. Scientific names for each characteristic species are provided in Table 2-3.

AQUATIC

Physical Features

Covers approximately 97% of the planning area at a lake level of 5,923 feet. Comprises the lake habitat of the planning area and adjacent tributaries where streamflow enters Bear Lake.

Comparable to DWR's open water and riverine key habitats.

Plant Species

Characteristic submerged aquatic vegetation includes northern watermilfoil and pondweed species. Floating vegetation includes duckweeds. Common emergent vegetation includes broadleaf cattail, hardstem bulrush, and phragmites.

Mammal Species

American mink, muskrat

Bird Species

American coot, American white pelican (shown here), Barrow's goldeneye, belted kingfisher, California gull, Canada goose, common goldeneye, common loon, common merganser, eared grebe, gadwall, green-winged teal, hooded merganser, lesser scaup, mallard, northern pintail, northern shoveler, osprey, red-breasted merganser, redhead, ring-billed gull, spotted sandpiper, tree swallow, trumpeter swan, tundra swan, western grebe, willet

Fish Species

Bear Lake Bonneville cutthroat trout, Bonneville whitefish, Bear Lake sculpin, Bear Lake whitefish, black bullhead, Bonneville cisco (shown here), brook trout, brown trout, common carp, green sunfish, lake trout, rainbow trout, redside shiner, speckled dace, Utah chub, Utah sucker, yellow perch

Reptile and Amphibian Species

Northern leopard frog and western chorus frog

Bonneville cisco photograph by Redmustang01. License info: https://creativecommons.org/licenses/by-sa/4.0/deed.en. Photograph unedited.

American Pelican photograph by Mike's Birds. License info: https://creativecommons.org/licenses/by-sa/2.0/. Photograph unedited.

Figure 2-9. Physical features and characteristic species of aquatic habitat in the planning area.

WETLAND

Physical Features

Covers approximately 3% of the planning area at a lake level of 5,923 feet. Includes emergent marsh, wet meadow, and shrubby wetlands.

Comparable to DWR's emergent key habitat.

Plant Species

Common emergent and floating vegetation includes arctic rush, broadleaf cattail, chairmaker's bulrush, common spikerush, hardstem bulrush, phragmites, duckweed species, and pondweed species.

Wet meadows are typically dominated by arctic rush, common spikerush, foxtail barley, horsetail species, scratchgrass, sedges, seep monkeyflower, and swordleaf rush.

Shrubby wetland areas are typically dominated or codominated by willow species, mainly narrowleaf willow and shining willow. If a herbaceous layer is present, it is usually dominated by graminoids (grass species, rush species, and sedge species).

Mammal Species

American mink, meadow vole, moose (shown here), muskrat, striped skunk, vole species

Bird Species

American coot, barn swallow, belted kingfisher, Brewer's blackbird, Canada goose, common goldeneye, gadwall, great blue heron, green-winged teal, killdeer, mallard, northern harrier, northern pintail, northern shoveler, redhead, red-winged blackbird, sandhill crane, spotted sandpiper, tree swallow, violet-green swallow, western grebe, willet, yellow-headed blackbird (shown here)

Fish Species

Utah chub, common carp, and green sunfish are found in emergent marsh areas where vegetation is sparse.

Reptile and Amphibian Species

Columbia spotted frog, common garter snake, eastern racer, northern leopard frog, striped whipsnake, tiger salamander, western (boreal) toad, western chorus frog, western terrestrial garter snake

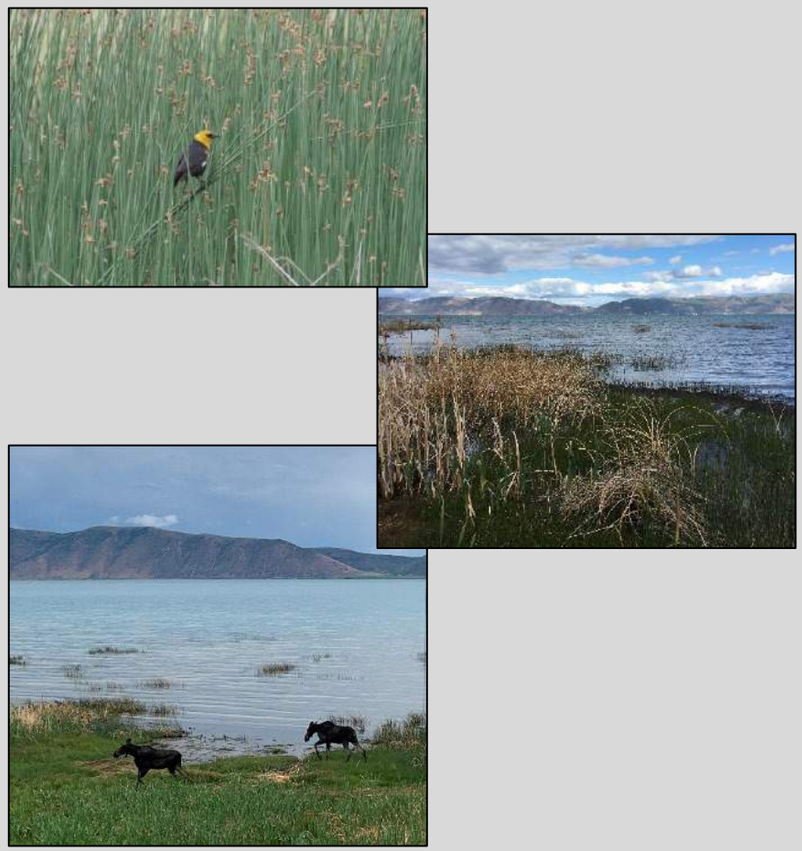


Figure 2-10. Physical features and characteristic species of wetland habitat in the planning area.

AGRICULTURE

Physical Features

Covers less than 1% of the planning area at a lake level of 5,923 feet. Includes pastureland planted for crops or livestock grazing.

Plant Species

Grasses, legumes, or grass-legume mixtures planted for the production of seed or hay crops (shown here) or planted for livestock grazing (shown here).

Mammal Species

Coyote, deer mouse, long-tailed weasel, northern pocket gopher, red fox, shrew species, striped skunk, vole species, and western harvest mouse

Bird Species

American crow, American goldfinch, American kestrel, American robin, barn swallow, brown-headed cowbird, California gull, Canada goose, common raven, Eurasian collared-dove, European starling, great blue heron, great horned owl, mourning dove, red-tailed hawk, red-winged blackbird, ring-billed gull, rock pigeon, song sparrow, and western meadowlark

Reptile and Amphibian Species

Western terrestrial garter snake

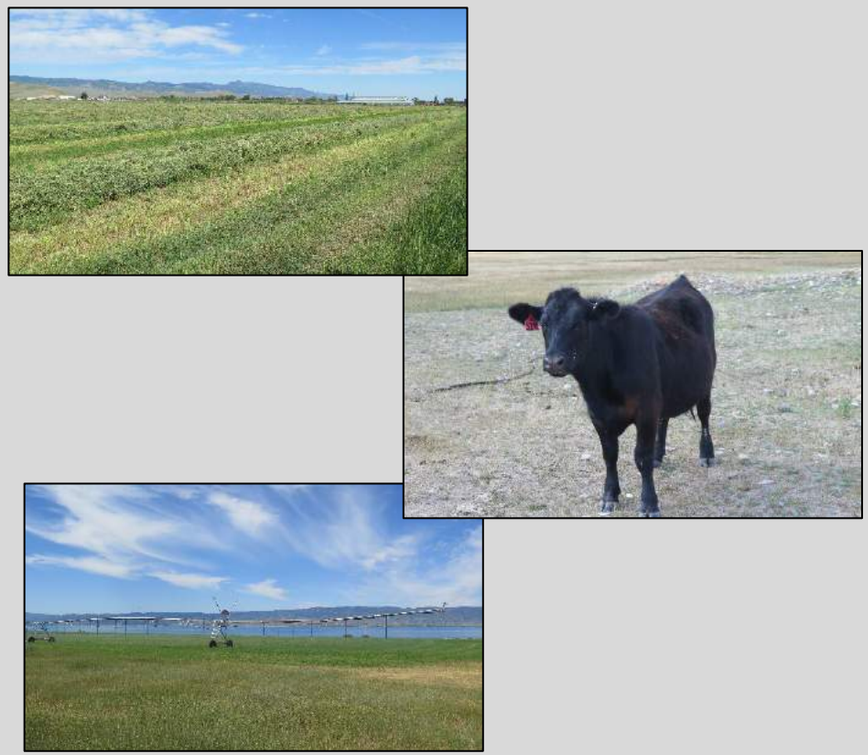


Figure 2-11. Physical features and characteristic species of agriculture habitat in the planning area.

DEVELOPED

Physical Features

Covers less than 1% of the planning area at a lake level of 5,923 feet.

Includes SWReGAP land cover classifications for Open Space to Low-Intensity Development and Medium- to High-Intensity Development.

Developed (open space to low intensity) includes areas with a mixture of constructed materials and vegetation, with impervious surfaces accounting for < 20% to 49% of total cover. This habitat includes open spaces, preserves, parks, natural areas, boat ramps, campgrounds, picnic areas, and single-family housing units.

Developed (medium to high intensity) includes areas with a mixture of constructed materials and vegetation, with impervious surfaces accounting for 50% to 100% of total cover. This habitat includes single-family housing units, apartment and condominium complexes, and commercial and disturbed areas.

Plant Species

Dominated by turf grass species and landscape or ornamental trees and shrubs. Common weed species include burdock, cheatgrass, common mallow, field bindweed, sow thistle, and yellow salsify.

Mammal Species

Big brown bat, cottontail rabbit, house mouse, little brown myotis, raccoon, and striped skunk

Bird Species

American crow, American goldfinch, American kestrel, American robin, barn swallow, black-billed magpie, black-capped chickadee, Bohemian waxwing, Brewer's blackbird, brown-headed cowbird, Bullock's oriole, California gull, common raven, downy woodpecker, Eurasian collared-dove, European starling, great horned owl (shown here), horned lark, house finch, house sparrow, house wren, killdeer, mallard, mourning dove, ring-billed gull, rock pigeon, and tree swallow

Reptile and Amphibian Species

Common garter snake and western terrestrial garter snake

Figure 2-12. Physical features and characteristic species of developed lands habitat in the planning area.

GRASSLAND

Physical Features

Covers less than 1% of the planning area at a lake level of 5,923 feet. Includes SWReGAP land cover classifications for Southern Rocky Mountain Montane-Subalpine Grassland.

Plant Species

Annual and perennial grass species include bluebunch wheatgrass, cheatgrass, Idaho fescue, Indian ricegrass, and Sandberg bluegrass. Scattered shrub and forb species may also be present.

Mammal Species

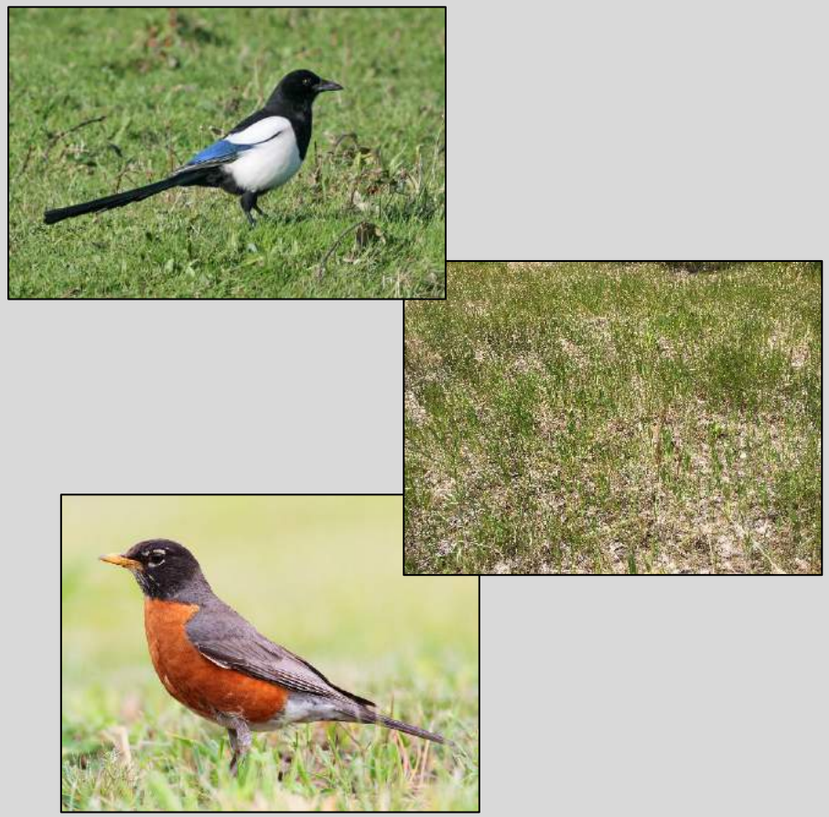
American badger, coyote, deer mouse, house mouse, meadow vole, northern pocket gopher, red fox, shrew species, and vole species

Bird Species

American kestrel, American robin (shown here), barn swallow, black-billed magpie (shown here), Brewer's blackbird, brown-headed cowbird, Canada goose, common raven, golden eagle, horned lark, killdeer, mourning dove, northern harrier, rough-legged hawk, and western meadowlark

Reptile and Amphibian Species

Eastern racer and western terrestrial garter snake



Black-billed magpie photograph by Ron Knight. License info: https://creativecommons.org/licenses/by-sa/2.0/. Photograph unedited.
American robin photograph by Kristof vt. License info: https://creativecommons.org/licenses/by-sa/3.0/deed.en. Photograph unedited.

Figure 2-13. Physical features and characteristic species of grassland habitat in the planning area.

RIPARIAN

Physical Features

Covers less than 1% of the planning area at a lake level of 5,923 feet. Includes SWReGAP land cover classification for Rocky Mountain Lower Montane Riparian Woodland and Shrubland. This habitat type contains riparian tree and shrub species that form single and multistory canopy structures.

Comparable to DWR's aquatic-forested and aquatic-scrub/shrub key habitats.

Plant Species

Dominant native trees include box elder, eastern cottonwood, narrowleaf cottonwood, and water birch. Introduced species include Russian olive.

Shrubs include chokecherry, currant species, narrowleaf willow, and shining willow. Herbaceous layers are often dominated by annual and perennial grass species; mesic forbs, sedge species, and rush species may also be present.

Mammal Species

Big brown bat, bobcat, cottontail rabbit, deer mouse, hoary bat, little brown myotis, long-tailed vole, moose, North American porcupine, raccoon, and striped skunk

Bird Species

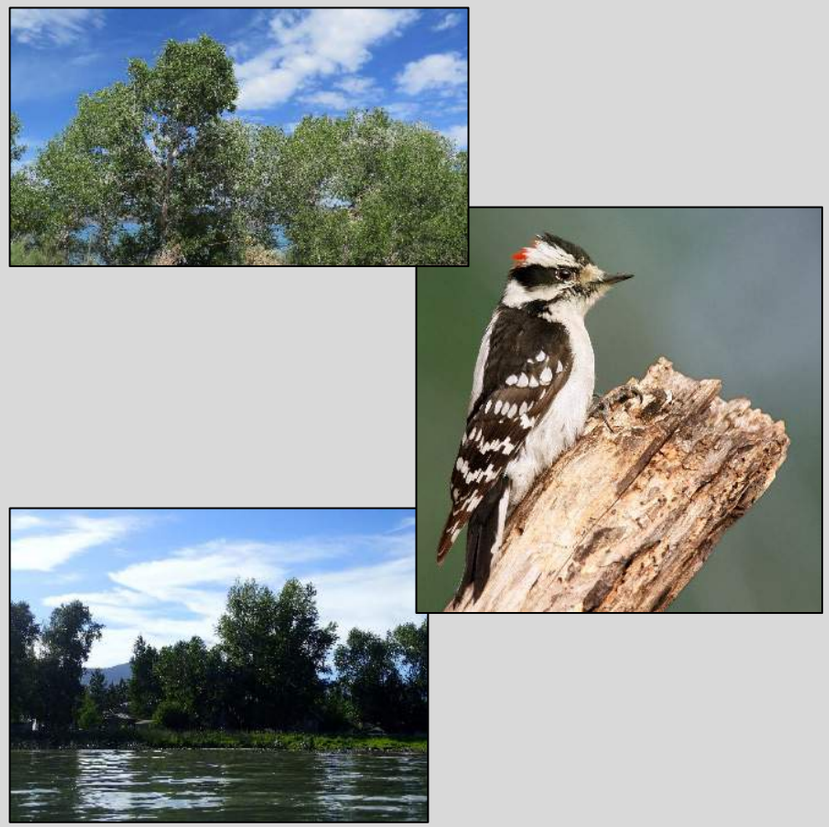
American goldfinch, American robin, bald eagle, black-billed magpie, black-capped chickadee, broad-tailed hummingbird, Bullock's oriole, dark-eyed junco, downy woodpecker (shown here), Eurasian collared dove, great horned owl, northern flicker, sharp-shinned hawk, tree swallow, western tanager, yellow-rumped warbler, and yellow warbler

Fish Species

Bonneville cutthroat trout are known to spawn in stream tributaries where riparian vegetation occurs on the banks.

Reptile and Amphibian Species

Western terrestrial garter snake and Woodhouse's toad



Downy woodpecker photograph by Wolfgang Wander. License info: https://creativecommons.org/licenses/by-sa/3.0/deed.en. Photograph unedited.

Figure 2-14. Physical features and characteristic species of riparian habitat in the planning area.

SHRUBLAND

Physical Features

Covers less than 1% of the planning area at a lake level of 5,923 feet. Includes SWReGAP land cover classifications for Inter-Mountain Basins Big Sagebrush Shrubland, Inter-Mountain Basins Big Sagebrush Steppe, and Inter-Mountain Basins Montana Sagebrush Steppe.

Plant Species

Common shrub species include antelope bitterbrush, basin big sagebrush, broom snakeweed, Plains pricklypear, rubber rabbitbrush, and Wyoming big sagebrush. The herbaceous layer is composed of annual and perennial grasses and forbs, including arrowleaf balsamroot, bluebunch wheatgrass, cheatgrass, Indian ricegrass, Sandberg bluegrass, Utah milkvetch, and yellow salsify.

Mammal Species

American badger, cottontail rabbit, deer mouse, house mouse, long-tailed vole, mule deer, North American porcupine, northern pocket gopher, pronghorn (shown here), and red fox

Bird Species

American goldfinch, black-billed magpie, Brewer's blackbird, Cassin's finch, common raven, golden eagle, horned lark, house wren, mourning dove, northern harrier, red-tailed hawk, sage thrasher, spotted towhee, Townsend's solitaire, and turkey vulture

Reptile and Amphibian Species

Common sagebrush lizard, gopher snake, Great Basin rattlesnake, Great Basin spadefoot, western skink, and western terrestrial garter snake

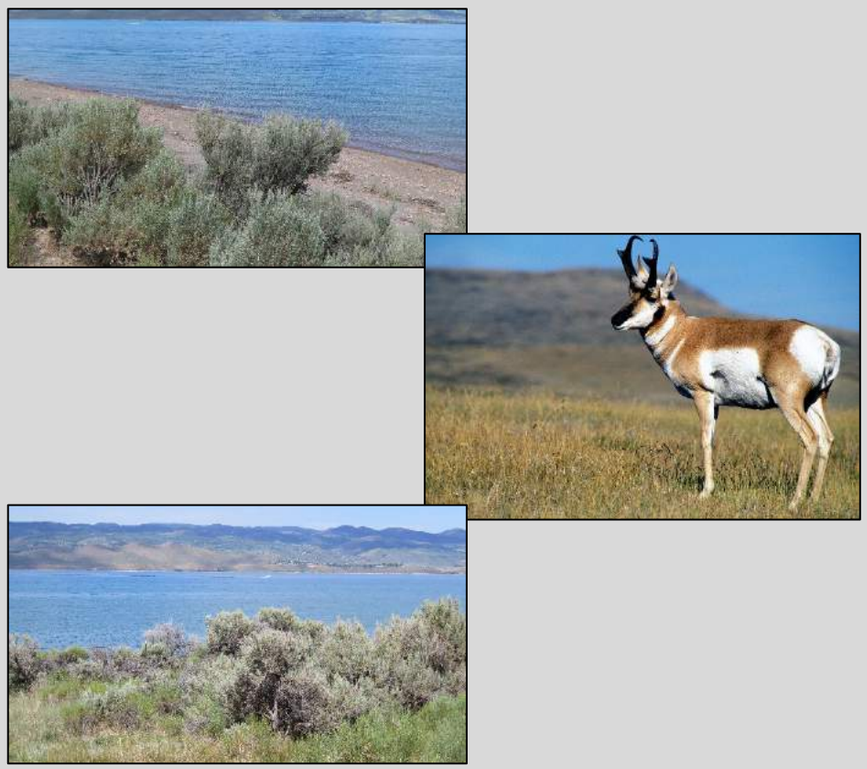


Figure 2-15. Physical features and characteristic species of shrubland habitat in the planning area.

WOODLAND

Physical Features

Covers less than 1% of the planning area at a lake level of 5,923 feet. Includes SWReGAP land cover classifications for Rocky Mountain Bigtooth Maple Ravine Woodland and Colorado Plateau Pinyon-Juniper Woodland.

Plant Species

Dominant native trees include box elder, Rocky Mountain maple, and Utah juniper. Understory layers may be present, dominated by shrubs and graminoids.

Mammal Species

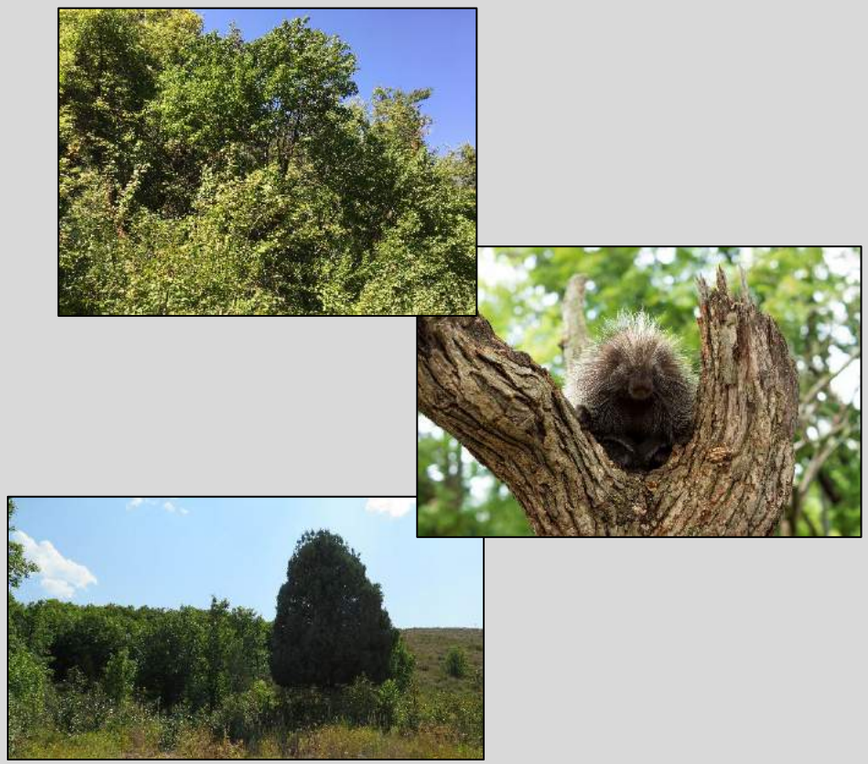
Big brown bat, bobcat, coyote, deer mouse, hoary bat, least chipmunk, little brown myotis, long-tailed vole, long-tailed weasel, moose, mule deer, North American porcupine (shown here), northern pocket gopher, raccoon, red fox, shrew species, and striped skunk

Bird Species

American crow, American goldfinch, American robin, bald eagle, black-billed magpie, black-capped chickadee, Brewer's blackbird, broad-tailed hummingbird, Bullock's oriole, Cassin's finch, cedar waxwing, common merganser, common raven, downy woodpecker, great horned owl, house finch, house wren, mourning dove, northern flicker, northern shrike, pine grosbeak, red-tailed hawk, sharp-shinned hawk, song sparrow, spotted towhee, Townsend's solitaire, turkey vulture, violet-green swallow, western tanager, western wood-pewee, wild turkey, and yellow warbler

Reptile and Amphibian Species

Common sagebrush lizard, eastern racer, gopher snake, Great Basin spadefoot, tiger salamander, western (boreal) toad, western skink, western terrestrial garter snake, and Woodhouse's toad



Porcupine photograph by Potawatomi Zoo. License info: https://creativecommons.org/licenses/by-sa/4.0/deed.en. Photograph unedited.

Figure 2-16. Physical features and characteristic species of woodland habitat in the planning area.

Table 2-3. Common and Scientific Names of Characteristic Species in the Planning Area (see Figures 2-9 to 2-16)

Common Name	Scientific Name
Plants	
Antelope bitterbrush (native)	*Purshia tridentata*
Arctic rush (native and nonnative)	*Juncus arcticus*
Arrowleaf balsamroot (native)	*Balsamorhiza sagittata*
Basin big sagebrush (native)	*Artemisia tridentata* ssp. *tridentata*
Bluebunch wheatgrass (native)	*Pseudoroegneria spicata*
Box elder (native)	*Acer negundo*
Broadleaf cattail (native)	*Typha latifolia*
Broom snakeweed (native)	*Gutierrezia sarothrae*
Burdock (nonnative)	*Arctium minus*
Chairmaker's bulrush (native)	*Schoenoplectus americanus*
Cheatgrass (nonnative)	*Bromus tectorum*
Chokecherry (native)	*Prunus virginiana*
Common mallow (nonnative)	*Malva neglecta*
Common spikerush (native)	*Eleocharis palustris*
Currant species (native)	*Ribes* spp.
Duckweeds (native)	*Lemna* spp.
Eastern cottonwood (native)	*Populus deltoides*
Field bindweed (noxious)	*Convolvulus arvensis*
Grass species (native and nonnative)	–
Foxtail barley (native)	*Hordeum jubatum*
Hardstem bulrush (native)	*Schoenoplectus acutus*
Horsetail species (native)	*Equisetum* spp.
Idaho fescue (native)	*Festuca idahoensis*
Indian ricegrass (native)	*Achnatherum hymenoides*
Narrowleaf cottonwood (native)	*Populus angustifolia*
Narrowleaf willow (native)	*Salix exigua*
Northern watermilfoil (native)	*Myriophyllum exalbescens*
Phragmites (also known as common reed) (noxious)	*Phragmites australis*
Plains pricklypear (native)	*Opuntia polyacantha*
Pondweed species (native and nonnative)	–
Rocky Mountain maple (native)	*Acer glabrum*
Rubber rabbitbrush (native)	*Ericameria nauseosa*
Rush species (native and nonnative)	–
Russian olive (nonnative)	*Elaeagnus angustifolia*
Sandberg bluegrass (native)	*Poa secunda*
Scratchgrass (native)	*Muhlenbergia asperifolia*
Sedges (native and nonnative)	*Carex* spp.
Seep monkeyflower (native)	*Mimulus guttatus*
Shining willow (native)	*Salix lucida*
Sow thistle (nonnative)	*Sonchus oleraceus*
Turf grass species (native and nonnative)	–
Swordleaf rush (native)	*Juncus ensifolius*
Utah juniper (native)	*Juniperus osteosperma*
Utah milkvetch (native)	*Astragalus utahensis*

Common Name	Scientific Name
Water birch (native)	*Betula occidentalis*
Willow species (native)	*Salix* spp.
Wyoming big sagebrush (native)	*Artemisia tridentata* ssp. *wyomingensis*
Yellow salsify (nonnative)	*Tragopogon dubius*
Yellow sweetclover (nonnative)	*Melilotus officinalis*
Mammals	
American badger	*Taxidea taxus*
American mink	*Neovison vison*
Big brown bat	*Eptesicus fuscus*
Bobcat	*Lynx rufus*
Cottontail rabbit	*Sylvilagus nuttallii*
Coyote	*Canis latrans*
Deer mouse	*Peromyscus maniculatus*
Hoary bat	*Lasiurus cinereus*
House mouse	*Mus musculus*
Least chipmunk	*Neotamias minimus*
Little brown myotis	*Myotis lucifugus*
Long-tailed vole	*Microtus longicaudus*
Long-tailed weasel	*Mustela frenata*
Meadow vole	*Microtus pennsylvanicus*
Moose	*Alces alces*
Mule deer	*Odocoileus hemionus*
Muskrat	*Ondatra zibethicus*

Common Name	Scientific Name
North American porcupine	*Erethizon dorsatum*
Northern pocket gopher	*Thomomys talpoides*
Pronghorn	*Antilocapra americana*
Raccoon	*Procyon lotor*
Red fox	*Vulpes*
Shrew species	*Sorex* spp.
Striped skunk	*Mephitis*
Vole species	*Microtus* spp.
Western harvest mouse	*Reithrodontomys megalotis*
Birds	
American coot	*Recurvirostra americana*
American crow	*Corvus brachyrhynchos*
American goldfinch	*Spinus tristis*
American kestrel	*Falco sparverius*
American robin	*Turdus migratorius*
American white pelican	*Pelecanus erythrorhynchos*
Bald eagle	*Haliaeetus leucocephalus*
Barn swallow	*Hirundo rustica*
Barrow's goldeneye	*Bucephala islandica*
Belted kingfisher	*Megaceryle alcyon*
Black-billed magpie	*Pica hudsonia*
Black-capped chickadee	*Poecile atricapillus*
Bohemian waxwing	*Bombycilla garrulus*

Common Name	Scientific Name
Brewer's blackbird	*Euphagus cyanocephalus*
Broad-tailed hummingbird	*Selasphorus platycercus*
Brown-headed cowbird	*Molothrus ater*
Bullock's oriole	*Icterus bullockii*
California gull	*Larus californicus*
Canada goose	*Branta canadensis*
Cassin's finch	*Haemorhous cassinii*
Cedar waxwing	*Bombycilla cedrorum*
Common goldeneye	*Bucephala clangula*
Common loon	*Gavia immer*
Common merganser	*Mergus merganser*
Common raven	*Corvus corax*
Dark-eyed junco	*Junco hyemalis*
Downy woodpecker	*Picoides pubescens*
Eared grebe	*Podiceps nigricollis*
Eurasian collared-dove	*Streptopelia decaocto*
European starling	*Sturnus vulgaris*
Gadwall	*Anas strepera*
Golden eagle	*Aquila chrysaetos*
Great blue heron	*Ardea herodias*
Great horned owl	*Bubo virginianus*
Green-winged teal	*Anas crecca*
Hooded merganser	*Lophodytes cucullatus*

Common Name	Scientific Name
Horned lark	*Eremophila alpestris*
House finch	*Haemorhous mexicanus*
House sparrow	*Passer domesticus*
House wren	*Troglodytes aedon*
Killdeer	*Charadrius vociferus*
Lesser scaup	*Aythya affinis*
Mallard	*Anas platyrhynchos*
Mourning dove	*Zenaida macroura*
Northern flicker	*Colaptes auratus*
Northern harrier	*Circus hudsonius*
Northern pintail	*Anas acutas*
Northern shoveler	*Anas clypeata*
Northern shrike	*Lanius excubitor*
Osprey	*Pandion haliaetus*
Pine grosbeak	*Pinicola enucleator*
Redhead	*Aythya americana*
Red-breasted merganser	*Mergus serrator*
Red-tailed hawk	*Buteo jamaicensis*
Red-winged blackbird	*Agelaius phoeniceus*
Ring-billed gull	*Larus delawarensis*
Rock pigeon	*Columba livia*
Rough-legged hawk	*Buteo lagopus*
Sage thrasher	*Oreoscoptes montanus*

Common Name	Scientific Name
Sandhill crane	*Grus canadensis*
Sharp-shinned hawk	*Accipiter striatus*
Song sparrow	*Melospiza melodia*
Spotted sandpiper	*Actitis macularius*
Spotted towhee	*Pipilo maculatus*
Townsend's solitaire	*Myadestes townsendi*
Tree swallow	*Tachycineta bicolor*
Trumpeter swan	*Cygnus buccinator*
Tundra swan	*Cygnus columbianus*
Turkey vulture	*Cathartes aura*
Violet-green swallow	*Tachycineta thalassina*
Western grebe	*Aechmophorus occidentalis*
Western meadowlark	*Sturnella neglecta*
Western tanager	*Piranga ludoviciana*
Western wood-pewee	*Contopus sordidulus*
Wild turkey	*Meleagris gallopavo*
Willet	*Tringa semipalmata*
Yellow-headed blackbird	*Xanthocephalus xanthocephalus*
Yellow-rumped warbler	*Setophaga coronata*
Yellow warbler	*Setophaga petechia*
Fishes	
Bear Lake sculpin	*Cottus extensus*
Bear Lake whitefish	*Prosopium abyssicola*
Black bullhead	*Ameiurus melas*
Bonneville cisco	*Prosopium gemmifer*
Bonneville whitefish	*Prosopium spilonotus*
Bear Lake Bonneville cutthroat trout	*Oncorhynchus clarkii utah*
Brook trout	*Salvelinus fontinalis*
Brown trout	*Salmo trutta*
Common carp	*Cyprinus carpio*
Green sunfish	*Micropterus cyanellus*
Lake trout	*Salvelinus namaycush*
Rainbow trout	*Oncorhynchus mykiss*
Redside shiner	*Richardsonius balteatus*
Speckled dace	*Rhinichthys osculus*
Utah chub	*Gila atraria*
Utah sucker	*Catostomus ardens*
Yellow perch	*Perca flavescens*
Reptiles and Amphibians	
Columbia spotted frog	*Rana luteiventris*
Common garter snake	*Thamnophis sirtalis*
Common sagebrush lizard	*Sceloporus graciosus*
Eastern racer	*Coluber constrictor*
Gopher snake	*Pituophis catenifer*
Great Basin rattlesnake	*Crotalus oreganus lutosus*
Great Basin spadefoot	*Spea intermontana*

Common Name	Scientific Name
Northern leopard frog	*Rana pipiens*
Striped whipsnake	*Masticophis taeniatus*
Tiger salamander	*Ambystoma tigrinum*
Western chorus frog	*Pseudacris triseriata*
Western skink	*Eumeces skiltonianus*
Western terrestrial garter snake	*Thamnophis elegans vagrans*
Western (boreal) toad	*Anaxyrus boreas*
Woodhouse's toad	*Bufo woodhousii*

Habitat Location and Condition

Using a cross section of Bear Lake, Figure 2-17 shows specific aquatic, wetland, and riparian habitats of Bear Lake. The condition and quality of habitats in the planning area can be negatively impacted through habitat degradation, fragmentation, sedimentation, and loss. Such impacts may stem from development, the introduction and spread of invasive species, the presence of noise and light, and pollution (e.g., sewage, fertilizer runoff, and chemicals from gasoline powered watercrafts). In some instances, habitat in the planning area has been altered from its pre-settlement condition by the use of the lake as a water storage reservoir. In general, human disturbances have fragmented contiguous shrublands and woodlands and altered riparian and other habitat types in the planning area.

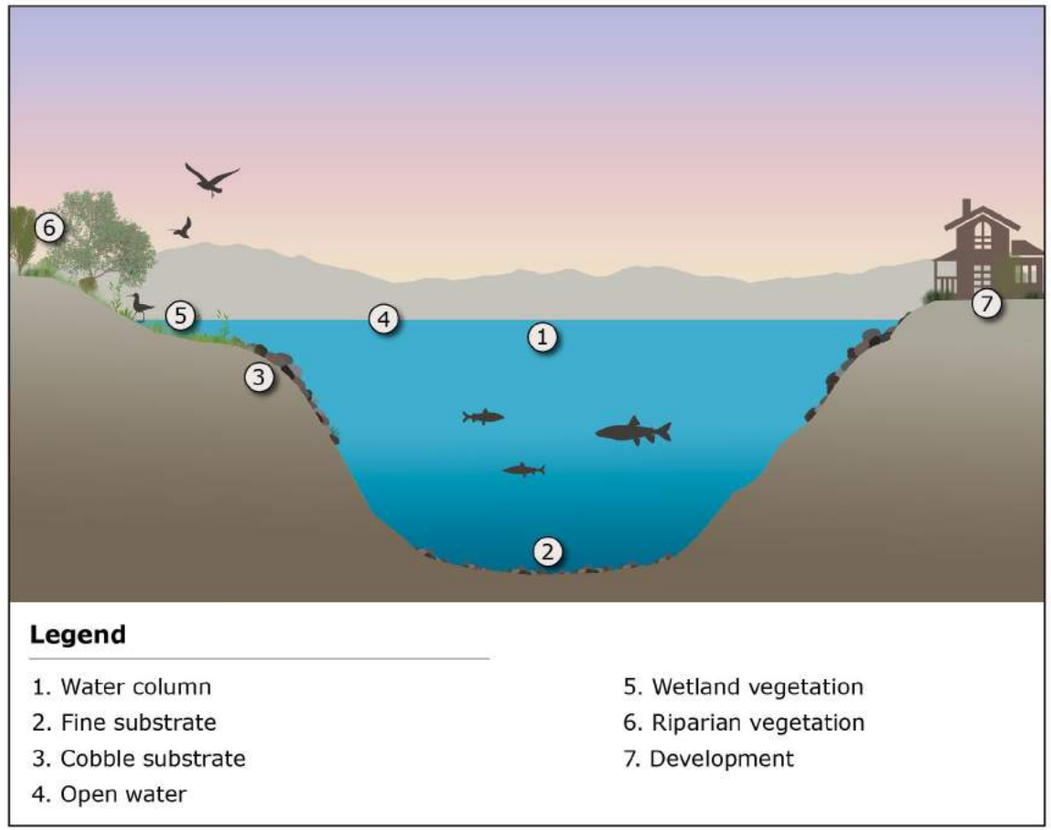


Figure 2-17. Cross section showing aquatic, wetland, and riparian habitats in the planning area.

Bird Habitat Conservation Areas

Bird Habitat Conservation Areas (BHCAs) are areas where priority bird species and priority habitats intersect, threats have been identified, and opportunities for management exist. BHCAs are a major component of the *Intermountain West Joint Venture 2013 Implementation Plan, Strengthening Science and Partnerships*, which provides information on habitat characteristics that are important to shorebirds, species-specific habitat, and population objectives (Intermountain West Joint Venture 2013). BHCAs may provide important migratory stop-over, foraging, nesting, and/or wintering habitat. BHCAs parallel and compliment the Important Bird Area program, administered by BirdLife International and its United States partner, the National Audubon Society. Two BHCAs are located in and adjacent to Bear Lake: the Bear Lake BHCA (which includes the Idaho portion of Bear Lake) and the North Rich BHCA (which includes the southern and southeastern shores of Bear Lake in Utah). Both BHCAs are shown on the GIS data viewer.

Vegetation

Vegetation is a major structural component of habitat. Vegetation is often classified by vertical structure or layers such as grasses and forbs (herbaceous), shrubs, and trees. Vegetation in the planning area can also be categorized in terms of native or desirable species, federally listed species, and invasive and noxious weed species. These categories are not mutually exclusive but can be helpful when making management decisions regarding regulations, restoration, and weed management. The distribution and abundance of plant species can be influenced by disturbance; the proximity of disturbance to the lake shoreline; and seed dispersal by wind, water, wildlife, and recreation activities.

NATIVE PLANT SPECIES

A native plant species is one that has evolved and occurs naturally in a particular region, ecosystem, or habitat (U.S. Forest Service [USFS] 2021). Native plant communities provide ecological functions such as native fish and wildlife habitat and species diversity, erosion control, flood moderation, water filtration, and development and enrichment of soil. Table 2-4 lists native plant species in the planning area, along with their wetland indicator status. The wetland indicator status of a plant reflects the likelihood of its presence in a wetland and influences where a particular plant species may be planted during revegetation and restoration projects. For example, a plant with an upland wetland indicator status (i.e., upland [UPL]) almost never occurs in wetlands and would therefore be planted in an upland area rather than a wetland area. This plant list can serve as a guide for planning revegetation or restoration projects, but is not meant to be an exhaustive list and does not reflect current seed or plant stock availability.

Table 2-4. Native Plant Species in the Planning Area

Common Name	Scientific Name	Wetland Indicator Status*
Aquatic and Wetland Plants		
Arctic rush	*Juncus arcticus*	FACW
Chairmaker's bulrush	*Schoenoplectus americanus*	OBL
Common spikerush	*Eleocharis palustris*	OBL
Duckweed species	*Lemna* spp.	OBL
Hardstem bulrush	*Schoenoplectus acutus*	OBL
Nebraska sedge	*Carex nebrascensis*	OBL
Northern watermilfoil	*Myriophyllum sibiricum*	OBL
Spiral ditchgrass	*Ruppia cirrhosa*	OBL
Swordleaf rush	*Juncus ensifolius*	FACW
Riparian Trees		
Box elder	*Acer negundo*	FACW
Eastern cottonwood	*Populus deltoides*	FAC
Narrowleaf cottonwood	*Populus angustifolia*	FACW

Common Name	Scientific Name	Wetland Indicator Status*
Peachleaf willow	*Salix amygdaloides*	FACW
Whiplash willow	*Salix lasiandra*	FACW
Shrubs		
Antelope bitterbrush	*Purshia tridentata*	
Big sagebrush	*Artemisia tridentata*	FACU
Black sagebrush	*Artemisia nova*	NI
Broom snakeweed	*Gutierrezia sarothrae*	NI
Chokecherry	*Prunus virginiana*	FAC
Golden currant	*Ribes aureum*	FAC
Mallow ninebark	*Physocarpus malvaceus*	NI
Narrowleaf willow	*Salix exigua*	FACW
Rubber rabbitbrush	*Ericameria nauseosa*	UPL
Woods' rose	*Rosa woodsii*	FACU
Yellow willow	*Salix lutea*	OBL
Forbs		
Hairy false goldenaster	*Chrysopsis villosa*	NI
Hoary tansyaster	*Machaeranthera canescens*	NI
Lewis flax	*Linum lewisii*	NI
Littleleaf pussytoes	*Antennaria microphylla*	NI
Milkweed species	*Asclepias* spp.	Varies by species
Rocky Mountain beeplant	*Cleome serrulata*	NI
Stemless mock goldenweed	*Stenotus acaulis*	NI
White marsh marigold	*Caltha leptosepala*	OBL
White sagebrush	*Artemisia ludoviciana*	FACU
Grasses		
Alkali sacaton	*Sporobolus airoides*	FAC
Alpine timothy	*Phleum alpinum*	FAC
Bluebunch wheatgrass	*Pseudoroegneria spicata*	NI
Bottlebrush squirreltail	*Elymus elymoides*	FACU
Indian ricegrass	*Achnatherum hymenoides*	UPL
Needle and thread	*Hesperostipa comata*	NI
Sand dropseed	*Sporobolus cryptandrus*	FACU
Sandberg bluegrass	*Poa secunda*	FACU
Slender wheatgrass	*Elymus trachycaulus*	FACU
Tufted hairgrass	*Deschampsia cespitosa*	FACW
Western wheatgrass	*Pascopyrum smithii*	FAC

* UPL = upland (almost never occurs in wetlands), FACU = facultative upland (usually occurs in non-wetlands, but may occur in wetlands), FACW = facultative wetland (usually occurs in wetlands), FAC = facultative (occurs in wetlands and non-wetlands), OBL = obligate (almost always occurs in wetlands), NI = non-indicator (Lichvar et al. 2016).

FEDERALLY LISTED PLANT SPECIES

Plant species listed by the USFWS as threatened or endangered are afforded an additional level of protection by law, regulation, or policy. According to the USFWS Information for Planning and Consultation (IPaC) planning tool, one federally listed threatened plant species protected under the ESA, Ute ladies'-tresses (*Spiranthes diluvialis*), has the potential to occur in Rich County, Utah; however, this species is not known to occur in the planning area (USFWS 2022).

INTRODUCED, INVASIVE, AND NOXIOUS WEED SPECIES

A weed is any plant that is not valued in a particular location and may be classified as introduced, invasive, and/or noxious. Weedy plant species terminology and definitions are provided in Figure 2-18.

Introduced Weed Species

A plant species living outside of its native range because of deliberate or accidental transport by human activities. Shown here is field sow thistle (*Sonchus arvensis*).

Photograph by Steve Dewey, Utah State University, Bugwood.org

Invasive Weed Species

An introduced plant species that adversely affects native species, habitats, or ecosystems. Shown here is Eurasian watermilfoil (*Myriophyllum spicatum*).

Photograph by Alison Fox, University of Florida, Bugwood.org

Noxious Weed Species

An introduced, invasive plant species that has been designated as injurious to native species, habitats, ecosystems, crops, or the health of humans or livestock. Shown here is phragmites (*Phragmites australis*).

Figure 2-18. Weedy plant species terminology and definitions.

As defined by Title 4, Chapter 17 of the Utah Noxious Weed Act, a *noxious weed* is "any plant the commissioner determines to be especially injurious to public health, crops, livestock, land, or other property" and a *county noxious weed* is "any plant that is: a) not on the state noxious weed list; b) especially troublesome in a particular county; and c) declared by the county legislative body to be a noxious weed within the county" (Utah Code 4-17-102). Invasive plant species, including most noxious weeds, are early successional species that have numerous adaptations for rapid colonization and spread in disturbed habitats. These adaptations include high reproductive rates; rapid germination and growth; and annual life histories in which the plant grows, flowers, sets seed, and dies in a single season. Noxious plant species may also have superior abilities to use soil and water resources, possess allelopathic mechanisms to suppress competing species, and have been removed from their native predators and pathogens in their new environment (Coombs et al. 2004; Mack et al. 2000; Sperry et al. 2006). These factors can result in a shift in the plant community toward dominance of nonnative, invasive plant species (Mack et al. 2000). In general, nonnative and invasive plants do not provide the same habitat function as native plants. Nonnative or invasive species can also displace native vegetation, resulting in a reduction of plant diversity and a decrease in overall habitat structure and function.

Along with these ecological impacts, introduced, invasive, and noxious weed species can also reduce water availability, interfere with agricultural crop production, be costly to treat, and can hinder recreation (e.g., weeds on the lake surface can get caught in props, thick weeds along the shore can discourage swimming). These species can also negatively affect views and the perception of beauty for visitors.

Treatment of four noxious weed species of particular concern—phragmites (*Phragmites australis*), tamarisk (*Tamarix ramosissima*), spotted knapweed (*Centaurea maculosa*), and purple loosestrife (*Lythrum salicaria*)—is a high priority in the planning area. Two notable invasive species, curly-leaf pondweed (*Potamogeton crispus*) and Eurasian watermilfoil (*Myriophyllum spicatum*), are also present in the planning area. Brief descriptions of these six species are provided in Figures 2-19a and 2-19b. Known location data for purple loosestrife, spotted knapweed, tamarisk, and Eurasian watermilfoil are shown on the GIS data viewer. Eurasian watermilfoil was first identified by the Idaho State Department of Agriculture on the Idaho side of Bear Lake in August 2019 (UDAF 2019a). Populations of the species were then identified in October 2019 on the Utah side of the lake, most commonly in marinas and other protected areas but also beginning to spread into some open water areas. FFSL began treatment of Eurasian watermilfoil at Bear Lake in the summer of 2020. Concerns with these specific species include the high potential for spreading, degradation to wildlife and fish habitat, impacts to recreational uses, and impairment of the viewshed.

Utah has 20 Cooperative Weed Management Areas (CWMAs), which are partnerships of federal, state, and local government agencies; tribes; and private landowners that set common goals and coordinate efforts to effectively manage noxious and invasive weeds across Utah. Government agencies in Utah often provide financial assistance to most counties in the state for weed control. The Highlands CWMA, Northern Utah CWMA, and Bear River Divide CWMA operate in the planning area. Rich County is a member of the Highlands CWMA and has a weed control department. Rich County is also generally responsible for mosquito control.

Phragmites (*Phragmites australis*)

Phragmites, also known as common reed, is a large, perennial, rhizomatous grass, or reed, forming monotypic stands in wetland areas. It is common in alkaline and brackish environments and can also thrive in highly acidic wetlands. It can survive in stagnant waters where the sediments are poorly aerated by providing the underground parts of the plant with a relatively fresh supply of air from the air spaces in the aboveground stems and rhizomes. The buildup of litter from the aerial shoots within stands prevents or discourages other species from germinating and becoming established. The rhizomes and adventitious roots themselves form dense mats that discourage annual and perennial native establishment. This species also alters hydrology by trapping sediments and reducing water movement through wetland ecosystems. Killing frosts may knock the plants back temporarily but can ultimately increase stand densities by stimulating bud development (Colorado State University 2000). Phragmites is of limited use as habitat due to its dense growth. This species is a Class 3 declared noxious weed in Utah. Class 3 weeds are found extensively throughout Utah, and statewide efforts are aimed at containing smaller infestations (UDAF 2019b).

Tamarisk (*Tamarix ramosissima*)

Tamarisk, also known as saltcedar, is an aggressive, woody noxious plant that has become established over a million acres of the western United States. Tamarisk crowds out native stands of riparian and wetland vegetation. It increases the salinity of surface soil, rendering the soil inhospitable to native plant species, and avoids drought stress by tapping into groundwater. Tamarisk generally provides lower habitat value, but can provide vital shade in hot, arid climates. These plants can widen floodplains by clogging stream channels and increase sediment deposition because of the abundance of tamarisk stems in dense stands (Colorado State University 2000). This species is a Class 3 declared noxious weed in Utah. Class 3 weeds are found extensively throughout Utah, and statewide efforts are aimed at containment of smaller infestations (UDAF 2019b).

Photograph by Steve Dewey, University of Connecticut, Bugwood.org

Purple loosestrife (*Lythrum salicaria*)

Purple loosestrife is a noxious weed that can create a monoculture in wet meadows, ditches, and along the banks of rivers and lakes. It reproduces by prolific seed production and a creeping rootstock. It can rapidly outcompete native vegetation and is difficult to remove once established. This species is a Class 2 declared noxious weed in Utah. Class 2 weeds pose a threat to the state, should be considered a high priority for control, and are known to exist in varying populations throughout the state. Class 2 weed populations are at levels where control or eradication may be possible (UDAF 2019b).

Photograph by Steve Dewey, University of Connecticut, Bugwood.org

Figure 2-19a. Weed species of particular concern in the planning area.

Spotted knapweed (*Centaurea maculosa* [syn. *C. steobe*])

Spotted knapweed is an aggressive noxious weed that can form large, dense infestations and grows in a variety of habitats and soil types (Jacobs 2012). It reproduces by seed only, with seeds typically germinating in the fall or the following spring, or seeds will remain dormant and viable for eight years or more (Jacobs 2012). Spotted knapweed can rapidly outcompete native vegetation, reduces wildlife habitat, and is difficult to remove once established. This species is a Class 2 declared noxious weed in Utah.

Photograph by Steve Dewey, University of Connecticut, Bugwood.org

Curly-leaf pondweed (*Potamogeton crispus*)

Curly-leaf pondweed is an invasive aquatic macrophyte that is native to Eurasia, Africa, and Australia (Thayer et al. 2016). This species has no floating leaves and grows entirely as a submersed aquatic plant. It is capable of surviving the winter as an intact leafy plant and grows rapidly in the early spring and summer (Thayer et al. 2016). It can tolerate a variety of environmental conditions, which has contributed to its spread. Curly-leaf pondweed negatively affects native vegetation communities, reducing plant diversity and altering water flow and availability of foraging and breeding habitats. This species is not currently a declared noxious weed in Utah, but its status is being evaluated and may change soon.

Photograph by Leslie J. Mehrhoff, University of Connecticut, Bugwood.org

Eurasian watermilfoil (*Myriophyllum spicatum*)

Eurasian watermilfoil is an invasive aquatic macrophyte that is native to Europe, Asia, and northern Africa (Jacono and Richerson 2011). It can tolerate a variety of environmental conditions, which has contributed to its spread. This species is primarily spread through movement of plant fragments, but can also reproduce by seed. Eurasian watermilfoil negatively affects native vegetation communities by forming dense, monotypic mats on the water surface that displace other aquatic plant species and reduce the availability of foraging and breeding habitats. Eurasian watermilfoil has little value as a food source and displaces aquatic invertebrates by excluding their host species. This species is not currently a declared noxious weed in Utah, but its status is being evaluated and may change soon.

Figure 2-19b. Weed species of particular concern in the planning area.

Introduced, invasive, and/or noxious weed plant species that are common within and adjacent to the planning area that should be considered as part of integrated weed management are listed in Table 2-5. FFSL typically treats the entirety of the Bear Lake shoreline for multiple species throughout the year.

Table 2-5. Introduced, Invasive, and Noxious Weed Plant Species Common in and near the Planning Area

Common Name	Scientific Name
Black henbane*	*Hyoscyamus niger*
Black medic	*Medicago lupulina*
Burdock	*Arctium minus*
Canada thistle*	*Cirsium arvense*
Cheatgrass	*Bromus tectorum*
Cocklebur	*Xanthium strumarium*
Common mullein	*Verbascum thapsus*
Common ragweed	*Ambrosia artemisiifolia*
Common teasel	*Dipsacus fullonum*
Curly-leaf pondweed	*Potamogeton crispus*
Dalmatian toadflax*	*Linaria dalmatica*
Dyers woad*	*Isatis tinctoria*
Eurasian watermilfoil	*Myriophyllum spicatum*
Field bindweed*	*Convolvulus arvensis*
Houndstongue*	*Cynoglossum officinale*
Musk thistle*	*Carduus nutans*
Phragmites*	*Phragmites australis*
Prickly Russian thistle	*Salsola tragus*
Purple loosestrife*	*Lythrum salicaria*
Reed canarygrass	*Phalaris arundinacea*
Russian olive*	*Elaeagnus angustifolia*
Scotch thistle*	*Onopordum acanthium*
Spotted knapweed*	*Centaurea maculosa*
Tamarisk*	*Tamarix ramosissima*
White sweetclover	*Melilotus alba*
Yellow sweetclover	*Melilotus officinalis*

* Species is on the State of Utah noxious weed list.

Lake Level Effects

The distribution, extent, composition, structure, and diversity of fish and wildlife habitats vary at high versus low lake levels. Rising lake levels can subject existing emergent wetland habitat to inundation or create new wetland habitat if high waters persist. When lake levels drop, emergent wetland habitats may become disconnected from water sources and dry out. However, new wetlands can also develop behind dropping lake levels in areas where water becomes trapped (e.g., sand bars).

An analysis of mapped Bear Lake wetland data, representing conditions observed in the summer of 2014 when lake levels ranged from 5,912 to 5,914 feet, indicates that most of the emergent marsh, lacustrine shore, and riverine wetland habitat (approximately 542 acres) was located between elevations of 5,912 and 5,917 feet (UGS 2014). Most of the emergent meadow, scrub-shrub, and forested wetland habitat (approximately 28 acres) was located between elevations of 5,917 and 5,923 feet (UGS 2014). These data reflect a point in time at particular lake levels but illustrate that most wetland habitat may not necessarily be close to the OHWM.

The abundance of plant and wildlife species associated with wetland habitats may fluctuate as wetlands change. In addition, at low lake levels, invasive plant species, particularly phragmites, can invade large areas of previously inundated habitat and significantly alter the structure, composition, and functioning of wetland habitats.

The extent of aquatic habitats (open water) increases at high lake levels and is reduced at low lake levels. Aquatic habitat decreases by approximately 9% as lake levels drop from 5,923 feet to 5,903 feet. Grassland, shrubland, and woodland habitat types are generally located near or above the OHWM at 5,923 feet; their acreages remain relatively constant with changing lake levels.

Riparian habitats are present in the planning area along streams entering Bear Lake and are also relatively constant; however, these areas can become disconnected from the lake and partly dry up at low lake levels (below 5,912.1 feet; see Lake Level Effects for Fish Species). Channels with perennial or intermittent flow that are covered during high water have the potential to support vegetation at lower lake levels.

The distribution and extent of terrestrial habitat is considerably greater at low versus high lake levels.

Further Reading

Biological resources of the Bear Lake basin, Utah (Palacios et al. 2007b)

Intermountain West Joint Venture 2013 Implementation Plan, Strengthening Science and Partnerships (Intermountain West Joint Venture 2013)

Riparian Buffer Design Guidelines for Water Quality and Wildlife Habitat Functions on Agricultural Landscapes in the Intermountain West (Johnson and Buffler 2008)

Utah Wildlife Action Plan (Utah Wildlife Action Plan Joint Team 2015)

GIS Data Layers

Bird Habitat Conservation Areas, Lake Level Contours, Local Noxious Weed Points, Local Noxious Weed Polygons, Local Vegetation Types, Local Wetlands, National Wetlands Inventory, Soil Types, Vegetation Types

Fish and Wildlife Species

Introduction

This section provides information on populations of fish and wildlife species known to occur within or adjacent to the planning area. It complements the Fish and Wildlife Habitat section by identifying priority fish and wildlife species on which to focus habitat enhancement and/or preservation goals and by providing information regarding certain species of regulatory and management concern. Bear Lake and adjacent areas provide habitat for many native species and provide important foraging opportunities and nesting and stop-over areas for migratory birds and raptors. Given anthropogenic disturbance in some areas, populations of nonnative species are also found. Habitat associations for particular fish and wildlife can be found in the Fish and Wildlife Habitat section in Figures 2-9 through 2-16.

Agencies and stakeholders working in the planning area should understand that certain fish and wildlife species are legally protected and may require special management under federal or state law. They should also understand that certain fish and wildlife species add to, or detract from, the overall health of the Bear Lake ecosystem (e.g., native species versus invasive species). Planning area agencies and stakeholders may also be interested in species that have recreational value, such as fish and birds. Not only does the presence of a variety of native species provide recreational opportunities, but it is also an indicator of a healthy ecosystem.

The sections that follow describe federally listed species, avian focal species, SGCN, aquatic invasive species, fish species, big game species, bird species, and bird species of management concern found in the planning area.

Federally Listed or Candidate Fish and Wildlife Species, Avian Focal Species, and Species of Greatest Conservation Need

Fish and wildlife species discussed in this section include federally listed species that are protected under the ESA (threatened and endangered species), species considered candidates for such listing (candidate species), focal species identified in the *Land Protection Plan for the Bear River Watershed Conservation Area* (USFWS 2013b), and species identified in the *Utah Wildlife Action Plan* as SGCN (Utah Wildlife Action Plan Joint Team 2015).

According to the USFWS IPaC planning tool, two federally listed wildlife species protected under the ESA have the potential to occur in Rich County, Utah: the western yellow-billed cuckoo (*Coccyzus americanus*) and Canada lynx (*Lynx canadensis*) (USFWS 2022). Both species are listed as threatened; however, they are not known to occur in the planning area. There is currently one ESA candidate wildlife species listed in Rich County, Utah: the monarch butterfly (*Danaus plexippus*). Although candidate species generally have no ESA requirements, agencies are encouraged to conserve the species. Monarch butterflies have the potential to occur in the planning area during summer months when they reproduce; however, there is a lack of data on monarch breeding habitat in Utah (Western Monarch Advocates 2021).

The *Land Protection Plan for the Bear River Watershed Conservation Area* identifies three avian focal species—greater sage-grouse (*Centrocercus urophasianus*), sage thrasher (*Oreoscoptes montanus*), and American avocet (*Recurvirostra americana*)—that have predicted key habitats adjacent to or near Bear Lake (USFWS 2013b). Predicted key habitats were developed through models to provide land managers with the best available information on landscape values for these focal species and can be used to inform the development of habitat conservation strategies, adaptive management, and biological planning.

The *Utah Wildlife Action Plan* identifies 169 SGCN in Utah, provides a summary of the distribution and abundance information for these species, and provides a threat assessment for some species and their habitats. Table 2-6 provides a list of SGCN derived from the *Utah Wildlife Action Plan* and includes each species' general habitat association, their potential to occur in or adjacent to the planning area, and threats identified in the *Utah Wildlife Action Plan* from a single-species and state-wide perspective. The threats listed in the table were identified through a threat assessment and could be used to assist agencies and organizations working on individual species to determine which threats are impacting those species (Utah Wildlife Action Plan Joint Team 2015). In addition to threats to individual species, the *Utah Wildlife Action Plan* outlines threats to key habitats. State-wide threats to key aquatic habitat, including aquatic, wetland, and riparian key habitats found in the planning area, consist of dams, droughts, fire and fire suppression, housing and urban areas, improper livestock farming and ranching, invasive nonnative species, other ecosystem modifications, and roads and railroads (Utah Wildlife Action Plan Joint Team 2015).

Table 2-6. Species of Greatest Conservation Need and Their Potential to Occur in or Adjacent to the Planning Area

Common Name and Scientific Name	General Habitat Association	Threats*	Potential to Occur in or Adjacent to the Planning Area
Birds			
American white pelican *Pelecanus erythrorhynchos*	This species' preferred nesting habitats are islands associated with freshwater lakes. This species forages in shallow lakes, marshlands, and rivers.	Problematic native species	This species commonly occurs in the planning area during the spring, summer, and fall months.
Bald eagle *Haliaeetus leucocephalus*	This species tends to nest within 650 feet of water. It eats mainly fish and carrion.	Roads and railroads	This species has been documented in the planning area.
Caspian tern *Hydroprogne caspia*	This species uses large lakes, marshes, beaches, islands, coastal waters, and bays, and nests on the ground in open, sparsely vegetated areas.	Problematic native species, dams, and water management/use	This species has been documented in the planning area.
Ferruginous hawk *Buteo regalis*	This species generally nests and forages in open country, primarily prairies, plains, and desert habitats. It tends to nest on cliffs, trees, or on power poles.	Problematic native species, droughts, recreational activities, fire and fire suppression, invasive nonnative species	This species may nest and forage near the planning area.
Golden eagle *Aquila chrysaetos*	This species inhabits open areas in mountainous regions and nests on cliffs or in large trees.	Fire and fire suppression, recreational activities, invasive nonnative species	This species has been documented in the planning area.
Greater sage-grouse *Centrocercus urophasianus*	This species inhabits sagebrush steppe and uses several types of sagebrush habitats during different times of the year.	Fire and fire suppression, invasive nonnative species, problematic native species, other ecosystem modifications, roads and railroads, droughts, dams and water management/use, housing and urban areas	This species has been documented near the planning area.
Lewis's woodpecker *Melanerpes lewis*	This species generally occurs in open woodland areas. It is a cavity nester.	Fire and fire suppression	This species has been documented near the planning area.
Northern pygmy-owl *Glaucidium gnoma*	This species is found in forest and woodland habitats and nests in tree cavities.	None identified	This species has been documented in and near the planning area.
White-faced ibis *Plegadis chihi*	This species inhabits marshes, ponds, swamps, and rivers, and typically nests on the ground in shrubs or aquatic vegetation.	Invasive nonnative species, dams and water management/use, problematic native species, droughts, housing and urban areas	This species has been documented in the planning area.

Common Name and Scientific Name	General Habitat Association	Threats*	Potential to Occur in or Adjacent to the Planning Area
Mammals			
Little brown myotis *Myotis lucifugus*	This species uses a variety of habitats, including woodlands and areas near water for foraging, and human-made structures, caves, and hollow trees for roosting.	Habitat shifting and alteration, improper livestock farming and ranching (threats from farming and ranching practices as a result of agricultural expansion and intensification), invasive nonnative species	This species may forage and roost in and near the planning area.
Townsend's big-eared bat *Corynorhinus townsendii*	This species occurs in many habitat types and is often found near forested areas. This species often forages near trees and roosts in caves, mines, and buildings.	Recreational activities, other ecosystem modifications	This species may forage near the planning area.
White-tailed prairie dog *Cynomys leucurus*	This species forms colonies and lives in underground burrows, often hibernating during the winter months. This species is endemic to Utah.	Invasive nonnative species, droughts	This species may occur in the planning area.
Fishes			
Bear Lake Bonneville cutthroat trout *Oncorhynchus clarkii utah*	This species is native to Bear Lake. It spends most of its life in Bear Lake and spawns in perennial tributaries.	Dams and water management/use, recreational activities, invasive nonnative species, fire and fire suppression, roads and railroads, habitat shifting and alteration, droughts, improper livestock farming and ranching, other ecosystem modifications	This species has been documented in the planning area.
Bear Lake sculpin *Cottus extensus*	This species is endemic to Bear Lake. It spends most of its time on the bottom of the lake.	Dams and water management/use, recreational activities, invasive nonnative species	This species has been documented in the planning area.
Bear Lake whitefish *Prosopium abyssicola*	This species is endemic to Bear Lake. It inhabits the cold, deep-water habitat of Bear Lake.	Dams and water management/use, recreational activities, invasive nonnative species	This species has been documented in the planning area.
Bonneville cisco *Prosopium gemmifer*	This species is endemic to Bear Lake. It typically inhabits the mid-lake depths of Bear Lake.	Dams and water management/use, recreational activities, invasive nonnative species	This species has been documented in the planning area.
Bonneville whitefish *Prosopium spilonotus*	This species is endemic to Bear Lake. It inhabits the middle and upper portions of the lake bottom.	Dams and water management/use, recreational activities, invasive nonnative species	This species has been documented in the planning area.

Common Name and Scientific Name	General Habitat Association	Threats*	Potential to Occur in or Adjacent to the Planning Area
Amphibians			
Columbia spotted frog *Rana luteiventris*	This species prefers isolated seeps and springs with permanent water sources. During winter months, this species burrows in the mud and is inactive.	Invasive nonnative species, housing and urban areas, dams and water management/use, droughts	This species may occur in the planning area.
Northern leopard frog *Lithobates pipiens*	This species uses a variety of aquatic habitats, especially near cattails and other aquatic vegetation. This species may be found foraging relatively far from water and during winter months can be found in moist burrows or underwater where it is inactive.	Invasive nonnative species, other ecosystem modifications, dams and water management/use, droughts	This species has been documented in the planning area.
Western (boreal) toad *Anaxyrus* (syn. *Bufo*) *boreas*	This species can be found in a variety of habitats, typically at high elevations, including wetlands, springs, slow moving streams, woodlands, lakes, ponds, and meadows.	Problematic native species, dams and water management/use, improper livestock farming and ranching, fire and fire suppression, invasive nonnative species	This species is not expected to occur in the planning area but may be present in areas adjacent to the planning area.
Insects			
Monarch butterfly *Danaus plexippus*	This species lays its eggs on its obligate milkweed host plant (primarily *Asclepias* species) and uses habitats with nectar pants. This species winters in Mexico and the Pacific Coast of California (USFWS 2020).	Loss of habitat, habitat degradation, climate change, herbicide application, insecticide application, and disease (USFWS 2020)	This species may occur in or near the planning area during summer months.
Western bumble bee *Bombus occidentalis*	This species can be found in a variety of habitats that provide abundant floral resources that bloom from spring to fall. It primarily nests underground, typically in abandoned rodent nests (Evans et al. 2008).	Disease, habitat loss and fragmentation, grazing, herbicide application, insecticide application, air pollution, and climate change (Evans et al. 2008).	This species may occur in or near the planning area.
Crustaceans			
Pilose crayfish *Pacifastacus gambelii*	This species is found in lakes, cool water ponds, streams, and rivers.	Dams and water management/use, droughts, invasive nonnative species	This species has been documented in the planning area.

Common Name and Scientific Name	General Habitat Association	Threats*	Potential to Occur in or Adjacent to the Planning Area
Mollusks			
Bear Lake springsnail *Pyrgulopsis pilsbryana*	This species has been reported in three springs in Rich County.	Dams and water management/use, improper livestock farming and ranching, problematic native species	This species historically occupied springs and marshes around Bear Lake. Surveys conducted in 2019 and 2020 identified this species in Swan Creek Spring, and it may be present in various springs around the lake. Swan Creek Spring is the source of Swan Creek, which flows into Bear Lake.
California floater *Anodonta californiensis*	This species is found in lakes and lake-like stream environments.	Dams and water management/use, other ecosystem modifications, invasive nonnative species, problematic native species	This species historically occupied areas in and around Bear Lake, specifically Big Creek near Laketown. Environmental DNA was collected for this species in Big Creek within the last few years, and it is likely that California floater is present in Big Creek. DWR plans to conduct snorkeling surveys to determine the presence of this species.
Lyrate mountainsnail *Oreohelix haydeni*	This species is associated with the edges of angular limestone talus. Common vegetative cover includes bitterbrush (*Purshia tridentata*), maple species (*Acer* spp.), big sagebrush (*Artemisia tridentata*), and balsamroot (*Balsamorhiza* spp.).	None identified	The lyrate mountainsnail historically occupied sites in Garden City Canyon (east of the planning area, and east of the town of Garden City). Surveys conducted in 2019 and 2020 identified this species in Garden City Canyon.
Western pearlshell *Margaritifera falcata*	This species is found in small streams.	Dams and water management/use, other ecosystem modifications, problematic native species, improper livestock farming and ranching, fire and fire suppression	This species historically occupied small streams near Bear Lake. Environmental DNA was collected for this species in Big Creek within the last few years, and it is likely that western pearlshell is present in Big Creek. DWR plans to conduct snorkeling surveys to determine the presence of this species.

Source: DWR (2021a); Utah Wildlife Action Plan Joint Team (2015).

* Species-specific statewide threats were taken directly from the *Utah Wildlife Action Plan* (Utah Wildlife Action Plan Joint Team 2015).

Aquatic Invasive Species

Aquatic invasive species (AIS) are nonnative organisms that live primarily in water and often outcompete native species. Humans have helped spread AIS around the world both intentionally and unintentionally. AIS can be spread by vectors such as ships, boats, aquaculture, aquatic recreation, water gardening, and seaplanes. Examples of AIS include curly-leaf pondweed and Eurasian watermilfoil (discussed previously in the Vegetation section), as well as zebra mussel (*Dreissena polymorpha*), quagga mussel (*Dreissena rostriformis*), and common carp (*Cyprinus carpio*) (Figure 2-20).

Quagga and zebra mussels are native to eastern Europe. Both mussel species are small and typically grow to the size of a fingernail (but can grow bigger). They are prolific breeders and can attach to hard and soft surfaces in fresh water. These organisms clog water intake structures; harm fisheries by removing plankton; and accumulate on structures such as docks, buoys, boat hulls, anchors, and shorelines. Quagga and zebra mussels were first found in the Great Lakes in the United States in the 1980s (Hoddle 2021).

Figure 2-20. Quagga (top) and zebra mussels (bottom). Photograph by NOAA Great Lakes Environmental Research Laboratory. Attribution-ShareAlike 2.0 Generic (CC BY-SA 2.0). Photograph unedited.

Currently, neither the quagga nor the zebra mussel occurs in Bear Lake, and there are significant state-led efforts to prevent their introduction. In Utah, quagga mussels are currently only found in Lake Powell. Utah Code 23-27-101 (Aquatic Invasive Species Interdiction Act) prohibits the possession, release, or transport of watercraft or equipment that has been in an infested water within the previous 30 days without being decontaminated. DWR has the authority to establish inspection stations along highways and at publicly accessible boat ramps and launch sites and to stop, detain, inspect, or quarantine any watercraft or equipment believed to be in violation of the Aquatic Invasive Species Interdiction Act. In Utah, there are mandatory inspection stations to intercept watercraft coming to Bear Lake from the south through Laketown Canyon and from the west through Logan Canyon; these stations typically operate from May through September.

The Idaho State Department of Agriculture also conducts watercraft inspections for AIS on major highways and near the Utah-Idaho state line (e.g., Franklin) and has an early detection monitoring program that includes sampling for mussels. An agreement is in place between DWR, the Idaho State Department of Agriculture, and the Bear Lake Regional Commission to collaborate on watercraft inspections (Poulsen 2021).

The best way to prevent the spread of aquatic invasive species is through proper boat and equipment decontamination. Decontamination should include the steps shown in Figure 2-21.

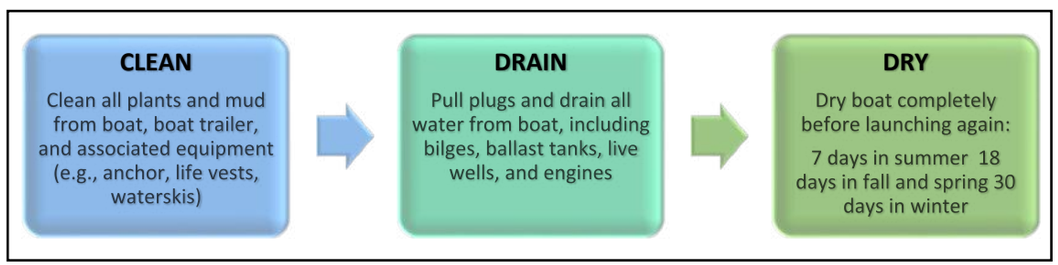


Figure 2-21. Proper boat and equipment decontamination for aquatic invasive species.

As discussed in Chapter 1, an annual watercraft decontamination certification form (required by DWR as part of the Aquatic Invasive Species Program) must be completed prior to receiving a beach launching permit from FFSL. DWR's website has additional information on the Aquatic Invasive Species Program (Utah Aquatic Invasive Species Task Force and DWR 2009).

Fish Species

Bear Lake is well known for its fisheries resources, which include four endemic species found nowhere else: Bear Lake whitefish (*Prosopium abyssicola*), Bonneville cisco (*Prosopium gemmifer*), Bonneville whitefish (*Prosopium spilonotus*), and Bear Lake sculpin (*Cottus extensus*) (Table 2-7). Fishery management at Bear Lake has generally focused on conserving native species and enhancing sport fishing opportunities. Fish stocking in Bear Lake first occurred in the 1890s and several efforts to increase fisheries habitat have taken place over the years. At least 12 fish species were introduced to Bear Lake between 1890 and 1990, including rainbow trout (*Oncorhynchus mykiss*), brown trout (*Salmo trutta*), brook trout (*Salvelinus fontinalis*), lake trout (*Salvelinus namaycush*), Yellowstone cutthroat trout (*Oncorhynchus clarkii bouvieri*), and Kokanee salmon (*Oncorhynchus nerka*) (McConnell et al. 1957; Tolentino et al. 2015). Stocking of Bear Lake Bonneville cutthroat trout (BCT) (*Oncorhynchus clarkii utah*) also occurred to supplement natural reproduction in Bear Lake's native population. After the 1950s, stocking efforts were narrowed to rainbow trout, lake trout, Yellowstone cutthroat trout, and Bear Lake BCT. Rainbow trout stocking was halted in the 1980s because of concerns about hybridization with the Bear Lake BCT. Yellowstone cutthroat trout was last stocked in Bear Lake in the late 1970s or early 1980s (Tolentino et al. 2015). Lake trout have been stocked off and on up to the present; only sterile lake trout have been stocked since 2002. Bear Lake BCT continue to be stocked in the spring as part of a Bear Lake BCT enhancement project (Tolentino et al. 2015).

Table 2-7. Fish Species Known to Reside in Bear Lake

Common Name	Scientific Name	Origin to Bear Lake
Bear Lake BCT	*Oncorhynchus clarkii utah*	Native
Bear Lake sculpin	*Cottus extensus*	Endemic
Bear Lake whitefish	*Prosopium abyssicola*	Endemic
Black bullhead	*Ameiurus melas*	Exotic
Bonneville cisco	*Prosopium gemmifer*	Endemic
Bonneville whitefish	*Prosopium spilonotus*	Endemic
Brook trout	*Salvelinus fontinalis*	Exotic
Brown trout	*Salmo trutta*	Exotic
Common carp	*Cyprinus carpio*	Exotic
Green sunfish	*Micropterus cyanellus*	Exotic
Lake trout	*Salvelinus namaycush*	Exotic
Rainbow trout	*Oncorhynchus mykiss*	Exotic
Redside shiner	*Richardsonius balteatus*	Native
Speckled dace	*Rhinichthys osculus*	Native
Utah chub	*Gila atraria*	Native
Utah sucker	*Catostomus ardens*	Native
Yellow perch	*Perca flavescens*	Exotic

Source: Telentino et al. (2015).

The following sections provide descriptions of the four endemic fish species residing in Bear Lake and their primary predators (native Bear Lake BCT and exotic lake trout). Descriptions include life history, food needs, and habitat requirements.

BEAR LAKE WHITEFISH

The Bear Lake whitefish (Figure 2-22) grows to a maximum size of approximately 10 inches, typically weighs less than 1 pound, and has a potential lifespan of more than 30 years (DWR 2021b; Thompson 2003). Visually, this species is indistinguishable from small Bonneville whitefish, which is less than 10 inches, and the only reliable way to separate the two species is through scale counts both above the lateral line and within the lateral line (Tolentino 2022). The Bear Lake whitefish is considered a gamefish by DWR, but the species is not usually pursued by anglers. This species spends most of its life in the deep-water habitat of Bear Lake (Sigler and Miller 1963) and prefers depths greater than 100 feet (Thompson 2003).

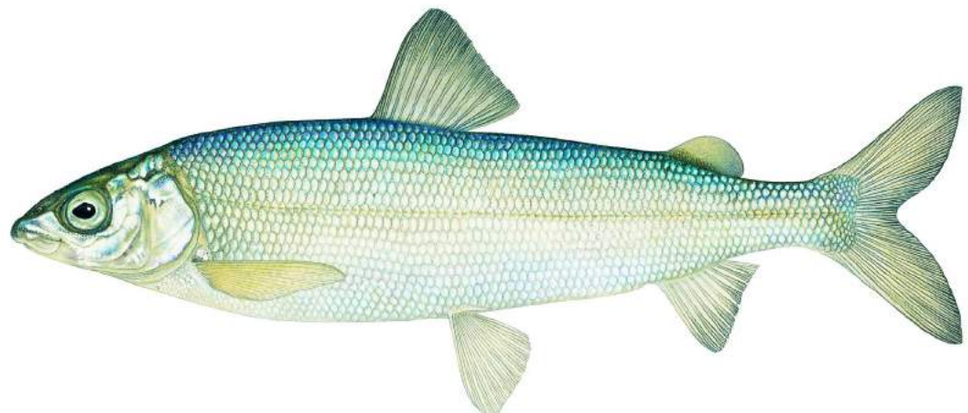


Figure 2-22. Bear Lake whitefish.
Illustration © Joseph R. Tomelleri. Used with permission.

The Bear Lake whitefish, unlike the Bonneville whitefish, occupies lake depths where food availability is low and the temperature is not optimal for maximum growth. It is understood that this fish species sacrifices optimal conditions for growth in exchange for the reduced risk of predation in deeper water habitat (Kennedy 2005). This species feeds primarily on

zooplankton early in their development, whereas adults feed on ostracod and chironomid larvae (Kennedy 2005; McConnell et al. 1957; Tolentino and Albrecht 2005; Tolentino and Thompson 2004). Thompson (2003) reported that the Bear Lake whitefish is almost exclusively dependent on ostracods, especially in the sub-adult to adult class sizes. Bear Lake whitefish usually spawn from mid-February to mid-March (Kennedy 2005).

BONNEVILLE CISCO

The Bonneville cisco (Figure 2-23) is a slender, pearly silver fish with a sharply pointed snout (DWR 2021b). It is small (less than 9 inches) and rarely lives more than 7 years (Sigler and Miller 1963; Tolentino 2021). Bonneville cisco is a popular game fish for food and bait and is thought to be the most abundant fish species in Bear Lake (Lentz 1986; McConnell et al. 1957). Adults are heavily preyed on by Bear Lake BCT and lake trout (Lentz 1986).

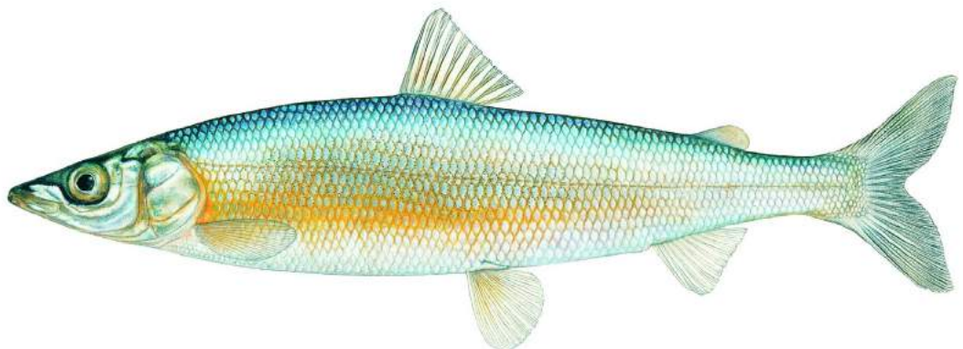


Figure 2-23. Bonneville cisco.
Illustration © Joseph R. Tomelleri. Used with permission.

The Bonneville cisco matures at about age 3 and spawns in mid-January at temperatures ranging from 33°F to 42°F. Spawning typically occurs in Bear Lake's shallow waters over rocky substrates (Figure 2-24) but also occurs in waters up to 60 feet deep over the natural rock formations and artificial reefs of Bear Lake (McConnell et al. 1957; Moon 2007; Tolentino 2020b) where the fish are susceptible to harvest with hand-held dipnets. The Bonneville cisco produces approximately 2,000 to 3,600 eggs per female, which are scattered over the rocky substrate. Eggs are heavily preyed on by Bear Lake whitefish, Bonneville whitefish, Bear Lake sculpin, Utah sucker (*Catostomus ardens*), and common carp (Bouwes and Luecke 1997). Wind currents and wave action may also be a large factor in egg loss in years when there is no ice cover.

Outside of the spawning period, the Bonneville cisco spends most of its time in the mid-water environment (Leucke and Wurtsbaugh 1993; McConnell et al. 1957; Moon 2007). Although it is typically found at mid-lake depths of 50 to 100 feet, the Bonneville cisco may move into slightly shallower water along the shoreline from dusk to dark to feed. It feeds extensively on zooplankton (*Epischura* spp.) (Wurtsbaugh and Hawkins 1990).

Figure 2-24. Rocky substrate habitats along the margins of Bear Lake.

BONNEVILLE WHITEFISH

Like the Bear Lake whitefish, the Bonneville whitefish (Figure 2-25) is silvery-white along its sides and charcoal gray to black on its back. It can grow to a much larger size than the Bear Lake whitefish, however, and can reach lengths of over 20 inches and weigh just over 4 pounds (DWR 2021b). The Bonneville whitefish is an important sportfish at Bear Lake. It occupies the middle and upper portions of the lake bottom where water temperatures are warmer than at the lower bottom of the lake (Sigler and Miller 1963). At these depths, Bonneville whitefish have more food available but are at a greater risk of predation by lake trout. As adults, this species inhabits shallow water much more frequently than the Bonneville cisco or the Bear Lake whitefish (Sigler and Miller 1963). Bonneville whitefish can live longer than 20 years (Tolentino et al. 2015).

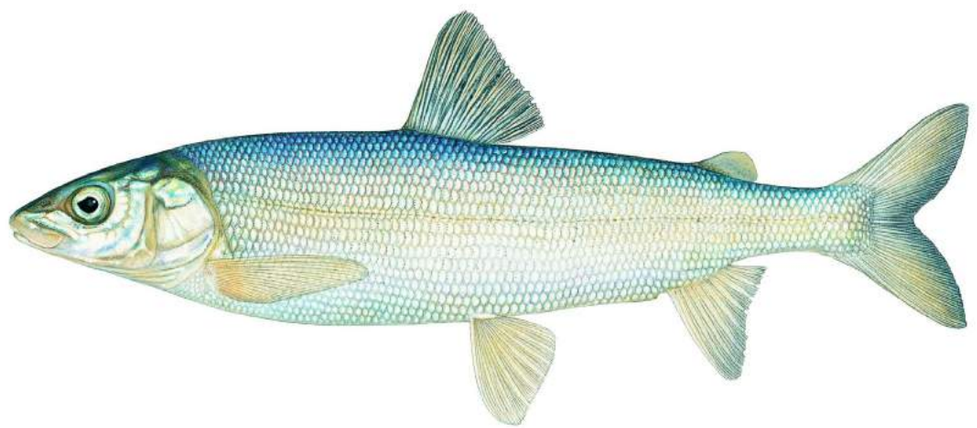


Figure 2-25. Bonneville whitefish.
Illustration © Joseph R. Tomelleri. Used with permission.

Bonneville whitefish young feed primarily on chironomid larvae and pupae but also consume terrestrial insects (Hymenoptera and Homoptera), aquatic insects, and worms (Kennedy 2005). Once Bonneville whitefish reach 10 to 12 inches or greater in length, their diet changes to small fish, especially Bear Lake sculpin (Moon 2007; Tolentino and Albrecht 2007; Tolentino and Thompson 2004).

This species spawns in mid-November to early January in shallow areas over rocky substrate (Sigler and Miller 1963), such as the eastern Bear Lake shoreline (Tolentino 2020b). Bonneville whitefish have also been shown to use artificial reefs placed in Bear Lake in 2005 to alleviate the loss of rock habitat (Moon 2007).

BEAR LAKE SCULPIN

The Bear Lake sculpin (Figure 2-26) has a broad flat head and is mottled and light brown. It is seldom fished or caught by anglers. The Bear Lake sculpin rarely exceeds 4 inches in length and lives for approximately 4 years (Ruzycki et al. 1998). It is considered the second-most abundant fish species in Bear Lake. Wurtsbaugh and Luecke (1998) estimated the population at between 1 and 2 million. Adult Bear Lake sculpin are common prey for Bear Lake BCT and lake trout and are therefore important in supporting the Bear Lake sport fishery (Ruzycki et al. 1998; Ruzycki and Wurtsbaugh 1999). In addition, Bear Lake whitefish, Bonneville whitefish, and adult Bear Lake sculpins have been shown to eat small, juvenile Bear Lake sculpins.

Figure 2-26. Bear Lake sculpin.
Illustration © Joseph R. Tomelleri. Used with permission.

In deep waters, where they spend most of their time, Bear Lake sculpin feed on macroinvertebrates and zooplankton. Data on the Bear Lake sculpin's diet also indicate that the species occupies rocky substrate along shorelines and artificial reefs (Wurtsbaugh and Hawkins 1990), where primarily chironomids were observed in the guts of adults and sub-adults (Moon 2007).

Bear Lake sculpin spawn from approximately mid-April through mid-May (Tolentino 2020b). Spawning habitat for the sculpin is limited in Bear Lake and is a controlling factor in spawning recruitment (Ruzycki et al. 1998). Ruzycki et al. (1998) note that Cisco Beach is the primary spawning area for this species. Bear Lake sculpin mature at about age 2 and spawn in the interstitial spaces of littoral cobble habitat in depths ranging from 1.6 to 9.8 feet (Glassic and Gaeta 2018, as cited in Ruzycki et al. 1998). Littoral cobble habitat consists of large cobbles within the littoral (nearshore) zone of the lake.

After hatching, sculpin fry swim to the surface and disperse throughout the lake, inhabiting both the warm littoral zone and the cold deep-water (profundal) zone of the lake (Ruzycki 1995). Those that live in the profundal zone migrate vertically in a daily cycle to attain faster growth in the warmer environments and to accelerate digestion.

BEAR LAKE BONNEVILLE CUTTHROAT TROUT

Bear Lake BCT (native to Bear Lake; Figure 2-27) is the only adfluvial cutthroat trout found in Utah and Idaho (Glassic and Gaeta 2020) and is an important game fish at the lake. Adfluvial adult fish spawn in rivers or streams; the resulting juveniles migrate to lakes for feeding as subadults and adults. Bear Lake BCT spend most of their life in Bear Lake and rely on tributary-lake connectivity to spawn, primarily in four perennial tributaries (St. Charles, Fish Haven, Big Spring, and Swan Creeks) (Glassic and Gaeta 2020). This species, in general, does not spawn until about age 5 or when they reach approximately 17.7 inches in length (Burnett 2003). Spawning usually occurs in the spring from approximately April through June (Glassic and Gaeta 2020; Nielson and Lentsch 1988). Nielson and Lentsch (1988) reported that Bear Lake BCT juveniles typically rear in their natal stream environment for 1 to 2 years and migrate to the lake during spring runoff the following season. However, a recent study (Heller 2021) shows that some Bear Lake BCT migrate out of tributary streams as young-of-the-year immediately after hatching, some migrate out the following year between June and August, and some migrate out as late as age 5.

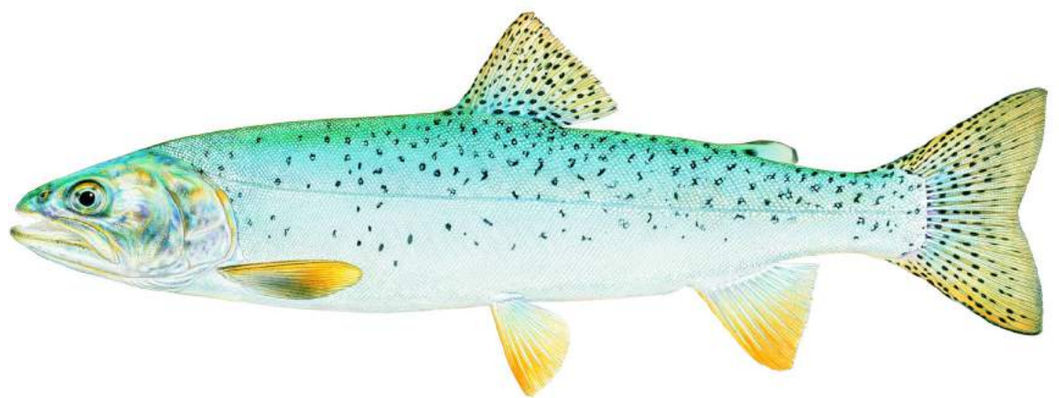


Figure 2-27. Bear Lake Bonneville cutthroat trout.
Illustration © Joseph R. Tomelleri. Used with permission.

Bear Lake BCT feed primarily on Bear Lake sculpin and Bonneville cisco (Glassic and Gaeta 2020), as well as Bear Lake whitefish and Bonneville whitefish (Nielson and Lentsch 1988). The species also feeds on whitefish eggs (Nielson and Lentsch 1988).

Bear Lake BCT are managed under a conservation agreement to ensure the species' long-term existence in its historical range and to preclude the need for federal listing (DWR 2019a). The overarching strategy is to protect the best remaining habitats and restore degraded areas by reestablishing habitat connectivity and integrity. The conservation agreement establishes goals for four geographic management units (Bear Lake is in the Bear River geographic management unit) and outlines a monitoring plan (DWR 2019a). Goals for the Bear Lake BCT population include maintaining the population at greater than 90% genetic purity and mitigating threats to the long-term persistence of the species. Threats include resource extraction, land conversion, hydropower development, invasive species, American white pelican (*Pelecanus erythrorhynchos*) (which congregate at the mouth of tributary spawning streams), water management, drought, and climate change (DWR 2019a; Tolentino 2020b). DWR, the Idaho Department of Fish and Game, the BLM, and USFWS are some of the parties involved in the conservation agreement (DWR 2019a).

Successful Partnerships

DWR, the Idaho Department of Fish and Game, Trout Unlimited, irrigation companies, and several real estate developers have completed projects since the early 2000s to help restore the Bear Lake BCT population (DWR 2019a). As of 2017, 15 fish screens were installed to prevent Bear Lake BCT loss to irrigation ditches, five culverts and two highway bridges were replaced to enhance spawning access and connectivity, three fish ladders were installed to enhance spawning access and connectivity, and two rotenone treatments were completed in Swan Creek and Fish Haven Creek to remove hybridized Bear Lake BCT and nonnative species (DWR 2019a). Sampling in 2017 indicated that the population of Bear Lake BCT has responded well to these projects and natural recruitment is increasing (DWR 2019a).

DWR operates a fish trap seasonally on one of the main tributaries of Bear Lake to capture wild Bear Lake BCT for restocking the lake and for hatchery brood stock replacement. Resulting fish reared from the collection of wild eggs are solely stocked back into Bear Lake; eggs collected for brood stock replacement maintain the genetic diversity of the hatchery brood fish. The hatchery brood fish eggs and resulting fish are then used for stocking other reservoirs in Utah, such as Strawberry and Scofield. Equal numbers of fish are collected throughout the extent of the spawning run, and additional fish not needed for the hatchery program are released upstream for natural spawning.

LAKE TROUT

The lake trout (Figure 2-28) is not native to Utah or Idaho but has been stocked in Bear Lake in various densities since 1911 for sport fishing. Stocking numbers were reduced in 1995 after bioenergetic modeling showed it was beneficial to stock more conservative numbers of lake trout; stocking numbers have remained at lower levels since than time (Tolentino 2021). A sterile stocking program was initiated in 2002 for the purpose of more control over lake trout natural production.

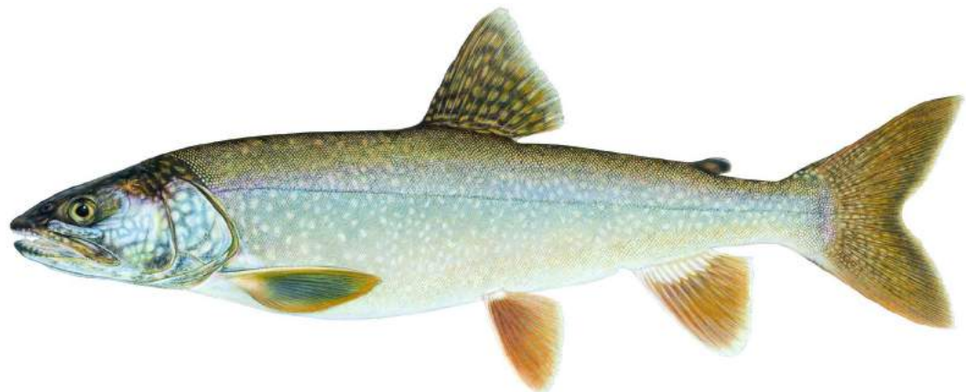


Figure 2-28. Lake trout.

Illustration © Joseph R. Tomelleri. Used with permission.

Lake trout consume Bear Lake whitefish, Bonneville whitefish, Bonneville cisco, and Bear Lake sculpin, but also prey on Bear Lake BCT. Ruzycki et al. (2001) estimated that lake trout and Bear Lake BCT consume 83% of the annual Bonneville cisco production, indicating that there is a need to control stocked numbers in the lake. Lake trout reside in the deeper waters of the lake but can access any part of the lake where prey species are found.

BEAR LAKE FISHERIES MANAGEMENT PLAN

The *Bear Lake Fisheries Management Plan* (Tolentino et al. 2015) emphasizes the preservation, protection, and maintenance of populations of Bear Lake whitefish, Bonneville cisco, Bonneville whitefish, and Bear Lake sculpin. In addition to this conservation emphasis, Bonneville cisco and Bonneville whitefish are also managed for sport fishery purposes. Two of the four species, Bonneville cisco and Bear Lake sculpin, have population objectives (Tolentino et al. 2015). The minimum population objective for Bonneville cisco is 2.5 million fish in Bear Lake. The minimum population objective for Bear Lake sculpin is 25 age-1 and older fish per 20-minute bottom trawl for 6 consecutive years. Fish monitoring for the four endemic species includes the following (Tolentino et al. 2015):

- Bonneville whitefish: Set gill nets annually in the spring, summer, and fall to monitor populations by season and depth; conduct comprehensive angler creel surveys at 5-year intervals.
- Bonneville cisco: Conduct annual hydroacoustic surveys to estimate population numbers; conduct comprehensive angler creel surveys at 5-year intervals.
- Bear Lake whitefish: Set gill nets annually in the spring, summer, and fall to monitor populations by season and depth.
- Bear Lake sculpin: Complete bottom trawl surveys every other year.

One management strategy for Bonneville whitefish, Bonneville cisco, and Bear Lake sculpin is to consider increasing spawning habitat by introducing rocky substrate (Tolentino et al. 2015). Management strategies for Bear Lake BCT and lake trout include stocking 170,000 Bear Lake BCT (7 inches in size or greater) annually in early May when zooplankton abundance begins to increase (unless natural recruitment is determined to be sufficient to maintain lake populations) and stocking 17,000 sterile lake trout (at a size of 6–7 inches) annually in early to mid-November (Tolentino et al. 2015; Tolentino 2020b).

Big Game Species

Big game species inhabit areas surrounding Bear Lake. These species include mule deer (*Odocoileus hemionus*), Rocky Mountain elk (*Cervus elaphus nelsoni*), pronghorn (*Antilocapra americana*), moose (*Alces alces*), coyote (*Canis latrans*), and mountain lion (*Puma concolor*). Limited numbers of black bear (*Ursus americanus*) may inhabit USFS land on the western side of Bear Lake (Palacios et al. 2007c). Habitat data for these species (except for coyote and mountain lion) were obtained from DWR (2020) and are shown in Figure 2-29 and on the GIS data viewer.

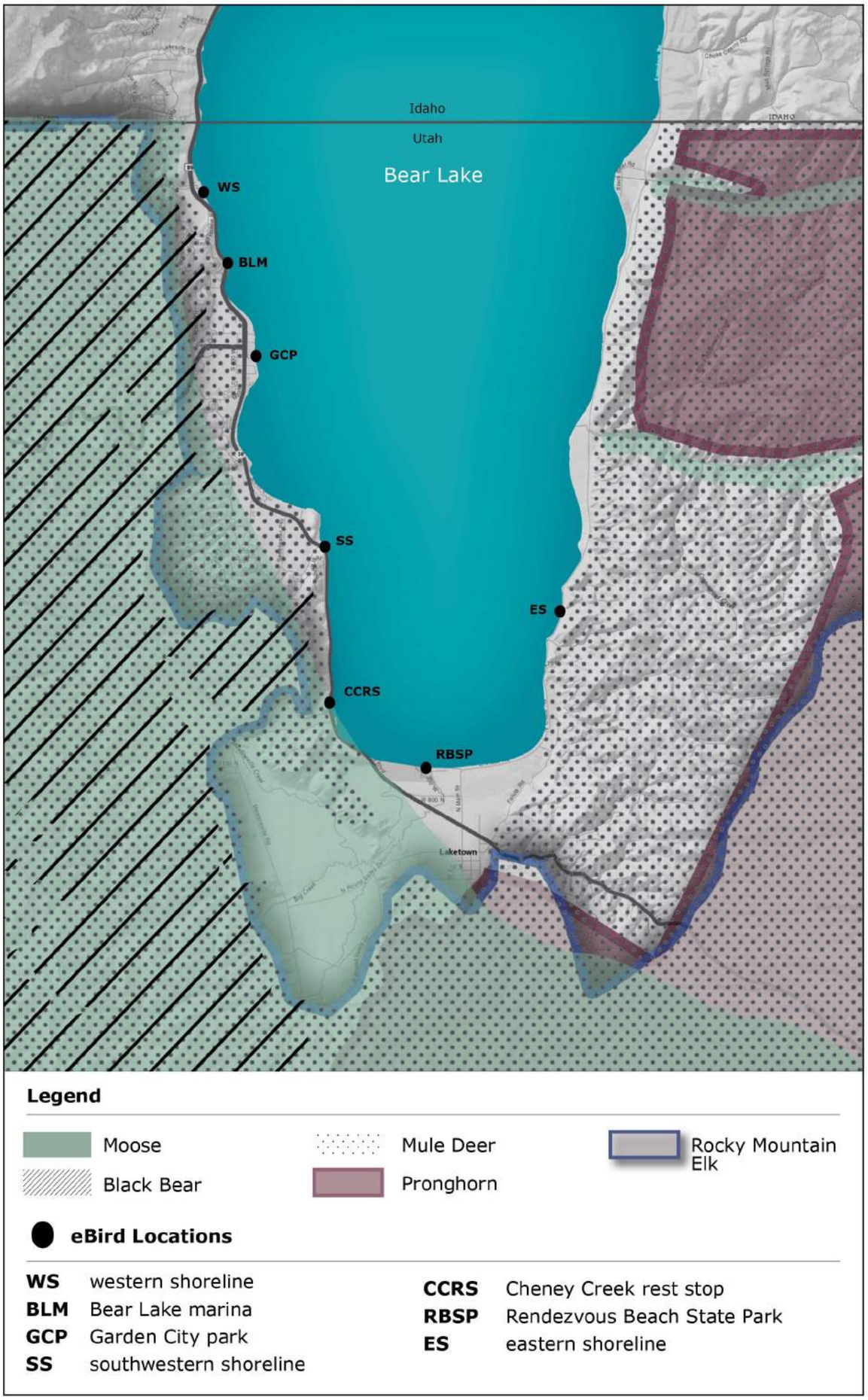


Figure 2-29. Big game habitat and eBird locations (hotspots) in and near the planning area.

Bird Species

The planning area is well-known for bird species diversity and provides important habitat for a variety of bird species. Many groups, including the National Audubon Society, conduct bird monitoring in and adjacent to the planning area. One of the National Audubon Society's counts for their annual Christmas Bird Count (CBC) overlaps the planning area. Data from this count are incorporated into Table 2-8.

Bird species data for specific locations in the planning area are available from eBird. eBird is a citizen-based global bird observation network that provides data sources for basic information on bird distribution and abundance at a variety of temporal and spatial scales. The presence or absence of species in addition to bird abundance are documented through checklist data. A birder fills out a checklist of all the birds seen or heard during a particular outing. Submissions are reviewed by automated data quality filters developed by regional birding experts before they are entered into the database, and unusual records are flagged by filters and reviewed by local experts. eBird data from 2018, 2019, and 2020 (where data were available) at seven locations (hotspots) in the planning area documented more than 150 bird species (Table 2-8; see Figure 2-29).

Table 2-8. Bird Species Recorded in or near the Planning Area in 2018, 2019, and 2020

Common Name	Scientific Name	Location*
Ducks, Geese, and Swans		
American wigeon	*Anas americana*	CCRS
Barrow's goldeneye	*Bucephala islandica*	WS, RBSP, CBC
Bufflehead	*Bucephala albeola*	SS, CBC
Cackling goose	*Branta hutchinsii*	WS, CBC
Canada goose	*Branta canadensis*	WS, BLM, GCP, SS, CCRS, RBSP, ES, CBC
Cinnamon teal	*Anas cyanoptera*	RBSP, ES
Common goldeneye	*Bucephala clangula*	WS, SS, CCRS, RBSP, ES, CBC
Common merganser	*Mergus merganser*	WS, BLM, SS, CCRS, RBSP, ES, CBC
Gadwall	*Anas strepera*	WS, CCRS, ES, CBC
Green-winged teal	*Anas crecca*	WS, BLM, ES, CBC
Hooded merganser	*Lophodytes cucullatus*	WS, SS, RBSP, CBC
Lesser scaup	*Aythya affinis*	SS, ES, CBC
Mallard	*Anas platyrhynchos*	WS, BLM, SS, CCRS, RBSP, ES, CBC
Northern pintail	*Anas acuta*	BLM, CCRS, ES
Northern shoveler	*Anas clypeata*	BLM, RBSP, ES
Redhead	*Aythya americana*	WS, SS, CCRS, CBC
Red-breasted merganser	*Mergus serrator*	SS, RBSP, ES,
Ring-necked duck	*Aythya collaris*	WS, CBC
Trumpeter swan	*Cygnus buccinator*	WS, BLM, SS, CCRS, RBSP, CBC
Tundra swan	*Cygnus columbianus*	BLM, SS, CCRS
Loons and Grebes		
Clark's grebe	*Aechmophorus clarkii*	SS, RBSP
Common loon	*Gavia immer*	WS, RBSP, ES
Eared grebe	*Podiceps nigricollis*	WS, SS, CBC
Horned grebe	*Podiceps auritus*	CBC
Pied-billed grebe	*Podilymbus podiceps*	BLM
Western grebe	*Aechmophorus occidentalis*	WS, BLM, GCP, SS, CCRS, RBSP, ES

Common Name	Scientific Name	Location*
Pelicans and Cormorants		
American white pelican	*Pelecanus erythrorhynchos*	WS, SS, CCRS, RBSP, ES
Double-crested cormorant	*Phalacrocorax auritus*	RBSP
Egrets and Ibis		
Great blue heron	*Ardea herodias*	WS, ES, CBC
White-faced ibis	*Plegadis chihi*	WS
Rails and Cranes		
American coot	*Fulica americana*	WS, BLM, SS, CCRS, RBSP, ES, CBC
Sandhill crane	*Grus canadensis*	WS, GCP, RBSP
Virginia rail	*Rallus limicola*	WS, CBC
Plovers, Sandpipers, and Gulls		
American avocet	*Recurvirostra americana*	RBSP
Black-necked stilt	*Himantopus mexicanus*	RBSP
Bonaparte's gull	*Chroicocephalus philadelphia*	WS, CCRS
California gull	*Larus californicus*	WS, BLM, GCP, SS, CCRS, RBSP, ES
Caspian tern	*Hydroprogne caspia*	SS, RBSP
Franklin's gull	*Leucophaeus pipixcan*	RBSP
Herring gull	*Larus argentatus*	SS
Killdeer	*Charadrius vociferus*	WS, GCP, SS, CCRS, RBSP, ES
Ring-billed gull	*Larus delawarensis*	WS, GCP, SS, CCRS, RBSP, ES, CBC
Spotted sandpiper	*Actitis macularius*	SS, CCRS, RBSP, ES
Willet	*Tringa semipalmata*	SS, RBSP, ES
Wilson's phalarope	*Phalaropus tricolor*	RBSP
Wilson's snipe	*Gallinago delicata*	ES
Pheasants and Grouse		
Chukar	*Alectoris chukar*	ES
Dusky grouse	*Dendragapus obscurus*	ES
Gray (Hungarian) partridge	*Perdix perdix*	CBC
Greater sage-grouse	*Centrocercus urophasianus*	ES
Ruffed grouse	*Bonasa umbellus*	WS
Sharp-tailed grouse	*Tympanuchus phasianellus*	CBC
Wild turkey	*Meleagris gallopavo*	WS, SS, RBSP, CBC
Vultures, Hawks, and Eagles		
Bald eagle	*Haliaeetus leucocephalus*	WS, SS, CCRS, RBSP, ES, CBC
Cooper's hawk	*Accipiter cooperii*	ES
Golden eagle	*Aquila chrysaetos*	WS, CCRS, CBC
Northern harrier	*Circus hudsonius*	SS, RBSP, ES
Osprey	*Pandion haliaetus*	GCP, CCRS, RBSP, ES
Red-tailed hawk	*Buteo jamaicensis*	WS, SS, CCRS, RBSP, ES, CBC
Rough-legged hawk	*Buteo lagopus*	WS, SS, CCRS, ES, CBC
Sharp-shinned hawk	Accipiter striatus	WS, ES, CBC
Swainson's hawk	*Buteo swainsoni*	SS, RBSP
Turkey vulture	*Cathartes aura*	WS, BLM, SS, CCRS

Common Name	Scientific Name	Location*
Falcons		
American kestrel	*Falco sparverius*	WS, SS, CCRS, ES, CBC
Owls		
Great-horned owl	*Bubo virginianus*	WS, SS, RBSP, CBC
Northern pygmy-owl	*Glaucidium gnoma*	WS, CBC
Pigeons and Doves		
Eurasian collared-dove	*Streptopelia decaocto*	WS, BLM, GCP, SS, CCRS, RBSP, ES, CBC
Mourning dove	*Zenaida macroura*	GCP, CCRS, RBSP, ES
Rock pigeon	*Columba livia*	WS, SS, ES, CBC
Nightjars		
Common nighthawk	*Chordeiles minor*	RBSP
Common poorwill	*Phalaenoptilus nuttallii*	ES
White-throated swift	*Aeronautes saxatalis*	ES
Hummingbirds		
Broad-tailed hummingbird	*Selasphorus platycercus*	WS, SS, RBSP, ES
Calliope hummingbird	*Selasphorus calliope*	ES
Rufous hummingbird	*Selasphorus rufus*	ES
Kingfishers		
Belted kingfisher	*Megaceryle alcyon*	WS, RBSP, CBC
Woodpeckers		
Downy woodpecker	*Picoides pubescens*	RBSP, ES, CBC
Hairy woodpecker	*Dryobates villosus*	WS, CBC

Common Name	Scientific Name	Location*
Lewis's woodpecker	*Melanerpes lewis*	ES
Northern flicker	*Colaptes auratus*	WS, BLM, GCP, SS, RBSP, ES, CBC
Flycatchers		
Dusky flycatcher	*Empidonax oberholseri*	ES
Gray flycatcher	*Empidonax wrightii*	ES
Least flycatcher	*Empidonax minimus*	ES
Western wood-pewee	*Contopus sordidulus*	CCRS, RBSP, ES
Western kingbird	*Tyrannus verticalis*	SS, RBSP
Blackbirds and Orioles		
Brewer's blackbird	*Euphagus cyanocephalus*	WS, GCP, SS, CCRS, RBSP, ES
Brown-headed cowbird	*Molothrus ater*	WS, SS, CCRS, RBSP, ES
Bullock's oriole	*Icterus bullockii*	WS, SS, CCRS, RBSP
Common grackle	*Quiscalus quiscula*	GCP
Red-winged blackbird	*Agelaius phoeniceus*	WS, BLM, GCP, CCRS, RBSP, ES, CBC
Rusty blackbird	*Euphagus carolinus*	GCP
Western meadowlark	*Sturnella neglecta*	SS, RBSP, ES
Yellow-headed blackbird	*Xanthocephalus*	WS, CCRS, RBSP
Vireos		
Plumbeous vireo	*Vireo plumbeus*	ES
Warbling vireo	*Vireo gilvus*	ES
Shrikes		
Northern shrike	*Lanius excubitor*	WS, SS, CBC

Common Name	Scientific Name	Location*
Jays and Crows		
American crow	*Corvus brachyrhynchos*	WS, BLM, GCP, SS, CCRS, RBSP, ES
Black-billed magpie	*Pica hudsonia*	WS, BLM, GCP, SS, CCRS, RBSP, ES, CBC
Clark's nutcracker	*Nucifraga columbiana*	WS
Common raven	*Corvus corax*	WS, BLM, GCP, SS, CCRS, RBSP, ES, CBC
Steller's jay	*Cyanocitta stelleri*	WS, SS, CBC
Larks		
Horned lark	*Eremophila alpestris*	WS, CCRS, ES, CBC
Swallows		
Bank swallow	*Riparia*	BLM
Barn swallow	*Hirundo rustica*	WS, GCP, SS, CCRS, RBSP, ES
Cliff swallow	*Petrochelidon pyrrhonota*	SS, CCRS, ES
Northern rough-winged swallow	*Stelgidopteryx serripennis*	SS, RBSP, ES
Tree swallow	*Tachycineta bicolor*	WS, GCP, SS, CCRS, RBSP, ES
Violet-green swallow	Tachycineta thalassina	SS, CCRS, RBSP, ES
Chickadees		
Black-capped chickadee	*Poecile atricapillus*	WS, GCP, SS, CCRS, RBSP, ES, CBC
Mountain chickadee	*Poecile gambeli*	WS, GCP, CBC
Nuthatches		
Red-breasted nuthatch	*Sitta canadensis*	WS, ES, CBC

Common Name	Scientific Name	Location*
Wrens		
House wren	*Troglodytes aedon*	GCP, SS, CCRS, RBSP, ES
Marsh wren	*Cistothorus palustris*	WS, GCP, CBC
Rock wren	*Salpinctes obsoletus*	ES
Gnatcatchers		
Blue-gray gnatcatcher	*Polioptila caerulea*	ES
Thrushes		
American robin	*Turdus migratorius*	WS, BLM, GCP, SS, CCRS, RBSP, ES, CBC
Mountain bluebird	*Sialia currucoides*	GCP, SS, ES
Swainson's thrush	*Catharus ustulatus*	WS
Townsend's solitaire	*Myadestes townsendii*	WS, ES, CBC
Thrashers		
Gray catbird	*Dumetella carolinensis*	WS, RBSP
Sage thrasher	*Oreoscoptes montanus*	ES
Starlings		
European starling	*Sturnus vulgaris*	WS, BLM, GCP, SS, CCRS, RBSP, ES, CBC
Waxwings		
Bohemian waxwing	*Bombycilla garrulus*	WS, SS, CBC
Cedar waxwing	*Bombycilla cedrorum*	WS, BLM, CBC
Warblers		
American dipper	*Cinclus mexicanus*	CBC
Common yellowthroat	*Geothlypis trichas*	GCP

Common Name	Scientific Name	Location*
MacGillivray's warbler	*Geothlypis tolmiei*	ES
Orange-crowned warbler	*Oreothlypis celata*	ES
Virginia's warbler	*Leiothlypis virginiae*	ES
Wilson's warbler	*Cardellina pusilla*	ES
Yellow-breasted chat	*Icteria virens*	ES
Yellow-rumped warbler	*Setophaga coronata*	GCP, RBSP
Yellow warbler	*Setophaga petechia*	WS, GCP, SS, CCRS, RBSP, ES
Sparrows		
American tree sparrow	*Spizelloides arborea*	WS, RBSP, CBC
Brewer's sparrow	*Spizella breweri*	ES
Chipping sparrow	*Spizella passerina*	SS, RBSP, ES
Dark-eyed junco	*Junco hyemalis*	WS, SS, CBC
Grasshopper sparrow	*Ammodramus savannarum*	ES
Green-tailed towhee	*Pipilo chlorurus*	ES
Harris's sparrow	*Zonotrichia querula*	WS
Lark sparrow	*Chondestes grammacus*	RBSP
Savannah sparrow	*Passerculus sandwichensis*	GCP
Song sparrow	*Melospiza melodia*	WS, GCP, SS, CCRS, RBSP, ES, CBC
Spotted towhee	*Pipilo maculatus*	WS, RBSP, ES, CBC
Vesper sparrow	*Pooecetes gramineus*	ES
White-crowned sparrow	*Zonotrichia leucophrys*	CBC
Tanagers, Grosbeaks, and Buntings		
Black-headed grosbeak	*Pheucticus melanocephalus*	WS, ES
Evening grosbeak	*Coccothraustes vespertinus*	WS, SS, ES
Lark bunting	*Calamospiza melanocorys*	RBSP
Lazuli bunting	*Passerina amoena*	SS, ES
Pine grosbeak	*Pinicola enucleator*	WS, SS, RBSP, CBC
Western tanager	Piranga ludoviciana	WS, GCP, CCRS, ES
Finches		
American goldfinch	*Spinus tristis*	WS, GCP, SS, RBSP, ES, CBC
Cassin's finch	*Haemorhous cassinii*	WS, RBSP, ES, CBC
Gray-crowned rosy-finch	*Leucosticte tephrocotis*	WS, CBC
House finch	*Haemorhous mexicanus*	WS, SS, CCRS, RBSP, ES, CBC
Pine siskin	*Spinus pinus*	SS, ES, CBC
Old World Sparrows		
House sparrow	*Passer domesticus*	WS, BLM, SS, CCRS, CBC

Source: eBird (2020).

* CCRS = Cheney Creek Rest Stop; WS = western shoreline; BLM = Bear Lake Marina; GCP = Garden City park; SS = southwestern shoreline; RBSP = Rendezvous Beach State Park; ES = eastern shoreline; CBC = Christmas Bird Count.

BIRD SPECIES OF MANAGEMENT CONCERN

As demonstrated in Table 2-8, the list of bird guilds and bird species (> 150) observed in the planning area is extensive. A bird guild is a group of species in a community that use the same set of resources in a similar manner but are not necessarily closely related taxonomically. Using DWR's list of key habitats (Utah Wildlife Action Plan Joint Team 2015) and specifically those found in the planning area—open water, emergent, and to a limited extent aquatic-forested and aquatic-scrub/shrub—the Bear Lake CMP recommends considering USFWS avian focal species (USFWS 2013b), Utah Wildlife Action Plan SGCNs, and Utah Partners in Flight (PIF) priority species (Parrish et al. 2002) when trying to achieve habitat-related management goals such as enhancement, restoration, and preservation. Utah PIF priority species are those species most in need of immediate and continuing conservation efforts.

Open water key habitat is comparable to the planning area's aquatic habitat type. Emergent key habitat is comparable to the planning area's wetland habitat type, and the aquatic-forested and aquatic-scrub/shrub key habitats are equivalent to the planning area's riparian habitat type (see Figures 2-10 and 2-14). The following sections provide information about these habitats and bird species that depend on them.

Aquatic Habitat and Indicator Species

Open water combines both standing aquatic and flowing habitats. It makes up approximately 2.6% of the total area of Utah (Utah Wildlife Action Plan Joint Team 2015) and includes lakes, reservoirs, streams, and rivers. Common types of birds seen in these habitats include ducks, geese, and swans (Anatidae family). The Anatidae family has evolved to float on the water's surface. Some species also dive for food in shallow areas. Several different species in this family can be observed in the planning area, including Canada goose (*Branta canadensis*), trumpeter swan (*Cygnus buccinator*), tundra swan (*Cygnus columbianus*), mallard (*Anas platyrhynchos*), gadwall (*Anas strepera*), northern pintail (*Anas acutas*), northern shoveler (*Anas clypeata*), cinnamon teal (*Anas cyanoptera*), green-winged teal (*Anas crecca*), American wigeon (*Anas americana*), redhead (*Aythya americana*), common goldeneye (*Bucephala clangula*), hooded merganser (*Lophodytes cucullatus*), red-breasted merganser (*Mergus serrator*), and common merganser (*Mergus merganser*).

Also represented on Bear Lake are western grebe (*Aechmophorus occidentalis*), Clark's grebe (*Aechmophorus clarkii*), horned grebe (*Podiceps auritus*), pied-billed grebe (*Podilymbus podiceps*), and eared grebe (*Podiceps nigricollis*). These species in the Podicipediformes family can be seen floating on the water but dive underwater to forage for fish. The American white pelican (SGCN and Utah PIF priority species) and osprey (*Pandion haliaetus*) can also be found in the planning area. The presence of these species may be used as an indication that a certain level of habitat quality is present.

Wetland and Riparian Habitat and Indicator Species

Wetland and riparian habitats, including those in and adjacent to the planning area, are generally more productive and biologically diverse than surrounding upland habitats. Riparian habitats are present in the planning area along streams entering Bear Lake. Bird communities in particular have greater diversity in wetland and riparian habitats than in upland habitats (McKinstry et al. 2004; Skagen et al. 2005). Roughly 50% of the bird species in the American Southwest, which includes Utah, nest exclusively in riparian and wetland habitat and another 21% nest in higher densities in these habitats than in surrounding habitats (Johnson et al. 1985; Skagen et al. 2005). Increasing evidence also highlights the importance of these habitats during bird migration. Freshwater marsh complexes include wetland types such as emergent marshes, wet meadows, and seasonal wetlands that provide important habitat to a variety of waterbirds and migrant species (Ivey and Herziger 2006).

The American avocet (USFWS avian focal species and Utah PIF priority species), which is found in northern Utah and has been observed in the planning area, inhabits shallow wetlands and mudflats (often saline or alkaline) during the breeding season. The presence of this species may be used as an indication that a certain level of habitat quality exists. Other important wetland species include black-necked stilt (*Himantopus mexicanus*; Utah PIF priority

species), white-faced ibis (*Plegadis chihi*; SGCN), Wilson's phalarope (*Phalaropus tricolor*), sandhill crane (*Grus canadensis*), marsh wren (*Cistothorus palustris*), great blue heron (*Ardea herodias*), and common yellowthroat (*Geothlypis trichas*).

The yellow warbler (*Setophaga petechia*), found throughout Utah and at Bear Lake, generally nests in small riparian trees. Given the yellow warbler's relative abundance in the area, its nesting habitat parameters can be used in the development of riparian habitat enhancement projects. Similarly, the bald eagle (*Haliaeetus leucocephalus*; SGCN), great blue heron, and broad-tailed hummingbird (*Selasphorus platycercus* Utah PIF priority species) all nest in lowland riparian habitats and can be the focus of habitat enhancement efforts.

Lake Level Effects

FISH SPECIES

The availability of littoral cobble habitat is affected by changing lake levels. Littoral cobble habitat can become exposed and inaccessible to fish at lower lake elevations (Figure 2-30). The endemic species (Bear Lake whitefish, Bonneville cisco, Bonneville whitefish, and Bear Lake sculpin) all depend on littoral cobble habitat for spawning, feeding, and rearing. These species are the prey base for Bear Lake BCT and lake trout; Bear Lake BCT and lake trout are therefore indirectly dependent on submerged littoral cobble habitats that maintain prey production. According to Glassic and Gaeta (2020), the abundance of available prey in Bear Lake may be reduced with lowering lake levels. Low lake levels that lower prey fish abundance may affect predator growth and survival (Ruzycki et al. 2001).

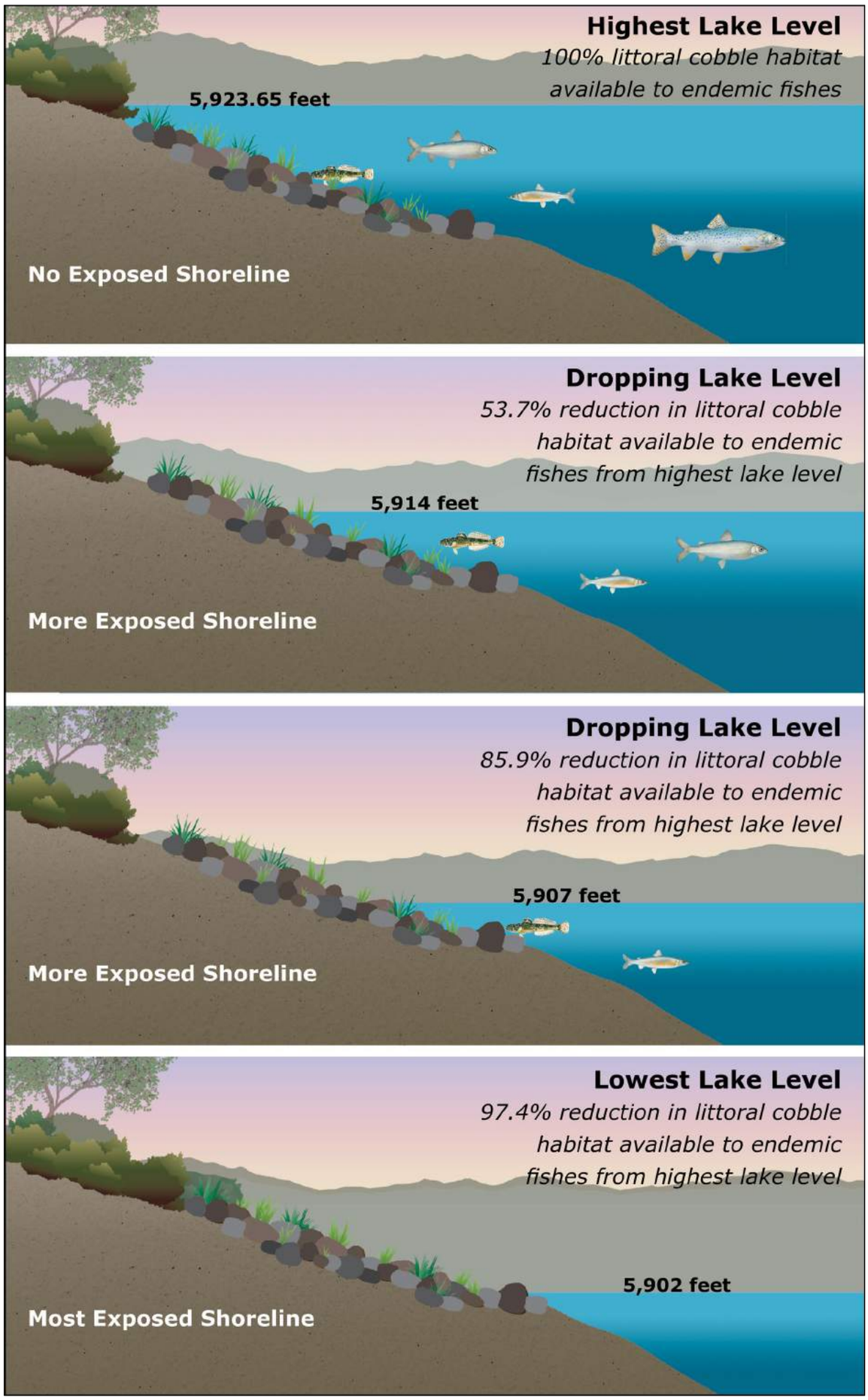


Figure 2-30. The influence of lake level on the accessibility of cobble habitats to Bear Lake fishes (Glassic and Gaeta 2018).

Glassic and Gaeta (2018) surveyed substrate types of 23,440.4 acres of Bear Lake (33.6% of Bear Lake's surface area at the time) and found that 98.9% of the substrate was sand, and the remaining 1.1% was cobble, cobble on sand, cobble on gravel, gravel, or bedrock (0.5% being exclusively cobble substrate). The average lake level decline during the past six significant droughts from 1898 through 2017 was 16.6 feet (from 5,923.65 feet to approximately 5,907 feet), which resulted in an 85.9% reduction in littoral cobble habitat (Glassic and Gaeta 2018). Lake level drops of 3.3 feet, 6.6 feet, and 9.8 feet from 5,923.65 feet reduce the total cobble habitat available to fish by 10.0%, 31.5%, and 53.7%, respectively (Glassic and Gaeta 2018). When the lake is at its lowest historical elevation of 5,902 feet, 97.4% of potential cobble substrate is left dry along the shoreline and unavailable to fish (see Figure 2-30). In years when the lake is low, the available spawning substrate is low to non-existent.

Specifically for Bear Lake sculpin, approximately 3,937 feet of lateral shoreline with suitable spawning habitat exists in the lake; this habitat extends approximately 246 feet from shore (Ruzycki et al. 1998). Albrecht et al. (2004) noted that when the lake was down 24 feet in 2005, available spawning habitat for Bear Lake sculpin was reduced to less than 5% of the potential spawning area.

The life cycle of the Bear Lake BCT is dependent on access to tributaries with enough streamflow for spawning, rearing, and migration. The main tributaries to Bear Lake can become disconnected from the lake when elevations drop below 5,912.1 feet (Glassic and Gaeta 2020) (Figure 2-31). To protect Swan Creek's connection with Bear Lake, DWR has applied for and been granted a permit to dredge sediments from the mouth of the creek in extremely low water years. Glassic and Gaeta (2020) predicted that when the lake is at its lowest historical elevation, Bear Lake BCT recruitment (population increase) would be reduced by 61.5% when compared to recruitment with full tributary access. Adequate streamflow in tributary streams and lake elevations that allow access to spawning streams are equally important for this species (Burnett 2003). Securing instream flows is probably the most important thing managers can do to protect the Bear Lake BCT (Tolentino 2019).

The Bear Lake Settlement Agreement rations irrigators' water allocations as lake elevations decrease (Last Chance Canal Company et al. 2004). As described in Chapter 1, the full allocation of 245,000 acre-feet is given when the maximum lake level is predicted to be above 5,914.7 feet. However, at a lake elevation at or below 5,904 feet, the allocation is 0 acre-feet. This practice at 5,904 feet protects approximately 14.1% of the littoral cobble spawning substrate (Glassic and Gaeta 2018). However, Glassic (2018) has shown that low lake levels that expose the majority of littoral cobble habitats are detrimental to survival of the four endemic species, and therefore the health of the lake's aquatic community. For the Bear Lake BCT, minimum water levels for access to all four Bear Lake BCT spawning streams (critical for reproduction) should be 5,912.1 feet or higher; however, it is preferable to have a lake elevation of 5,914.7 feet or higher to maximize access (Tolentino 2020b).

Figure 2-31. St. Charles Creek in September 2012 at approximately 5,916 feet of elevation (left) and in June 2003 (right) at approximately 5,908 feet of elevation. Modified from Glassic 2018. Used with permission.

MAMMAL SPECIES

In general, the distribution and extent of terrestrial habitats for mammals increase during periods of low lake levels and decrease during periods of high lake levels. Impacts to mammal species from changing lake levels are likely minimal because of the predominance of upland habitats in the landscape surrounding Bear Lake.

BIRD SPECIES

The effects of changing lake levels on birds that use Bear Lake habitats are highly variable and depend on species-specific foraging and nesting requirements. Many wading species, waterfowl, and shorebirds use shallowly flooded wetlands or shorelines for foraging. At low lake levels, there is likely a loss or reduction in rooted emergent aquatic vegetation, submergent vegetation, aquatic invertebrates, and fish, which decreases foraging habitat for these species. Wetland foraging bird species experience different effects based on lake level changes. A transitory shoreline that shifts over time may change the habitat at a specific location from flooded to dry. Piscivorous (fish-eating) bird species that depend on open water habitats are affected less by changes in lake level.

Species that nest in rooted emergent vegetation either over water or at water level likely experience a loss or reduction in rooted emergent aquatic vegetation for nesting substrate, a loss in standing water around emergent vegetation, and increased predation with low lake levels. Species that nest along the shoreline and shallow water nesters experience a loss of nesting habitat with the highest lake levels because nesting habitat is inundated. At middle to low lake levels, nesting habitat at the shoreline becomes disconnected from lake water and dries up.

AMPHIBIAN AND REPTILE SPECIES

In general, the distribution and extent of terrestrial habitats for reptiles increase during periods of low lake levels and decrease during periods of high lake levels. Impacts to reptiles from changing lake levels are likely minimal due to the predominance of upland habitats in the landscape surrounding Bear Lake.

The distribution and extent of amphibian habitats that are close to water are reduced during periods of low lake levels because of the loss of aquatic habitat. At high lake levels, available aquatic habitats for amphibians increase. Amphibians occupying wetland or riparian habitats may be negatively affected if that habitat becomes disconnected from its water source and dries out with lower lake levels. However, new wetlands (and new amphibian habitat) can also emerge behind dropping lake levels in areas where water becomes trapped (such as sand bars).

MOLLUSK SPECIES

In addition to the mollusk species described in Table 2-6, duskysnails (*Amnicola* spp.), marsh snails, physids (Physidae), ramshorns (Planorbidae), amber snails (Succineidae), and pea clams (Pisidium) may inhabit the riparian areas surrounding Bear Lake. The shrubland surrounding Bear Lake may provide habitat for mountainsnails (Oreohelicidae), daggers (Pupillidae), columns (Pupillidae), glass snails (Vitrinidae), and gloss snails (Gastrodontidae). Mollusk habitats would experience similar effects from changing lake levels as amphibian habitats.

Further Reading

Bear Lake Fish Management Plan (Tolentino et al. 2015)

Birds and mammals of the Bear Lake basin, Utah (Palacios et al. 2007c)

EBird Explore Hotspots website (eBird 2020)

Fish of Bear Lake, Utah (Palacios et al. 2007d)

Fishes of the Great Basin – A natural history (Sigler and Sigler 1987)

Intermountain West Waterbird Conservation Plan (Ivey and Herziger 2006)

Land Protection Plan, Bear River Watershed Conservation Area, Idaho, Utah, and Wyoming (USFWS 2013b)

Littoral habitat loss caused by multiyear drought and the response of an endemic fish species in a deep desert lake (Glassic and Gaeta 2018)

The influence of multiyear drought and associated reduction in tributary connectivity on an adfluvial fish species (Glassic and Gaeta 2020)

Trophic Interactions Between Fish and Invertebrates in Bear Lake, Utah-Idaho (Wurtsbaugh and Hawkins 1990)

Utah Field Office Guidelines for Raptor Protection from Human and Land Use Disturbances (Romin and Muck 2002)

Utah Partners in Flight Avian Conservation Strategy Version 2.0 (Parrish et al. 2002)

Utah Wildlife Action Plan: A Plan for Managing Native Wildlife Species and Their Habitats to Help Prevent Listing under the Endangered Species Act (Utah Wildlife Action Plan Joint Team 2015)

GIS Data Layers

Bathymetry (5 meters), Bird Habitat Conservation Areas, Black Bear Habitat, Blue Grouse Habitat, Chukar Partridge Habitat, eBird Locations (Hotspots), Hungarian Partridge Habitat, Lake Level Contours, Lake Shoreline Overview, Local Wetlands, Mercury in Fish Tissue, Moose Habitat, Mule Deer Habitat, National Wetlands Inventory, Pronghorn Habitat, Ring-necked Pheasant Habitat, Rocky Mountain Elk Habitat, Wild Turkey Habitat

2.4 Water Resources

Water resources in the planning area are presented in three sections: Hydrology, Limnology, and Water Quality. The Hydrology section provides information on the Bear Lake watershed, including inflows, outflows, and groundwater inputs. It also provides a graph of the historical surface elevations of the lake. The Limnology section discusses lake stratification, water clarity, and the lake's aquatic community. The Water Quality section explains how water quality is managed and assessed, and discusses water quality data, water quality concerns, monitoring, and sediment dynamics.

Hydrology

Bear Lake's 379-square-mile watershed is relatively small. The lake receives natural inflows directly from North Eden Creek, South Eden Creek, and Indian Creek (Idaho) from the east; Hodges Canyon, Swan Creek, Fish Haven Creek (Idaho), and St. Charles Creek (Idaho) from the west; Bloomington Creek (Idaho), Worm Creek (Idaho), and Dingle Marsh (Idaho) from the north; and Big Creek from the south (Figure 2-32 and Table 2-9). Estimates of flow into Bear Lake from tributaries are not available because most of these tributaries are not gaged. However, PacifiCorp manages Bear Lake water for irrigation and flood control purposes and therefore works to predict and measure inflows into the lake. PacifiCorp estimates the total inflow into the lake via a water balance (representing the change in storage not attributable to Lifton Pumping Station outflows or Inlet Causeway inflows), whose components include direct groundwater inflow, direct lake precipitation, and evaporation. Total direct tributary inflow is solved for as an unknown in the water balance. The average winter/spring runoff increase in volume to Bear Lake from direct tributaries (based on data from 1922 to 2019) was approximately 18,321 acre-feet per year (approximately 25.3 cubic feet per second). The total median annual increase in lake elevation from all sources (including the Bear River) (based on data from 1916 to 2019 from the fall minimum to the spring maximum) was roughly 3.1 feet, which equates to approximately 210,000 acre-feet (Baldwin 2020).

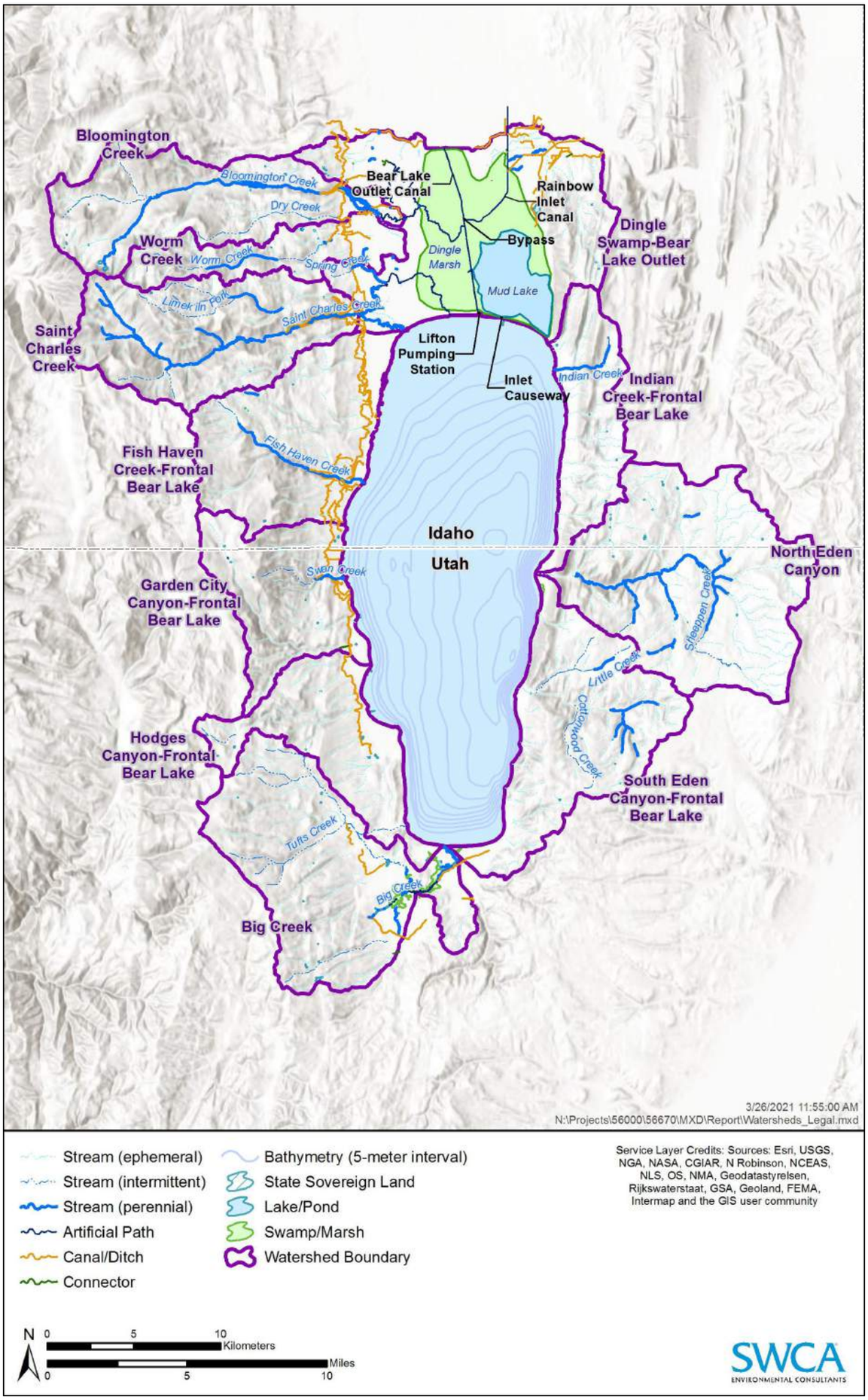


Figure 2-32. Bear Lake watershed and surrounding tributary watersheds.

Table 2-9. Bear Lake Tributary Watersheds

Tributary	Watershed Area (square miles)
Big Creek	47
Bloomington Creek*	33
Dingle Marsh*	57
Fish Haven Creek*	35
Hodges Canyon	24
Indian Creek*	19
North Eden Creek	53
St. Charles Creek*	35
South Eden Creek	37
Swan Creek (Garden City Canyon)	24
Worm Creek*	15
Total	**379**

* Most of the tributary watershed is in the state of Idaho.

Bear Lake has intermittently been naturally connected to the Bear River through geologic time until ca. 10,000–8,000 years ago (Lamarra 1980) when they became separated (Belmont et al. 2018). As discussed in Chapter 1, hydrologic modifications in the early 1900s created permanent artificial connections between the lake and river to facilitate water storage. The Bear River now serves as Bear Lake's largest inflow and outflow. The Bear River is diverted into Bear Lake via the Rainbow Inlet Canal through Mud Lake, and water is diverted out of Bear Lake back into Bear River via the Lifton Pumping Station and the Bear Lake Outlet Canal that runs through Dingle Marsh. By adding the upper portions of the Bear River watershed to the Bear Lake drainage area, Bear Lake's basin-to-lake-area ratio moved from 4.8:1 to 29.5:1 (Dean et al. 2007; Wurtsbaugh and Leucke 1997).

The creeks that enter Bear Lake from the west (Swan Creek, Fish Haven Creek, St. Charles Creek) are fed by groundwater flowing through cavernous Paleozoic rocks in the Bear River Range (Dean et al. 2007). Bear Lake also receives groundwater inputs via tributary base flows, springs and seeps, and direct groundwater discharge (Dean et al. 2007). The locations of all springs are not known, but some have been identified by surface bubbles. Because of the dominance of winter precipitation, most of the inflow to Bear Lake is from snowmelt. The volume of water in the lake is dependent on precipitation, timing and intensity of spring runoff, temperature, and operation of the lake as a water storage reservoir. The volume of Bear Lake water that is lost to evaporation varies dramatically with changing surface elevations because evaporation is proportional to surface area. A time series of Bear Lake surface elevations since 1903 is shown in Figure 2-33.

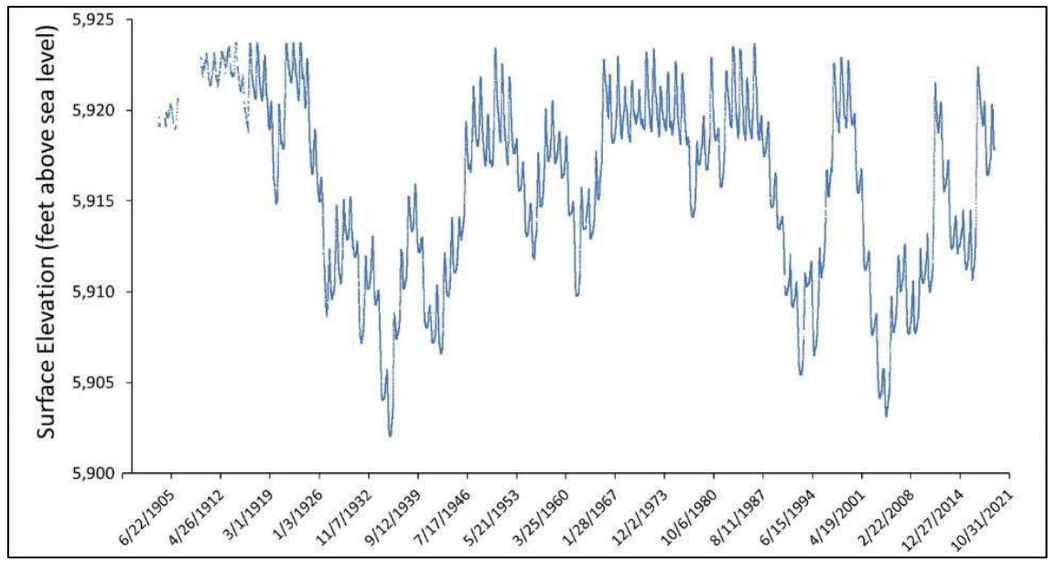


Figure 2-33. Bear Lake surface elevations from 1903 to 2019.

Further Reading

Climatic and limnologic setting of Bear Lake, Utah and Idaho (Dean et al. 2009)

Coprecipitation of phosphorus with calcium carbonate in Bear Lake, Utah (Birdsey 1985)

Trophic interactions between fish and invertebrates in Bear Lake, Utah-Idaho (Wurtsbaugh and Hawkins 1990)

GIS Data Layers

Bathymetry (5 meters), Depth to Groundwater (cm), HUC 12 Watersheds, Lake Level Contours, National Hydrography Dataset, USGS Flow Gages

Limnology

Limnology is the study of freshwater or saline water contained within continental boundaries and covers lakes, ponds, reservoirs, streams, rivers, wetlands and estuaries (Horne and Goldman 1994). Key terms to know for the limnology section of the CMP are in the sidebar box on this page. Bear Lake is a large, 69,684-acre natural lake, with an average depth of 91.9 feet and a maximum depth of 206.7 feet on its eastern edge (Dean et al. 2009). It is oligotrophic, which means that the lake has a relatively low productivity because of its low nutrient content. Much of the watershed is calcareous in geology, and the waters of the lake are consequently alkaline, with mean calcium carbonate ($CaCO_3$) concentrations of 268 milligrams per liter (mg/L) (Wurtsbaugh and Leucke 1998). Most of the lakebed is covered in fine marl (calcium-carbonate rich) sediment, and calcareous sediment swirls can be seen in Bear Lake in images from space (Figure 2-34). The precipitation of calcium carbonate influences the appearance (color) of the lake and may also limit primary production by binding phosphorus to and removing phosphorus from the water column (Birdsey 1985, 1989; Dean et al. 2009).

Terms to Know

Stratification
The separation of water of different temperatures and densities at different depths

Overturn (turnover)
The process of a lake's water turning over from top (epilimnion) to bottom (hypolimnion) when the surface water (epilimnion) becomes denser (the maximum density of water is 4 degrees Celsius) than the bottom water (hypolimnion)

Dimictic
A lake that overturns twice every year

Monomictic
A lake that overturns once every year

Pelagic
The open water areas of a lake where light does not penetrate to the bottom

Secchi depth
A measure of water transparency defined by the depth at which a Secchi disc is no longer visible from the surface

Nutrient bioassay
An experiment done in an enclosed container filled with lake water representing conditions in a lake

Plankton
The collection of organisms that live in the water column and are unable to swim against a current

Benthic
The region of the lake bottom, the sediment surface, and some sub-surface layers

Macroinvertebrate
Organisms that lack a spine and are large enough to be seen with the naked eye

Figure 2-34. Bear Lake from space depicting sediment swirls. Image courtesy of National Aeronautics and Space Administration's Earth Observatory.

Bear Lake is typically stratified into three distinct thermal layers: epilimnion or upper layer, metalimnion or intermediate layer, and hypolimnion or lower (bottom) layer. The lake does not freeze every winter, and the duration of ice cover is variable. In years when the lake freezes over, it behaves like a typical dimictic lake with spring and fall overturns (mixing); in years when it does not freeze, it may become inversely stratified in winter and monomictic with overturn in January (Dean et al. 2009). Vertical thermal stratification may result in a 32.8- to 65.6-foot epilimnion, an approximately 32.8-foot metalimnion, and a broad hypolimnion, although the depth of the metalimnion can be variable (Wurtsbaugh and Hawkins 1990). Horizontal thermal gradients also exist in the lake. In the winter, surface waters in nearshore areas are cooler than surface waters in the pelagic or open water zone. In the summer, they are warmer.

Water clarity in Bear Lake is affected largely by physical rather than biological factors. There is little or no relationship between water clarity and chlorophyll *a* concentrations (a measure of primary plant production in the water column used to determine productivity) (Ecosystems Research Institute 2004; Wurtsbaugh and Hawkins 1990); therefore the lake's trophic status may not be interpreted by standard limnological metrics such as Secchi depth (water transparencies are not as great as they should be for an oligotrophic lake). Bear Lake's oligotrophic status is illustrated by low average chlorophyll *a* concentrations (approximately 0.5 micrograms per liter), which are highest during fall and winter mixing. Bear Lake's mean epilimnetic total phosphorus concentrations (11 micrograms per liter; Wurtsbaugh and Hawkins 1990) are also indicative of oligotrophic conditions, although the diversion of Bear River water into the lake has likely increased nutrient concentrations (Dean et al. 2009; Lamarra et al. 1983). Even though phosphorus concentrations are low, nutrient bioassay experiments have shown that phytoplankton growth is usually limited by nitrogen, although nitrogen concentrations in the lake have increased since 1997 (Dean et al. 2009). Low chlorophyll *a* concentrations are a result of both limiting nutrients and zooplankton grazing pressure. During summer stratification, chlorophyll *a* concentrations may be higher in the metalimnion and hypolimnion than in the epilimnion (Dean et al. 2009).

Aquatic Community

PHYTOPLANKTON, ZOOPLANKTON, AND THE FOOD WEB

Phytoplankton, photosynthesizing invertebrate microscopic organisms (plants) in the upper sunlit layer of waterbodies (e.g., algae, diatoms), form the base of the pelagic food web in Bear Lake. Most phytoplankton are small enough to be grazed by zooplankton, small organisms (e.g., protozoans and animals) that drift with water currents and feed on other plankton (Wurtsbaugh and Hawkins 1990). Although Bear Lake phytoplankton have not been studied extensively, diatoms are thought to be the dominant taxa in the lake (Dean et al. 2009). Bear Lake's zooplankton community comprises relatively small organisms such as Cladocera, copepods, rotifers, and both pelagic- and epibenthically associated taxa. The abundance of zooplankton in Bear Lake may be limited by low phytoplankton concentrations and by inorganic particles in the water column that may interfere with feeding and digestion (Wurtsbaugh and Hawkins 1990). Dominant zooplankton crustaceans in Bear Lake are *Daphnia* spp. and *Epischura nevadensis*. *Epischura nevadensis* is zooplanktivorous at latter life stages and likely preys upon smaller copepods and other zooplankton. Zooplankton populations are also limited because they are preyed on, to some degree, by fish such as juvenile Bear Lake whitefish, Bonneville cisco, and Bear Lake sculpin.

The lake's fish population is largely associated with the benthic zone (Figure 2-35), and some fishes may undergo daily vertical migrations through the water column. In summer months, fish aggregate in the littoral zone or where the metalimnion intersects the lakebed (Wurtsbaugh and Hawkins 1990) because it provides a range of optimal temperatures for numerous species and may have the highest benthic invertebrate abundances (Dean et al. 2009). Eight species of fish in Bear Lake feed primarily on benthic invertebrates (particularly chironomid larvae and ostracods). Only one species, Bonneville cisco, preys on significant amounts of zooplankton (Wurtsbaugh and Hawkins 1990). Stable isotope and stomach content analyses done by Wurtsbaugh and Hawkins (1990) confirmed that Bonneville cisco appear to prey mainly on zooplankton, whereas chub species and speckled dace (*Rhinichthys osculus*) appear to prey principally on benthic invertebrates. The stable isotope analysis was not as conclusive for other native fish species but indicated that many fish species (Bear Lake whitefish, Bonneville whitefish, Bear Lake sculpin, and speckled dace) appear to prey on both pelagic and benthic invertebrate taxa.

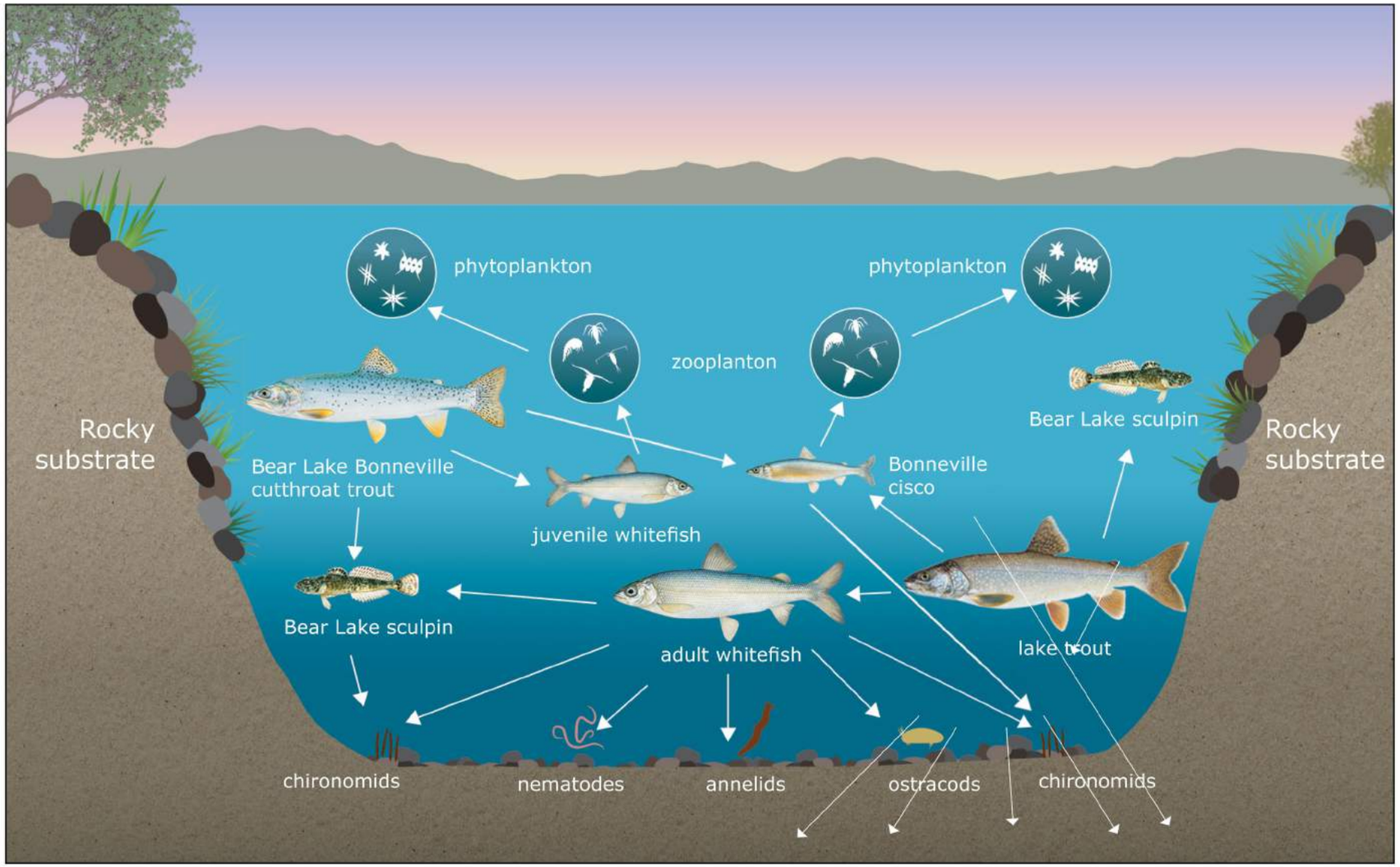


Figure 2-35. Simplified depiction of the Bear Lake ecosystem.

BENTHIC INVERTEBRATES

Benthic invertebrates are small aquatic animals and the aquatic larval stages of certain insects that live on the bottom sediments of river, streams, and lakes and do not have a backbone. They can include beetles, dragonfly larva, mosquito larva, snails, crustaceans, and worms. Benthic macroinvertebrates are those benthic invertebrates that are large enough to be observed with the naked eye and without the use of magnification. Benthic invertebrates are important components of the Bear Lake food web because they consume organic matter and are in turn consumed by other wildlife such as fish and birds. Benthic invertebrate communities are also indicators of ecological condition (e.g., water quality) because different benthic invertebrate taxa have varying levels of tolerance to pollutants. Other organisms that can be used to assess the condition of waterbodies include zooplankton, algae, fish, aquatic plants, amphibians, and birds.

The most recent benthic invertebrate sampling of Bear Lake occurred in 1987. The study reported at least 70 taxa of benthic invertebrates associated with the lake (Wurtsbaugh and Hawkins 1990). Most of the macroinvertebrates were part of five taxonomic groups: flies (Diptera [Chironomidae]), crustaceans other than ostracods (Cladocera, Copepoda, and Amphipoda), ostracods (Ostracoda), worms (Nematoda and Annelida), and mites (Trombidiformes) (Wurtsbaugh and Hawkins 1990). In all, 44% of all taxa were chironomid midges, which occupy shallow burrows less than 0.4 inch into the sediments. Worms occur within the lake sediments, and crustaceans and mites occur on or near the sediment-water interface (Wurtsbaugh and Hawkins 1990). Overall benthic invertebrate biomass in the lake is low, likely because of low primary production in the lake and the dominant soft marl sediments that do not provide good habitat (Dean et al. 2009).

Lake Level Effects

The effects on the limnology of Bear Lake from varying lake levels are tied to changes in surface area and inundated benthic habitats. As the level of the lake drops, the inundated benthic habitat area is reduced. Given that benthic habitats and benthic macroinvertebrates are an important component of the lake food web, there is likely a reduction in the availability of benthic prey for Bear Lake fishes. At a median elevation of 5,912 feet, approximately 1,385 acres of benthic habitat (on the Utah portion of Bear Lake) becomes exposed and unavailable for aquatic benthic macroinvertebrates and fish. At a low elevation of 5,903 feet, approximately 4,169 acres of benthic habitat (on the Utah portion of Bear Lake) becomes exposed and unavailable for aquatic benthic macroinvertebrates and fish. There is unlikely to be a major effect from a lowered lake surface area on the limnology of the lake other than reductions in the availability of certain habitats and connectivity to tributary streams.

Further Reading

Climatic and limnologic setting of Bear Lake, Utah and Idaho (Dean et al. 2009)

Coprecipitation of phosphorus with calcium carbonate in Bear Lake, Utah (Birdsey 1985)

Trophic interactions between fish and invertebrates in Bear Lake, Utah-Idaho (Wurtsbaugh and Hawkins 1990)

GIS Data Layers

Bathymetry (5 meters), Depth to Groundwater (cm), HUC 12 Watersheds, Lake Level Contours, National Hydrography Dataset, USGS Flow Gages

Water Quality

Water Quality Management and Assessment

DWQ assigns beneficial uses to waters of the state to protect them for domestic use, recreation, aquatic life, and agricultural uses. Water quality standards, consisting of numeric thresholds for individual pollutants and narrative descriptions of desired conditions, are used to determine beneficial use attainment. Beneficial use classes and water quality standards are set forth in Utah Administrative Code R317-2.

DWQ assesses the biological, chemical, and physical integrity of Utah surface waters every 2 years and reports beneficial use attainment status in the DWQ integrated report (DWQ 2016). To carry out the assessment, surface waters of the state such as rivers, lakes, and streams have been separated into discrete sub-watershed units called assessment units. Assessment units are delineated by DWQ and are based on USGS 5th-level and 6th-level hydrologic unit codes. Data collected in each assessment unit are compared to state numeric and narrative criteria for each designated beneficial use, as written in Utah Administrative Code R317-2. Surface waters failing to meet water quality standards for any designated beneficial use are listed on Utah's 303(d) list of impaired waterbodies and are subsequently prioritized for development of a total maximum daily load (TMDL) study to outline the process to restore beneficial use attainment.

The State of Utah has designated the following beneficial uses to Bear Lake (Utah Department of Environmental Quality 2020):

- 2A: frequent primary contact recreation
- 3A: cold water fish and their associated food chain
- 4: agricultural uses

Bear Lake currently supports the assessed beneficial uses and in 2016 was reported as a category 2 waterbody (DWQ 2016). An assessment unit is reported as category 2 "if there are insufficient data to assess all beneficial uses, yet those uses that have been assessed are found to be supporting designated uses" (DWQ 2016). Although Bear Lake was found to support the 2A (frequent primary contact recreation) beneficial use, there were insufficient data to fully assess both the 3A and 4 beneficial uses (VanderLaan 2020).

Watersheds of the tributaries that drain into Bear Lake have mixed assessment determinations. On the east side of Bear Lake, South Eden Creek from its headwaters to Bear Lake is supporting all assessed uses, whereas North Eden Creek and tributaries from Bear Lake to headwaters is not supporting the 3A (cold water fish and their associated food chain) beneficial use because of temperature exceedances. The North Eden assessment unit was first listed on Utah's 303(d) list of impaired waterbodies in 2010 and is a low priority for TMDL development (DWQ 2016).

On the south side of the lake, the Laketown assessment unit (which includes Big Creek) is not supporting the 3A beneficial use because of impairments of dissolved oxygen and temperature. The west side tributaries to Bear Lake (Bear Lake West assessment unit) are not supporting the 3A beneficial use based on a biological assessment of aquatic macroinvertebrates. DWQ used an empirical model in the biological assessment to quantify the assemblage of benthic macroinvertebrates to assess attainment of the 3A aquatic life use. Both the Laketown and Bear Lake West assessment units have a low priority designation for TMDL development (DWQ 2016). Figure 2-36 depicts the assessment units of Bear Lake and the surrounding watersheds, the assessment determination from the 2016 integrated report, and DWQ water quality monitoring location IDs (MLIDs) on Bear Lake.

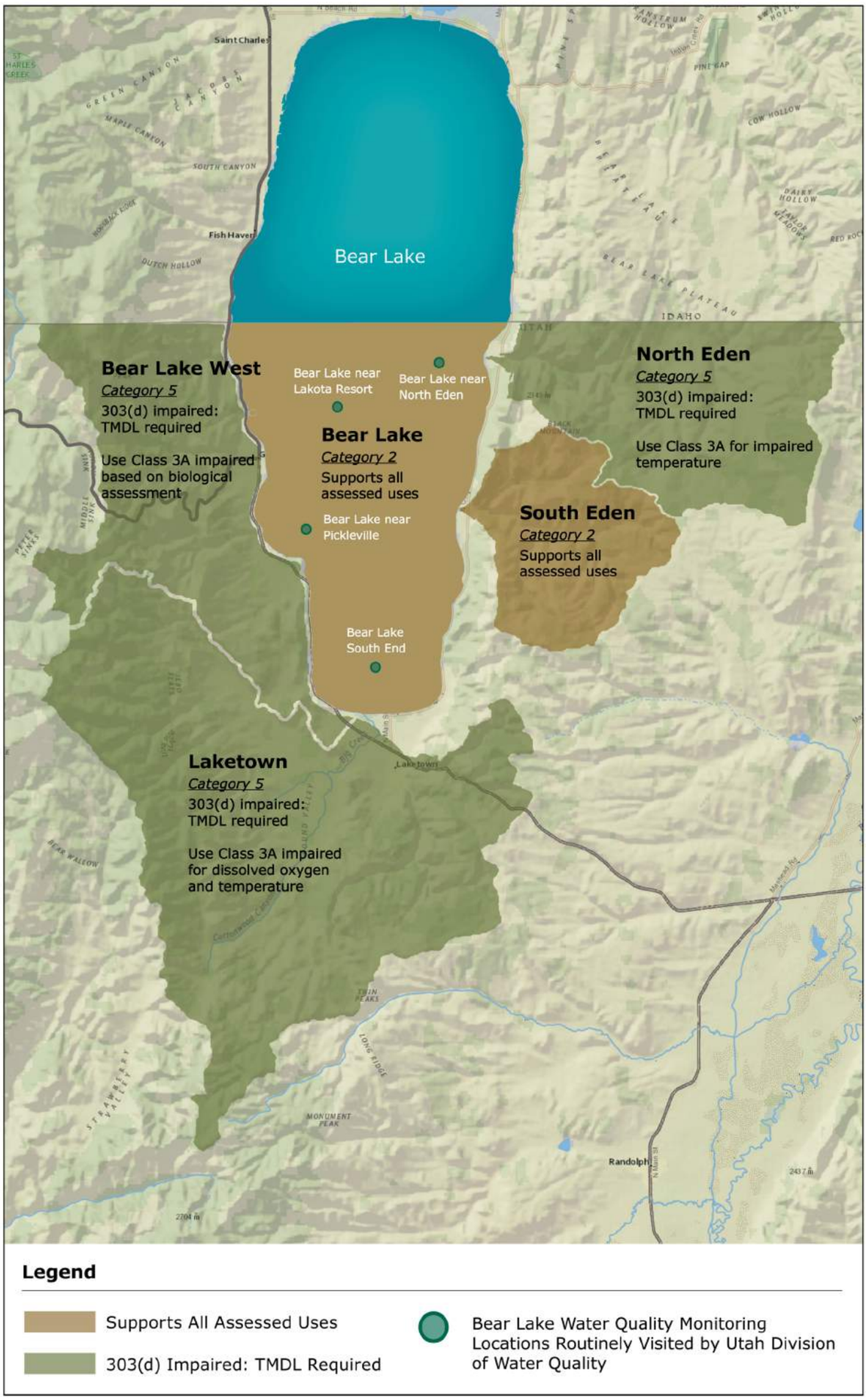


Figure 2-36. Division of Water Quality assessment units, 2016 assessment results, and routine monitoring locations on Bear Lake.

Water Quality Data Summary

Water quality data collected at DWQ monitoring locations on Bear Lake provide additional context in understanding DWQ assessment determinations. Data associated with monitoring locations on Bear Lake were retrieved from DWQ's online public database, the Ambient Water Quality Monitoring System (DWQ 2020). Four monitoring locations on Bear Lake are visited by DWQ on an annual basis. From north to south they are Bear Lake near North Eden (MLID 4907180), Bear Lake near Lakota Resort (MLID 4907170), Bear Lake near Pickleville (MLID 4907160), and Bear Lake South End (MLID 4907150) (see Figure 2-36). Although DWQ collects a variety of parameters to assess beneficial use attainment, only a subset of those parameters is discussed here. Water quality conditions at Bear Lake were evaluated by analyzing DWQ water chemistry data for select core and supplemental indicator parameters associated with discrete grab samples collected from the surface and bottom of the lake between 1993 and 2017.

Average surface pH across the four monitoring locations (8.6, record count [n]= 52) is relatively high and does not vary considerably from average pH near the bottom of the lake (8.5, n = 44) (Table 2-10). At the high pH levels in Bear Lake, phosphorus can bind to the abundant calcium carbonate and precipitate out of solution as calcium phosphate, or coprecipitate with calcium carbonate by adsorbing onto the mineral. Both processes result in a reduction of the amount of biologically available phosphorus in the water column. Despite the high levels of calcium carbonate and other minerals in the lake, the concentration of total dissolved solids (TDS) does not exceed 410 mg/L and is well below the TDS water quality standard (1,200 mg/L) for beneficial use class 4 waters (DWQ 2020).

Table 2-10. pH Measurements Collected on Bear Lake between 1993 and 2017

MLID	Site Name	Count	Minimum	Maximum	Average	Standard Deviation
Surface						
4907170	Bear Lake near Lakota Resort	13	8.3	9.01	8.58	0.18
4907180	Bear Lake near North Eden	13	8.10	8.91	8.56	0.19
4907160	Bear Lake near Pickleville	12	8.27	8.95	8.60	0.21
4907150	Bear Lake South End	14	8.13	8.92	8.53	0.21
Bottom						
4907170	Bear Lake near Lakota Resort	12	7.83	8.80	8.38	0.27
4907180	Bear Lake near North Eden	11	7.95	8.62	8.32	0.19
4907160	Bear Lake near Pickleville	10	7.73	8.80	8.50	0.30
4907150	Bear Lake South End	11	8.21	8.93	8.62	0.21

Source: DWQ (2020).

DWQ works collaboratively with several groups to monitor *Escherichia coli* (*E. coli*) concentrations at several beaches around Bear Lake to determine if the public needs to be informed of a health risk, and to assess attainment of the 2A beneficial use class, which protects the water for frequent primary contact recreation. Each summer during the recreation season, DWQ and officials from the Bear River Health Department coordinate to collect *E. coli* samples from beaches at Bear Lake where people are recreating. *E. coli* is a type of bacteria found in the intestines and feces of warm-blooded animals. Although not generally harmful themselves, *E. coli* bacteria in the water indicates the presence of feces or sewer contamination and raises the possibility of other disease-causing pathogens in the water (DWQ 2021). As discussed in the Water Quality Management and Assessment section above, Bear Lake was fully supporting the 2A (frequent primary contact recreation) beneficial use in 2016 based on the *E. coli* data.

Surface grab samples collected by DWQ between 1993 and 2017 had dissolved oxygen concentrations well above the minimum water quality standard of 4.0 mg/L for the 3A (cold water aquatic life use) beneficial use (Figure 2-37). The specific sample depth for dissolved oxygen measurements is variable, ranging from 0 to 6.6 feet below the water surface. Dissolved oxygen may decline below the minimum water quality standard of 4.0 mg/L in the deep hypolimnion of Bear Lake because of decomposing organic matter in late summer to early fall; however, dissolved oxygen concentrations are generally high throughout the water column for most of the year (Dean et al. 2009). Abundant dissolved oxygen and clear water are characteristics of oligotrophic lakes with low primary productivity, although water clarity in Bear Lake is lower than expected for an oligotrophic lake because of inorganic compounds (such as calcium carbonate) in the water column.

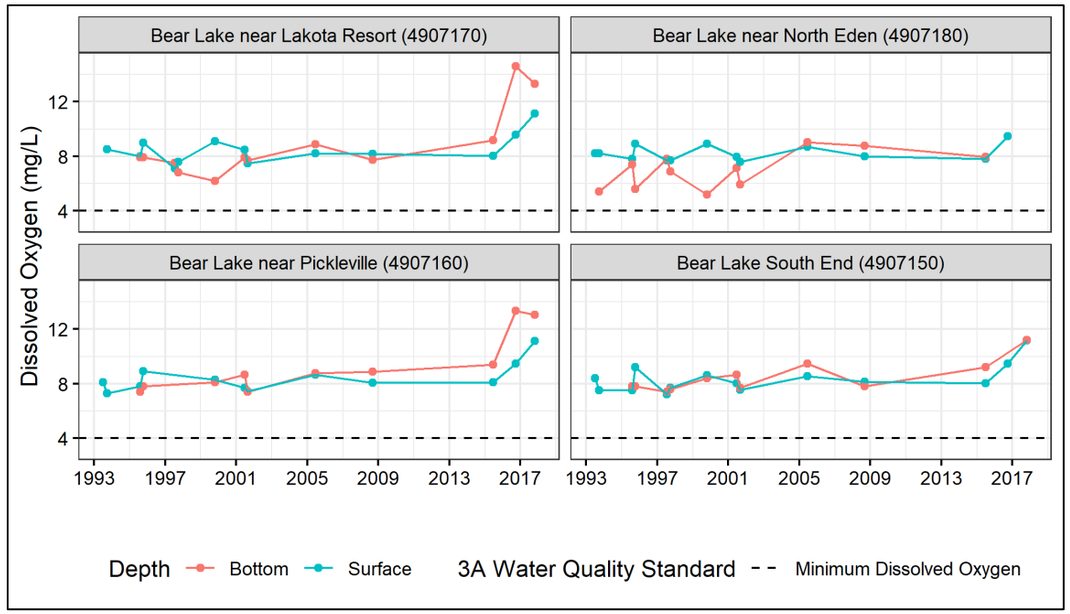


Figure 2-37. Dissolved oxygen concentrations from four Utah Division of Water Quality monitoring locations on Bear Lake (1993 to 2017).

Low primary productivity in Bear Lake can be partially attributed to the lake's high assimilative capacity for nutrient input. Nutrient loading to Bear Lake occurs from lake inflows like the Bear River, as well as various nonpoint sources in the watershed. The Bear River is the primary source of nutrient loading, conveying an estimated 60% to 80% of the phosphorus that is delivered to Bear Lake (Dean et al. 2009). The Bear River in the Bear Lake subbasin in Idaho is currently not meeting the 3A (cold water aquatic life) beneficial use designation because of impairments of phosphorus, temperature, and total suspended solids (Idaho Department of Environmental Quality 2018). Phosphorus loading is greatly reduced as the Bear River flows through Dingle Marsh, the natural wetland system at the northern edge of Bear Lake in the Bear Lake National Wildlife Refuge. In addition to phosphorus retention, Dingle Marsh is also effective at reducing loads of total suspended solids, nitrate, and total organic carbon (Allen 2011). Phosphorus levels in the lake are further reduced by high concentrations of naturally occurring calcium carbonate because phosphorus tends to coprecipitate with calcium carbonate at relatively high pH levels, which are observed at Bear Lake (Dean et al. 2009). Aside from a spike in the late 1990s, total phosphorus concentrations are not observed above the 0.025-mg/L pollution indicator threshold for lakes and reservoirs as noted in Utah Administrative Code R317-2 (Figure 2-38).

Nitrate, an inorganic form of nitrogen, is an important nutrient for phytoplankton growth and is usually the limiting nutrient for primary productivity in Bear Lake (Dean et al. 2009). Nitrogen compounds, such as ammonia and nitrite, are readily converted to nitrate in the oxygen-rich waters of Bear Lake. Nitrate is found in human and animal waste and fertilizers and can be conveyed to Bear Lake from many diffuse nonpoint sources both around the lake and in the surrounding watersheds. Nitrate is also highly mobile and can easily pass through soil into groundwater. Figure 2-38 depicts dissolved nitrate and nitrate (nitrate + nitrate) concentrations from the surface of Bear Lake between 1993 and 2017. Dissolved nitrate and nitrate concentrations in Bear Lake are very low and are not typically present above laboratory reporting limits for this parameter.

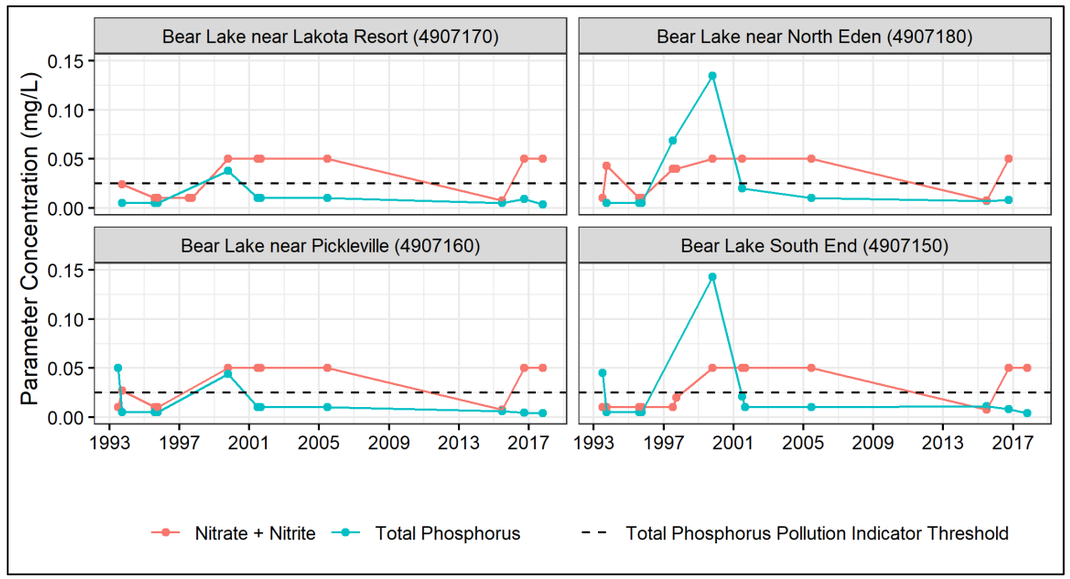


Figure 2-38. Concentrations of total phosphorus and dissolved nitrate and nitrite from four Utah Division of Water Quality monitoring locations on Bear Lake (1993 to 2017).

Note: The pollution indicator threshold of 4.0 mg/L for nitrate as N is not included in this plot to preserve scale.

Water Quality Concerns

Although Bear Lake is currently an oligotrophic lake with low levels of primary productivity, increased population, development, and agricultural activities in the watershed may result in increased nonpoint source pollution loads to Bear Lake. The primary water quality issues in the Bear River Basin (which includes northern Utah, southeastern Idaho, western Wyoming, and all of Bear Lake and the Bear River watershed) are nutrient and sediment loading from agricultural activities and hydrologic modifications (Gerner and Spangler 2006). Increased nutrient input from nonpoint source pollution is a concern because excessive algal growth in nutrient-rich waters can lead to unsightly algal blooms that can have negative ecological impacts and may restrict recreation uses. In 2008, a TMDL implementation plan for agriculture was developed to outline best management practices (BMPs) on agricultural lands in Idaho to meet the requirements of the Bear River TMDL (Smith et al. 2008). The objective of the plan is to reduce the amount of nutrients (nitrogen and phosphorus) and sediment entering surface and groundwaters in the Bear Lake subbasin from agricultural practices.

Nutrient input may also occur from septic systems around the lake and from septic systems in the larger Bear Lake Basin. A groundwater study was conducted by the Ecosystems Research Institute in 1996 after DWQ raised concern about the potential for nutrients entering Bear Lake from shallow groundwater contaminated by nutrients from septic tanks and other nonpoint source polluting activities in the watershed. Ecosystems Research Institute examined nutrient concentrations above and below the residential development on the southeast side of Bear Lake and determined that data collected through the study provided no evidence to suggest septic tank influence on groundwater or on Bear Lake (Ecosystems Research Institute 1996). A more recent study analyzing the potential impacts from septic systems was not available at the time the Bear Lake CMP was written; however, increasing development near the lake may raise the risk for additional septic system nutrient inputs to the lake if local sewer connections are not available or if alternative septic or on-site treatment systems that provide additional water quality protections are not employed.

Nutrients from current and future development activities in the larger Bear Lake Basin, which drains into Bear Lake, may have impacts on water quality if developments are not required to tie into a sewer system or employ alternative systems to protect water quality. Additionally, short-term vacation rentals around the lake may contribute nutrient pollution regardless of the wastewater disposal method utilized on-site. This is because vacation rental occupancy may not be consistent with the sewage service capacity or with the design capacity of the on-site septic system of a home.

In addition to nutrients like phosphorus and nitrogen, nonpoint source pollution can also include pesticides, bacteria, salts, sediment, and oil and grease. Nonpoint source pollution is caused by runoff from snowmelt or rainfall that moves across the ground, picking up natural and anthropogenic pollutants, and finally depositing them into a waterbody. Around Bear Lake, nonpoint source pollution can come from recreation activities, rural development, urban development, and agricultural activities. There are currently no Utah Pollution Discharge Elimination System (UPDES) discharge permits on or around Bear Lake; therefore, nonpoint source pollution remains the primary mechanism for pollution to enter the lake. Nonpoint source polluting activities around Bear Lake and the specific pollutants associated with each activity are depicted in Figure 2-39. Because these sources of pollution are not on sovereign lands but have the potential to affect sovereign lands, there may be a need for collaborative management and partnerships with local governments to ensure resources are protected.

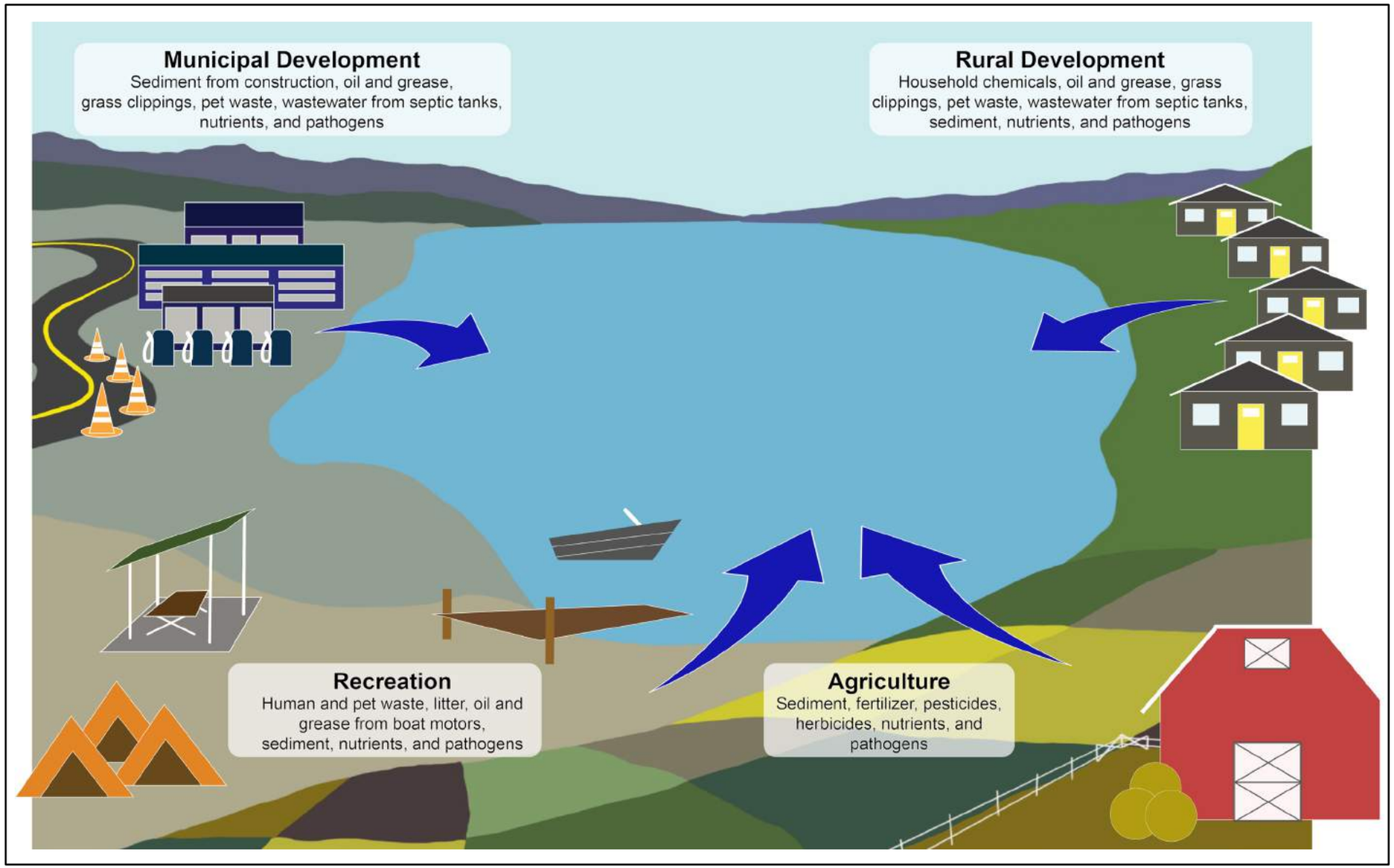


Figure 2-39. Nonpoint source pollution around Bear Lake.

Ongoing Water Quality Monitoring Efforts

Recent increases in development and population around Bear Lake pose challenges for agencies and resource managers who work to balance economic growth while striving to maintain the water quality and clarity that draw visitors to the lake year-round. Although DWQ collects water quality samples from Bear Lake each year, the frequency of data collection and type of samples collected are insufficient to understand complex limnological processes. The USGS, in partnership with various state and local organizations, has deployed two automated water quality monitoring and weather profiling stations on Bear Lake to build a robust baseline dataset that can be used by planners and scientists to make informed decisions about lake management and to assess future impacts to the lake. Data collected by the USGS at the two research platforms can be used to better understand a host of issues, including impacts to water quality from changing lake levels, primary productivity and nutrient cycling in the lake, lake evaporation rates for water budget quantification, and spatial and temporal variability of limnology process in Bear Lake. Data collected at the buoys on Bear Lake is housed in the USGS online public database, the National Water Information System (NWIS), and a final project report will be completed in Year 5 (2022) of the USGS study.

The USGS dataset may eventually address known data gaps in the watershed, such as the information about the quantity and quality of groundwater input to the lake. The groundwater contribution to Bear Lake is significant and has prevented the lake from drying up or becoming saline in the years before lake levels were controlled by the diversion system (Dean et al. 2009). Comparisons of chemical compositions between shallow groundwater and surface waters in the Bear Lake drainage area indicate that the groundwater source is more likely to be a deep aquifer than a shallow aquifer (Dean et al. 2009). The source of groundwater contribution may be a spring within the lake, although the location of the lacustrine (lake) spring remains unknown (Dean et al. 2009).

Lake Level Effects

The relationship between lake level and water quality is complex and not well understood for Bear Lake, and no clear lake level thresholds relate directly to water quality. However, changes in lake level likely influence a number of lake processes. Lake level is largely influenced by water management (i.e., use of Bear Lake as a water storage reservoir), which is affected by precipitation in the region. Precipitation in the Bear Lake drainage area falls primarily as snow in the winter and spring, and most of the water that enters Bear Lake is from snowmelt (either from surface water or groundwater input).

Lake levels are reduced during drought conditions through diversions (water withdrawals) and net evaporation. Warm dry summers result in net evaporation, keeping the lake saturated with carbonate minerals, which co-precipitate with phosphorus in the lake (Dean et al. 2009). As the lake is reduced below the median lake elevation of 5,912 feet, large swaths of lakebed become exposed and are most prominent on the north and south ends of the lake where bathymetry maps reveal the lakebed is relatively flat and shallow. The surface area of the lake is reduced considerably as the lake level drops below the median water level elevation of 5,912 feet, resulting in increased wildlife visitation and recreation activity at newly exposed lakebed areas. Pollutants like animal waste from wildlife or pets, litter, and household chemicals will be deposited and as a result, bacteria and nutrient concentrations along the shoreline may increase as pollutants are submerged with rising lake levels. Although nutrient input is generally reduced by the physical and chemical properties of Bear Lake, the assimilative capacity for nutrients has not been quantified, and primary productivity may increase in the warm and shallow areas of the lake at low lake levels. There is typically a lower duration of ice cover at low lake levels (Dean et al. 2009), although the effect of ice cover on water quality is not yet well understood.

The level of Bear Lake rises as snowmelt contributes to seasonal runoff in the spring. The greatest loading of total suspended solids and nutrients from the Bear River coincides with spring seasonal runoff (Allen 2011). Nutrient loading during spring flow events in the Bear River is consistent with the conceptual model that nonpoint source pollution accounts for most of the nutrient input to the lake because surface runoff from snowmelt transports nutrients and other pollutants. Although loading of total suspended solids and nutrients is greatest during spring flow events in the Bear River, these are the flow regimes when Dingle Marsh is most effective at reducing loads (Allen 2011). High water levels in Dingle Marsh result in more water surface area and emergent vegetation area where water velocities are slowed, allowing for the settling and deposition of particles being transported by flow (Allen 2011). Dingle Marsh is less effective at reducing nutrient loading during periods of low flow due to the opposite scenario in which the marsh area is reduced (Allen 2011).

In addition to Dingle Marsh, other wetlands around the lake may serve as filters for runoff entering the lake.

Although the relationship between water quality and lake level is not well understood, data collected by the USGS at the two water quality research platforms on Bear Lake may provide additional insight for future research studies and may ultimately help quantify water quality impacts from changing lake levels.

Sediment Dynamics

Although sediment is a natural component of river, lake, and wetland ecosystems, excessive loading of fine sediment can have negative effects on water quality, recreational and aesthetic values, property values, and ecological communities. Sediment studies were not identified for the planning area (the Utah portion of Bear Lake), but they have been conducted in the Bear River-Mud Lake-Bear Lake system.

As mentioned previously, Dingle Marsh acts as a sediment and nutrient filter for Bear River flows entering Bear Lake, as evidenced by the very different salinity, chemical composition, and sediment concentrations found in Bear River flows (Belmont et al. 2018). Mud Lake, the open-water area in the southeast corner of Dingle Marsh, plays a central role in filtering sediment from Bear River water before it enters Bear Lake. Several studies document the sediment trapping efficiency of Dingle Marsh and Mud Lake for phosphorus (most of which is transported with sediment), total suspended solids, and nitrate (Belmont et al. 2018). For example, Allen (2011) found that approximately 50% of suspended sediments and total phosphorus was retained within Dingle Marsh during the 2008 flow year, which had flows below (77%) the average historic discharge. Because the 2008 measurements were conducted during a lower-than-average water year, it is possible that Dingle Marsh may not be as effective at trapping suspended solids in very high runoff years, and increased loading of fine sediments (and phosphorus) may result in their delivery to Bear Lake and deposition onto the shoreline. During very high runoff years, flows may take a direct path through Dingle Marsh, mobilizing sediments deposited in previous years and delivering them (along with associated nutrients) to Bear Lake (Thompson 2021).

Belmont et al. (2018) reviewed available flow and suspended sediment datasets and observed that all previous studies concluded that Dingle Marsh serves as a sediment trap, but the efficiency of trapping varies considerably with the seasons. Mud Lake serves as a sediment sink for much of the year and transitions to a sediment source to the Bear Lake Outlet Canal and Bear River when the Lifton pumps are operating. The sediment trapping efficiency of Mud Lake also varies from year to year, likely dependent on flow and sediment concentrations (Belmont et al. 2018). More frequent and longer-term monitoring of suspended sediment is needed to improve understanding of the system's sediment storage and release processes (Belmont et al. 2018).

Sediment core analysis has provided additional information on sediment dynamics in Mud Lake. Results of sediment core analysis demonstrate that Mud Lake has historically and continues to serve as a sediment sink (Belmont et al. 2018). The depositional environment of Mud Lake has changed considerably over time. Two major shifts in sediment sources have been identified: 1) approximately 100 years ago when Bear River was diverted into Mud Lake, and 2) a significant increase in most rare earth elements, silver, and mercury during the past 10 years

(Belmont et al. 2018). Further study could be helpful in determining where these rare earth, silver, and mercury sediment sources are coming from and what the implications are for the health of the Mud Lake and Bear Lake ecosystems (Belmont et al. 2018).

Healthy riparian corridors and wetland areas also play a role in regulating sediment inputs into aquatic ecosystems such as Bear Lake. As sediment-laden water passes through wetlands, water velocities may be reduced, and some of the sediment may drop out of the water. Riparian vegetation also filters and traps sediment. Protection of healthy wetlands and riparian corridors along tributary streams may help reduce sedimentation in Bear Lake.

Because sediment is easily eroded, transported, and deposited in high-energy current and wave environments, shorelines can be dynamic. Analysis of Bear Lake's shoreline (focusing primarily on Bear Lake in Idaho) from historical imagery covering 1980–2016 indicates that a substantial amount of deposition has occurred in most areas around the lake over the past several decades (Belmont et al. 2018). The shoreline at low lake levels has moved lakeward by 100 to 160 feet in several areas, and as much as 1,600 feet in the northwest corner of the lake near St. Charles Creek. The only location with documented shoreline erosion (i.e., the shoreline moving landward or receding) is along the eastern edge of the northern lake near Porcupine Hollow, Peterson Hollow, and Idaho's Bear Lake State Park (Belmont et al 2018). Approximately 10% of the sandy shoreline area in the northwest corner of Bear Lake (the lake area that has experienced the most shoreline change) transitioned to vegetation cover between 2003 and 2016 (Belmont et al. 2018). The establishment of vegetation, including invasive species such as phragmites, plays a role in trapping sediments and reducing total shoreline area. In addition, constructed features that extend into the waters of Bear Lake (e.g., marinas) can affect the movement of currents and sediment, as well as wave and wind action, resulting in impacts to shorelines in particular areas from sediment distribution changes.

USGS is currently working on a sedimentation study on the north end of Bear Lake (sediment associated with Mud Lake inflows) but is not currently conducting research in the planning area (Rowland 2020).

LAKE LEVEL EFFECTS

An important connection between lake level and sediments in Bear Lake relates to the exposure of sediments as the lake drops. During high lake elevations, shoreline sediments are eroded by wave action from some shoreline areas and are redistributed and deposited along other areas of the shoreline. These sediments create and sustain shoreline areas that are coveted for recreation along the lake (Thompson 2021).

While sediment-rich flows are entering the lake from Bear River via Mud Lake (generally during periods of high runoff), sediments and organic material are deposited along the lake shoreline. Extensive deposition of sediments and organic material on some shoreline areas can impact recreational opportunities in those areas (Thompson 2021).

As the lake level recedes, sediments may be pulled toward the center of the lake to deeper water. These sediments may become "buried" in the deeper areas of the lake and lost, potentially depleting or diminishing shorelines. As the level of the lake drops from 5,923 feet, the amount of exposed sediment area (shoreline) increases. At a median elevation of 5,912 feet, approximately 1,385 acres of sediment area (shoreline) becomes exposed. At a low elevation of 5,903 feet, approximately 4,169 acres of sediment area (shoreline) becomes exposed. These data cover the Utah portion of Bear Lake only.

Further Reading

Bear Lake Subbasin TMDL Implementation Plan for Agriculture (Smith et al. 2008)

Climatic and limnological setting of Bear Lake, Utah and Idaho (Dean et al. 2009)

Data Summary Bear Lake Groundwater Project (Ecosystems Research Institute 1996)

Recent Increases in Sediment and Nutrient Accumulation in Bear Lake, Utah/Idaho, USA (Smoak and Swarzenski 2004)

Seasonal Transport of Suspended Solids and Nutrients Between Bear River and Bear Lake (Allen 2011)

Sediment Dynamics in the Bear River-Mud Lake-Bear Lake System (Belmont et al. 2018)

Utah's Final 2016 Integrated Report (Utah Division of Water Quality 2016)

Water Quality in the Bear River Basin of Utah, Idaho, and Wyoming Prior to and Following Snowmelt Runoff in 2001 (Gerner and Spangler 2006)

GIS Data Layers

Assessment Units and Beneficial Uses, Bathymetry (5 meters), HUC 12 Watersheds, Lake Level Contours, UPDES Permits, UPDES Stormwater Permits, Wastewater Treatment Plants, Water Quality Monitoring Locations

2.5 Socioeconomics

Socioeconomic information is presented in three sections: Demographics and Economics, Recreation and Tourism, and Agriculture and Energy Exploration and Development. The Demographics and Economics section provides information on local population sizes, local income, projected population growth, employment, and socioeconomic trends. The Recreation and Tourism section discusses recreation and tourism around Bear Lake and provides information on associated tax revenues. The Agriculture and Energy Exploration and Development section reviews the importance of agriculture and energy exploration in Rich County.

Demographics and Economics

In 2020, Rich County had a population of approximately 2,510 (U.S. Census Bureau 2021a). In 2020, the population of Garden City was approximately 602, and the population of Laketown was approximately 299 (U.S. Census Bureau 2021b, 2021c). In 2019, the median household income was $57,902 in Rich County, $53,571 in Garden City, and $74,500 in Laketown (U.S. Census Bureau 2021a, 2021b, 2021c). The median value of an owner-occupied home in Rich County in 2019 was $202,500 (U.S. Census Bureau 2021a). Table 2-11 presents expected population growth in Rich County, Garden City, and Laketown in the coming decades.

Table 2-11. Current and Projected Population Growth in Utah's Bear Lake Region

Location	2018*	2030†	2040†	2050†
Rich County	2,389	2,843	3,153	3,495
Garden City	442	796	883	979
Laketown	270	313	347	419

* Data from U.S. Census Bureau (2019a, 2019b).
† Data from Utah Governor's Office of Management and Budget (2012).

The economy of Rich County and the Bear Lake Valley is based on agriculture, recreation, tourism, and service-oriented businesses and government agencies. The government sector makes up the largest portion of non-farm jobs in Rich County (25%), followed by the leisure and hospitality sector (24%) and trade/transportation/utilities (14%). Sectors such as financial activities, construction, professional/business services, and education/health/social services account for the remaining 37% of non-farm jobs in Rich County (Utah Department of Workforce Services [UDWS] 2021a). Farming and agriculture data are provided in the Community Resources section of the CMP.

In 2020, Rich County had an unemployment rate of 3.4% with 1,122 employed out of a labor force of 1,162 (UDWS 2021b). The average monthly nonfarm wage in Rich County in 2020 was $2,501, which represented a 6% increase from 2019 (UDWS 2021b). Because Rich County has a seasonal, tourism-based economy, it often experiences strong economic growth in the summer and lesser economic activity in the winter (UDWS 2021a).

Recent socioeconomic trends in Rich County suggest a transition away from the resource-based economy that has traditionally supported the area. Indicators of this transition include a reduction in farm jobs and an increase in investment income. There are fewer jobs to support ranching and an increase in the population living on non-wage income such as retirement and investments (Poulsen 2017). The transition away from a resource-based economy can also be attributed to the growing recreation and tourism industry that is supported by Bear Lake.

Recreation and Tourism

Bear Lake is the center of the recreation and tourism industry of Rich County and the Bear Lake Valley. The lake is a popular recreation destination for the residents of northern Utah's population centers and also draws substantial numbers of visitors from Wyoming, Idaho, and elsewhere in Utah. Bear Lake State Park in Utah attracts a large portion of these visitors (Leaver 2018); annual visitation at Bear Lake State Park is provided in the Recreation and Access section. Most of the recreation and tourism at Bear Lake occur in the summer.

However, if the lake freezes over, the lake is also a popular destination for ice fishing in the winter. Winter sports such as snowmobiling, snowshoeing, alpine skiing (at Beaver Mountain), and Nordic skiing are all available within a short drive of Garden City.

With more than 40,000 visitors to Bear Lake on any given summer weekend, tourism is the fastest growing industry in the north half of Rich County (BRAG 2013). Recreation and tourism visitation to Bear Lake provides economic opportunities through employment, income generated from wages, proprietor's income, tax revenues, and property income.

Employment and wages related to Bear Lake recreation and tourism are associated with Bear Lake State Park in Utah; restaurants; convenience and retail stores; boat and other water sports rental providers and outfitters; hotels, motels, resorts, and short-term rentals; recreational vehicle (RV) parks and campgrounds; and other service-oriented businesses. Privately owned businesses around Bear Lake also create socioeconomic benefits through proprietor's income. Some of the largest, private recreation-related employers in 2020 were BLH Enterprises (recreational goods rental), JJH Holding (restaurant), Trendwest Resorts (travel agency), Ideal Beach Master Association (property management), Bridgerland Adventure Park (amusement parks), MMB LLC (recreational vehicle parks and campgrounds), Conestoga Ranch (recreational vehicle parks and campgrounds), and Epic Recreation (recreational goods rental) (UDWS 2021c).

Since 2000, the number of second homes in the Garden City area has increased substantially. In 2007, the number of second homes outnumbered primary residences by three to one (Envirocentric 2014a). Second homes are homes purchased as vacation homes and are not used as primary residences. Although the building of second homes can boost property tax revenue and the local economy by creating more demand for services, these homes can also place a strain on cities' resources because more infrastructure is needed but the permanent resident population remains unchanged.

Tax revenues from Bear Lake recreation and tourism are primarily from a sales tax applied to the purchases of goods and services from businesses near the lake as well as a transient room tax applied to various temporary lodging hotels, motels, inns, trailer courts, campgrounds, and tourist homes. A county can also impose a restaurant sales tax of up to 1% on all sales of prepared foods and beverages sold by a restaurant for immediate consumption. Restaurant sales tax in Rich County in fiscal year 2021 totaled $103,259 (Utah State Tax Commission 2021). In addition, a municipality may levy a resort community sales tax if the transient room capacity of the municipality is greater than or equal to 66% of its U.S. Census population. Garden City levies the resort community tax, which totaled $801,141 in fiscal year 2021 (Utah State Tax Commission 2021). Local sales tax revenues for sales taxes other than restaurant and resort community are presented in Table 2-12.

Table 2-12. Local Sales Tax Revenues

Location	Fiscal Year 2018	Fiscal Year 2019	Fiscal Year 2020	Fiscal Year 2021
Rich County	$117,317	$142,799	$141,770	$177,475
Garden City	$215,694	$242,365	$260,199	$349,602
Laketown	$40,400	$42,121	$49,409	$57,239

Source: Utah State Tax Commission (2021).

A county transient room tax is applied to the rental charge for any suite, room, or rooms in a motel, motor court, inn, campground, or similar public accommodation for a stay of fewer than 30 consecutive days. County transient room tax for Rich County is presented in Table 2-13. Recreation and tourism at Bear Lake also contribute to income associated with rental properties near the lake.

Table 2-13. Rich County Transient Room Tax

Location	Fiscal Year 2018	Fiscal Year 2019	Fiscal Year 2020	Fiscal Year 2021
Rich County	$304,411	$378,009	$424,659	$637,793

Source: Utah State Tax Commission (2021).

If the water quality of Bear Lake were to become compromised from excessive nutrient input or other nonpoint source pollutants (see Water Quality Concerns in the Water Resources section), opportunities for recreation and tourism could be reduced or temporarily prevented in some areas. This would likely have negative impacts on the local and regional economy. A Bear Lake economic impact study is currently being planned that would look at the economic implications of decreased water quality and quantity in Bear Lake.

Agriculture and Energy Exploration and Development

Agriculture has remained an important component of the economy of Rich County and the Bear Lake Valley. Livestock products account for 80% of Rich County's agricultural income, and the county is a leader in livestock production statewide (BRAG 2013). However, Rich County has determined that protecting recreational opportunities, as well as maintaining water quality, air quality, and wildlife, should be prioritized over extractive and consumptive uses (Poulsen 2017). Additional agricultural data are provided in the Community Resources section of the CMP.

Energy exploration and development have also played a role in the socioeconomics of the Bear Lake Valley. Rich County and the Bear Lake Valley have seen cycles of petroleum exploration for the past 60 years. In the early 1980s, oil and gas exploration was very active in Rich County and adjacent Wyoming counties; however, there are no active leases in the county at this time (BRAG 2013). The most recent oil exploration efforts in the area occurred in 2008 (Poulsen 2017). An increase in demand for oil could increase the potential for oil exploration in the Bear Lake area. However, as described in Chapter 1, FFSL has withdrawn Bear Lake sovereign lands from mineral leasing since 1978, pursuant to Utah Code 65A-6-5. No mineral leasing can occur on Bear Lake sovereign lands.

Lake Level Effects

The economic contributions of Bear Lake to Rich County, Garden City, and Laketown can be impacted by varying lake levels. The amount of exposed shoreline and lakebed varies depending on lake level, affecting recreation capacity and tourism opportunities. Lake levels can also affect the accessibility of the lake for boating and other water sports, because both low and high lake levels affect access to some marinas and boat ramps.

At low lake levels of 5,910 and 5,903 feet, approximately 1,924 and 4,169 acres of shoreline are exposed in Utah, respectively. Socioeconomic effects at low lake levels could include reduced income and employment related to boating and water sports activities that require access to the lake from marinas and boat ramps. At these low lake levels, the lake is too shallow to access three or four of the five marinas in Utah. Accessing many of the boat ramps is also difficult for most watercraft at these levels. However, access to the lake is still possible for watercraft and water sports that do not require marina infrastructure (e.g., canoeing, kayaking, and fishing) and for watercraft that can launch from the shoreline.

At a lake level of 5,917 feet, approximately 407 acres of shoreline in Utah is exposed. At the high lake level of 5,923 feet, no shoreline is exposed in Utah. Socioeconomic effects at high lake levels may include reduced income and employment related to recreation and tourism activities that require access to the shorelines and lakebed of Bear Lake. As the lake level rises, more shoreline and lakebed become inundated and inaccessible for beach recreation and associated lakebed parking. At a lake level of approximately 5,915 feet, no lakebed parking can occur in the Garden City or southwest shoreline areas. However, boat launching is possible at Bear Lake State Park in Utah and other developed areas during years with high lake levels (Utah Division of State Parks and Recreation 2005). High lake levels may also result in adverse economic effects if repairs are needed for structures or other property damaged by inundation.

Further Reading

A History of Rich County (Parson 1996)

Bear River Economic Development District Comprehensive Economic Development Strategy 2013-2018 (BRAG 2013)

Rich County Quick Facts (UDWS 2021b)

Rich County Resource Management Plan (Poulsen 2017)

The State of Utah's Travel and Tourism Industry (Leaver 2018)

GIS Data Layers

Boat Ramps, Campgrounds, DWR-Managed Access, Improved Public Access Points, Lake Level Contours, Marinas, Motorized Access, State Parks, Trails

2.6 Community Resources

Community resources are those resources associated with Bear Lake that are valued, enjoyed, used, or needed by the general public. The general public is varied and includes stakeholder groups who participated in the planning process (see Appendix B). Community resources in the planning area are discussed in seven sections: Agriculture, Infrastructure, Cultural Resources, Visual Resources, Recreation and Access, Public Safety and Enforcement, and Education and Outreach. The Agriculture section focuses on agriculture in Rich County and near Bear Lake, irrigation, and water rights. The Infrastructure section discusses infrastructure at the lake, such as marinas, docks, buoys, boat ramps, utilities, canals, and roads. An overview of the prehistory and history of the Bear Lake region, previously documented cultural resources, and regulatory guidelines are provided in the Cultural Resources section. The Visual Resources section explains Bear Lake's exceptional scenic qualities and discusses the Bear Lake shoreline. The Recreation and Access section covers specific recreation areas and uses such as Bear Lake State Park, public recreation access points, parking, camping, trails, fishing and hunting, and boating and recreational use regulations. Finally, the Public Safety and Enforcement section explains general public safety issues at the lake and who is responsible for enforcement, and the Education and Outreach section provides information on education, outreach, and research efforts.

Agriculture

Agriculture and Water Resources

The NRCS identifies important farmlands to ensure that the productive capacity of American agriculture is not impaired. The agency prepares statewide lists of soil mapping units that meet the criteria for 1) prime farmland, 2) unique farmland, 3) farmland of statewide importance, or 4) farmland of local importance (7 CFR 657). Table 2-14, as inventoried by the NRCS, provides the total acreage of these important farmland types within 0.5 mile of the planning area relative to the total size of Rich County. *Prime farmland* has the best combination of physical and chemical characteristics for producing crops. *Unique farmland* is land other than prime farmland that is used for production of specific high-value crops. *Farmland of statewide importance* or *farmland of local importance* considers parameters such as location, potential for high yields of specific crops, and growing season. Important farmland types are also shown in the GIS spatial data viewer.

Table 2-14. Acres of Important Farmland Type within 0.5 mile of the Planning Area

Important Farmland Type	Acres Within 0.5 Mile of Planning Area	Percentage of Total County Size
Prime farmland if irrigated	1,355	0.2%
Unique farmland	0	0.0%
Farmland of statewide importance	393	0.1%
Farmland of local importance	950	0.1%

Source: NRCS (2021).
Note: Total county acreage is assumed to be 661,760 (Utah Department of Heritage and Arts 2020).

Historically, Rich County has been predominantly agricultural despite advances in mining, oil and gas exploration, and recreation (Parson 1996). Figure 2-40 shows an agricultural field near Bear Lake. Though much of Rich County is elevated highland, it also has fertile lowlands that support productive farms and livestock. Livestock and livestock products account for a large part of the county's income (Utah State Historical Society 1988). Agricultural statistics and irrigated land by crop for Rich County are presented in Tables 2-15 and 2-16. Figure 2-41 shows selected agricultural data for land near the planning area.

Figure 2-40. Agricultural field near Bear Lake.

Table 2-15. Rich County Agricultural Statistics

Agricultural Parameters	2017 Census of Agriculture Data
Number of farms	160 (1% increase from 2012)
Land in farms (acres)	374,947 (8% decrease from 2012)
Percentage of total county area	57%
Average size of farm (acres)	2,343 (10% decrease from 2012)
Percentage of land in farms by use	Pastureland: 77% Cropland: 19% Woodland: 2% Other uses: 2%
Acres irrigated	42,422 (11% of land in farms)
Percentage of share of state sales by type	Livestock, poultry, products: 84% Crops: 16%
Rank in state by value of sales	Cattle and calves: 9th Sheep, goats, wool, mohair, milk: 17th Other crops and hay: 18th Grains, oilseeds, dry beans, dry peas: 19th Fruits, tree nuts, berries: 20th

Source: USDA (2017).

Table 2-16. Irrigated Land by Crop in Rich County

Irrigated Land	Rich County (acres)
Surface Irrigated Crop	
Grass/hay	29,884
Pasture	14,752
Alfalfa	9,019
Grain	1,905
Berries	52
Corn	11
Sub-surface Irrigated Crops	
Pasture	15,038
Grass/hay	32
Total Irrigated Crop Lands	70,693

Source: DWRe (2004).

As shown in Table 2-16, most of the irrigation water in Rich County has been used for grass/hay, pasture, and alfalfa. The largest irrigation water sources in Bear Lake Valley are Big Spring and Swan Creek (Figure 2-42). The origin of Swan Creek is Swan Creek Spring, which is one of the most dependable irrigation sources in Utah (Parson 1996). Some of the water from Swan Creek is used as culinary water for Garden City and for residents north of Garden City. The largest user of Swan Creek water is the Hodges Irrigation Company (Parson 1996).

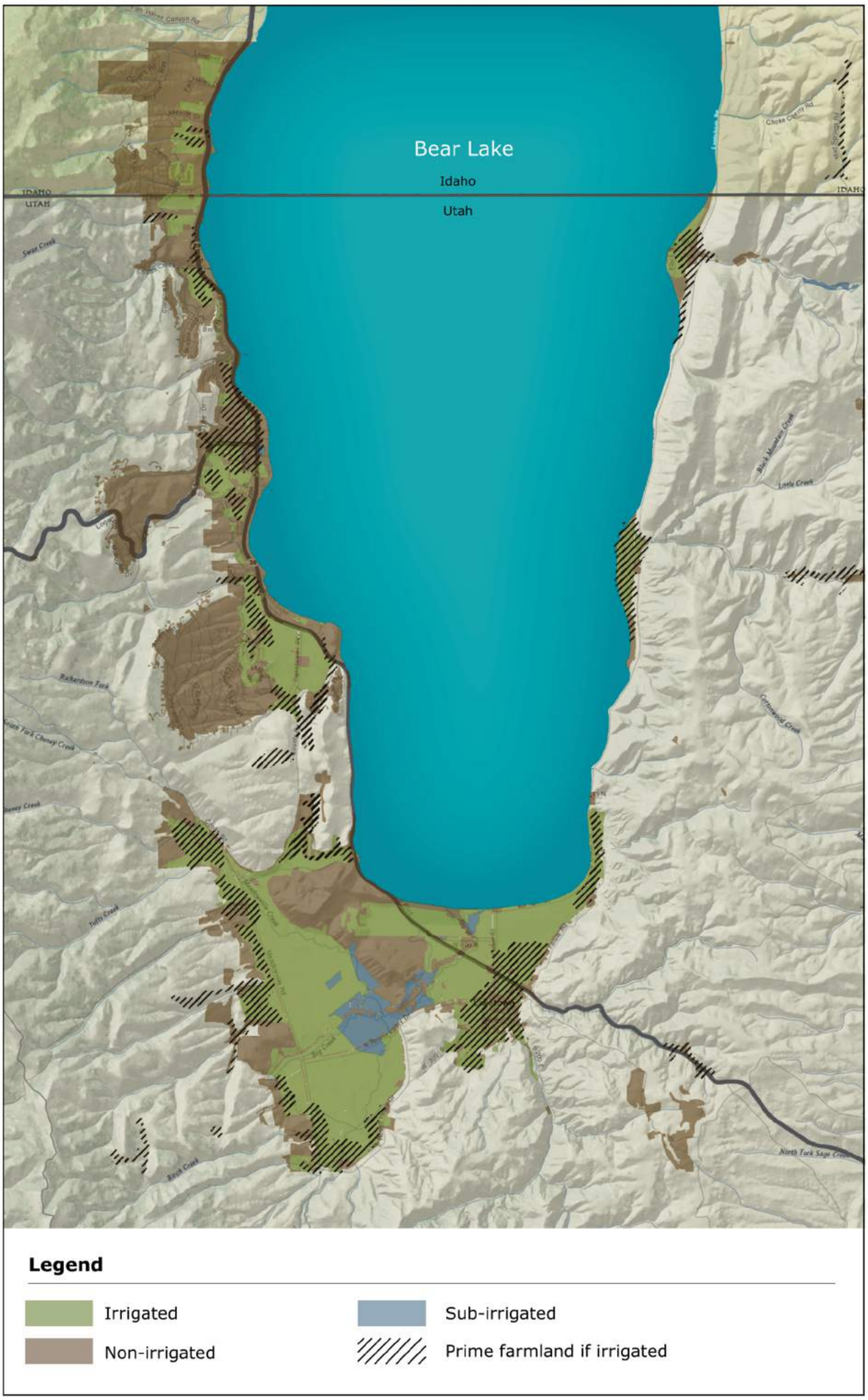


Figure 2-41. Selected agricultural data for land near planning area.

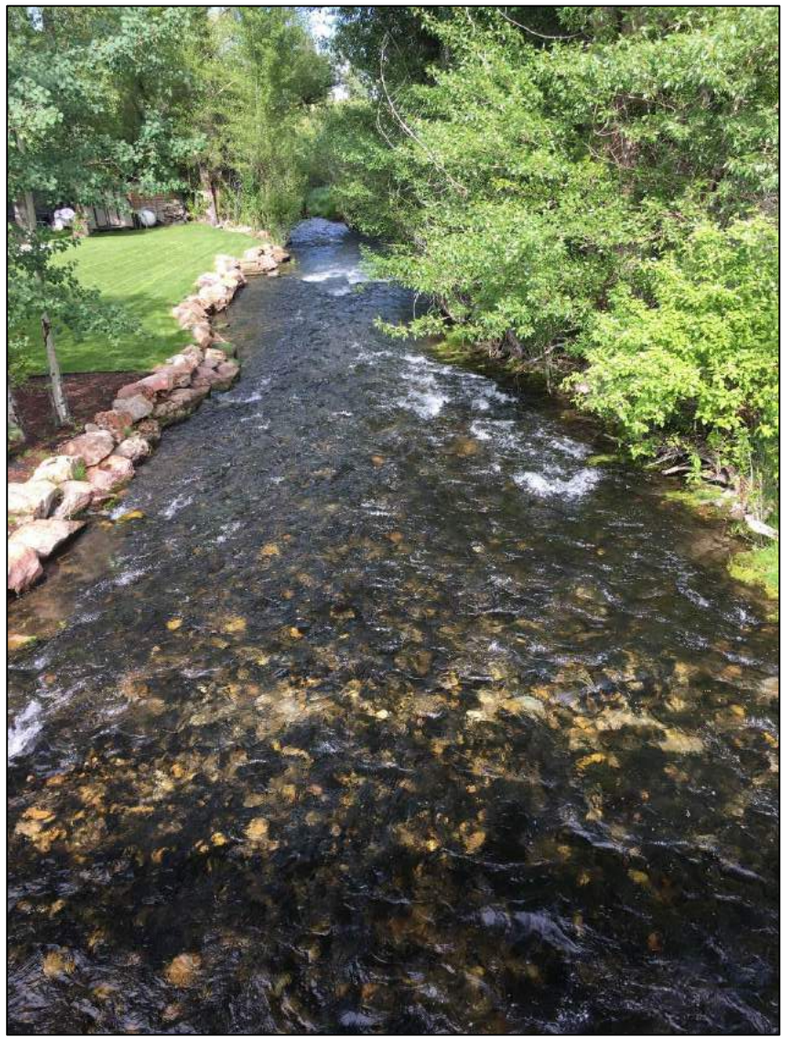


Figure 2-42. Swan Creek.

The agricultural industry uses approximately 94% of the developed water in the Bear River Basin (DWRe 2004). Municipal and industrial uses account for the remaining 6%. By 2054, these percentages are expected to change to 89% for agriculture uses and 11% for municipal and industrial uses (DWRe 2004). Agricultural water depletions (unrecoverable uses) are estimated to be 536,000 acre-feet in the Utah portion of the Bear River Basin. For comparison, municipal and industrial uses deplete approximately 21,000 acre-feet (DWRe 2004). Options to reduce agricultural water use include improving irrigation efficiency, reducing water diversions, measuring or metering flows, reusing water, and implementing cooperative water operating agreements.

Agriculture and Water Rights

A water right is a right to divert and use water based on quantity, source and point of diversion, priority date, nature and extent of use, and physically putting water to beneficial use (DWRi 2011). The three basic beneficial uses of water for water rights are domestic, stock watering, and irrigation, which are allocated based on an annual requirement or "duty" as described in Table 2-17; other beneficial uses include municipal, industrial, and instream flows (Reid et al. 2008).

Table 2-17. Basic Beneficial Uses of Water and their Associated Requirements for Water Rights

Basic Beneficial Uses of Water	Requirements for Water Right (acre-feet)
Domestic: Domestic use is any use of water inside the home.	0.45
Stock watering: Stock watering use is quantified based on equivalent livestock unit. An equivalent livestock unit is one horse and foal or cow and calf, or the equivalent number of sheep, goats, pigs, chickens, etc. The beneficial use period for these uses is generally year-round, but can vary with specific needs.	0.028
Irrigation: Irrigation use is the act of applying water to any plant to obtain optimal growth and maintenance of that plant. Although not always harvested as crops, lawns, gardens, shrubs, pastures, and nonnative trees and plants are all considered plants that require irrigation.	**Range**: 3.0 to 6.0 per irrigated acre **Average**: 4.0 per irrigated acre This "duty" is based on the highest water consuming crop, which is alfalfa, during the growing season of the region and surface irrigation practices.

Source: Reid et al. (2008).

Water rights in Utah, Idaho, and other western states are based on the doctrine of prior appropriation (water rights are determined by priority of beneficial use). All waters are public property in Utah and Idaho. DWRi regulates the appropriation and distribution of water in the State of Utah, pursuant to Title 73 of the Utah Code. The State Engineer, who is the director of DWRi, gives approval for the diversion and use of any water, regulates the alteration of natural streams, and has the authority to regulate dams to protect public safety. The Idaho Department of Water Resources manages water rights in Idaho (portions of Bear Lake water are allocated to the State of Idaho and other Idaho entities). Because FFSL does not regulate water rights, the Bear Lake CMP does not outline management strategies for water rights. However, an applicant must have a valid water right before FFSL can authorize pumping equipment in the planning area.

Irrigation

IRRIGATION COMPANIES AND SYSTEMS

Irrigation companies can own the right to use water from a surface and/or groundwater source; this water is delivered to users by a canal, ditch, or pipeline. Individual shareholders in an irrigation company do not legally own the water right. This right is allocated based on the number of shares in an irrigation company owned by an individual shareholder. The value or quantity of water allocated to a share of water is not constant throughout the state and varies considerably from one irrigation company to another. In some canal companies, a share of water is allocated per acre, whereas in others, three or four shares may be needed to provide sufficient irrigation water for 1 acre of alfalfa (Reid et al. 2008).

Small irrigators in the Bear River Basin or at Bear Lake may obtain a permit from FFSL to use irrigation pumps to withdraw water directly from the lake or its tributaries and apply it to crops or rangeland. Methods for withdrawing water include securing hoses, installing floating pumps, and constructing pumping plants. Irrigation equipment may present an impediment to navigation or degrade water quality by causing shoreline erosion, resulting in harm to Public Trust resources. FFSL's authorization process for irrigation equipment helps protect the Public Trust on sovereign lands.

Other agricultural infrastructure built on sovereign lands may include irrigation distribution systems that can consist of diversions, canals, and return flow structures. When properly designed and sited, structures such as diversions and canals pose no problem to navigation, nor do they degrade shorelines. However, poorly designed and sited structures can result in increased erosion or navigation hazards. In addition, irrigation water distribution systems are efficient weed vectors.

Bear Lake is used as a water storage reservoir, primarily for irrigation purposes. As discussed in Chapter 1, irrigation companies have legal water rights to water from the Bear River and Bear Lake diversion system. The infrastructure of this diversion system, located on the Idaho portion of the lake, is also discussed in Chapter 1. FFSL does not have the legal authority or jurisdiction to control water levels in Bear Lake.

Tile Drains (Field Drains)

Tile drains are installed to allow water in wet or saturated ground to rapidly drain away from an area, to lower the groundwater table, or to relieve hydrostatic pressure. They are typically underground linear structures oriented to land contours and are often used in agriculture because saturated soils do not provide enough aeration for crop root development. There are no known tile drains in the planning area, although there are several drains of a different type that come out on Bear Lake sovereign lands. These drains may be stormwater-related or may be directing small springs or water flows across upland private property into the lake.

Adjacent upland owners installing new tile drain systems that extend on or over sovereign land must apply for authorization from FFSL. Modern land drains are similar in function to tile drains but are more often associated with commercial or residential development and construction.

Livestock Watering

When linked with a water right and associated diversion, livestock watering is a recognized use of sovereign lands. However, livestock watering directly in Bear Lake or its tributaries can have negative impacts on water quality and recreational uses. FFSL may begin working with landowners on strategies to bring water to livestock at locations away from the lake or its tributaries. FFSL will partner with agencies such as UDAF and NRCS during this process.

Fences are a necessary and practical component of livestock management but must not unnecessarily compromise navigation and/or recreation. Any and all fences on sovereign lands require FFSL authorization. Unauthorized fences on sovereign lands are considered trespasses and may be subject to criminal and civil penalties pursuant to Utah Code 65A-3-1.

Lake Level Effects

Because agricultural lands around Bear Lake are above the OHWM of 5,923.65 feet, they are not typically affected by increasing or decreasing lake levels, with relatively few exceptions where adjacent agricultural operators are pumping irrigation water directly from the lake. However, decreasing lake levels affect irrigation allocations to downstream contract holders, as discussed in Chapter 1. If the maximum lake level is predicted to be at or below 5,914.7 feet, the allocation volume decreases with the lake level. If the lake level prediction is at or below 5,904.00 feet, the allocation is 0 acre-feet.

Further Reading

A History of Rich County (Parson 1996)
Bear River Basin: Planning for the Future (DWRe 2004)
Utah's Counties (Utah State Historical Society 1988)
Water Rights in Utah (Reid et al. 2008)

GIS Data Layers

Canals, Farmland Classes, FFSL Authorizations, Grazing Allotments, Lake Level Contours, Landownership, Points of Diversion, Soil Types, Water Rights Regions, Water-Related and Agricultural Land Use, Zoning

Infrastructure

Infrastructure in the planning area may include marinas, docks, piers, buoys, regulatory markers, boat ramps, utilities, and outfall structures (e.g., stormwater drains) (Figure 2-43). These infrastructure elements on sovereign lands are described in more detail below. Canals, irrigation ditches, and roads located near the planning area are also discussed in this section. Additional infrastructure for recreation users in the planning area is discussed in the Recreation section of Chapter 2.

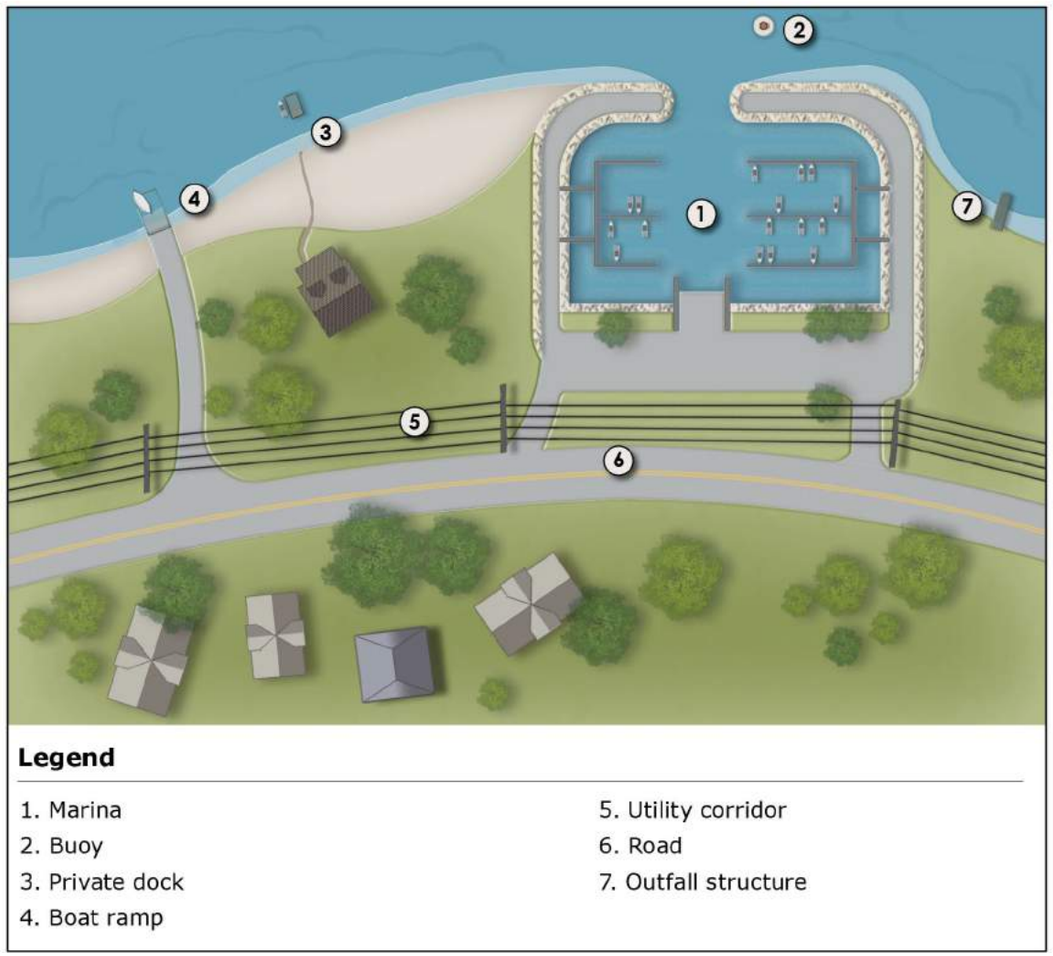


Figure 2-43. Plan view of possible infrastructure at Bear Lake.

When considering infrastructure development and construction, project proponents must comply with FFSL authorization processes and other applicable federal, state, and county requirements. Some of the existing infrastructure in the planning area has been authorized by FFSL; however, some infrastructure, especially older infrastructure, may not have been authorized. Chapter 1 of the Bear Lake CMP describes the FFSL authorization process. BMPs in the Infrastructure section of Chapter 3 include design specifications for certain types of infrastructure. Infrastructure data layers are also available in the GIS spatial data viewer.

If not designed and maintained appropriately, infrastructure can negatively affect navigation, fish and wildlife habitat, aquatic beauty, public recreation, and water quality. Careful placement of infrastructure is important because poorly placed infrastructure can damage the resource, impede navigation and public access, and detract from aquatic beauty and the overall recreation experience. Proper infrastructure design and installation are important in preventing the creation of hazards to navigation and public safety. Infrastructure should be designed to adapt to lake level changes, protect natural resources, be safe for the public, and maintain public access along the shoreline.

Marinas

A marina is a sheltered harbor with moorings and supplies for pleasure craft and small boats. Marinas require a valid authorization from FFSL. The marinas on the Utah half of Bear Lake are all located on the west side and are shown on the GIS data viewer. From north to south, they are as follows:

- Bear Lake State Park Marina (public marina north of Garden City) (Figure 2-44)
- Azure Cove Marina (private marina in Garden City operating under a SULA)
- Ideal Beach Resort Marina (private marina in Garden City operating under a SULA)
- Marina on Gus Rich Point (private marina in Garden City operating under a SULA)
- EPIC Recreation RV Park and Marina (private marina south of Garden City operating under a SULA)

Figure 2-44. Bear Lake State Park Marina, Utah.

Docks

Docks at Bear Lake are sometimes used by adjacent upland owners as a place to moor watercraft, to get in and out of the water for swimming, or to sunbathe and relax (Figure 2-45). Docks may be considered permanent or seasonal and include floating swim platforms, fixed platforms, portable piers, shoreline docks, and other similar structures (Figure 2-46). Permanent docks are typically built on wood or concrete piles sunk into the lakebed and are not easily removed or relocated. Seasonal docks often include floating docks or wheeled piers that can be relocated based on fluctuating water levels and removed from sovereign lands for storage outside of the primary recreation season at Bear Lake. When left out on the lake between sunset and sunrise, floating docks and swim platforms that are not connected to the shoreline must display a white 360-degree flashing light 3.3 feet above the surface of the water to meet Coast Guard standards. Floating docks, swim platforms, and other structures not connected to the shoreline should not be placed further than 500 feet lakeward of the actual water line of Bear Lake or in a water depth that exceeds 6 feet.

All docks, platforms, piers, and similar structures must be labeled with the last name of the permittee and the last three digits of the issued permit number in 3-inch-tall (minimum) letters that are visible on the lakeward side of the structure. All seasonal docks, wheeled piers, and similar structures must be completely removed from sovereign land, along with all associated anchors and anchor lines, between November 1 and April 30 of each year.

All permanent and seasonal docks, portable piers, swim platforms, and other similar structures require a valid permit from FFSL. Shoreline docks in excess of 150 feet in length, as well as all docks that are not connected to the shoreline, must also be approved by DSP or DOR. Small floating docks and other similar structures placed for recreational use also require approval from the USACE and are often covered through Nationwide Permit 11.

Figure 2-45. Dock extending into the water at Bear Lake.

Figure 2-46. Floating platform at Bear Lake.

Buoys and Regulatory Markers

Different types of buoys are used for various purposes, including to direct watercraft or to warn of navigational hazards. The Coast Guard publishes standards and procedures for the use of buoys and other aids to navigation (Coast Guard 2020).

Mooring buoys are used to anchor or moor boats or seasonal docks. Mooring buoys must be white, circular or cylindrical, and have a 2-inch blue horizontal stripe. All buoys must be labeled with the last name of the applicant in 1-inch-high (minimum) letters that are visible above the water surface. Although mooring buoys themselves are not required to have a light, any boat that is anchored or moored on the lake between sunset and sunrise must display the boat's white, 360-degree anchor light. Personal watercraft cannot be legally moored on the lake overnight.

Mooring buoys should not be placed any further than 500 feet lakeward of the actual water line of Bear Lake. Mooring buoys are generally considered seasonal structures and must be completely removed from sovereign land, along with all associated anchors and anchor lines, between November 1 and April 30 of each year.

Regulatory markers or informational buoys provide helpful information such as "Slow," "Wakeless Speed," "Swim Area," and "Danger/Hazard." They must meet Coast Guard standards and must be a cylindrical can style with a minimum diameter of 9 inches.

All mooring buoys and regulatory markers must be authorized by a valid permit from FFSL and approved by DSP or DOR. Mooring buoys also require approval from the USACE, with non-commercial mooring buoys typically authorized through Nationwide Permit 10. Other temporary buoys, markers, small floating docks, and similar structures placed for recreational use require USACE approval and are often authorized through Nationwide Permit 11.

Boat Ramps

Boat ramps at Bear Lake are used to launch watercraft or otherwise access the shoreline from adjacent, upland properties. They consist of permanent (Figure 2-47) and seasonal structures, all of which require authorization from FFSL. Permanent ramp structures also require approval from the USACE and may require a Water Quality Certification from DWQ. The boat ramp authorization process allows FFSL to evaluate the number, size, location, and type of ramps at Bear Lake so that adverse impacts to the Public Trust, sensitive resources, and public safety can be minimized. Public and some private boat ramps in the planning area are shown on the GIS data viewer. FFSL recognizes two types of permanent boat ramps and one type of seasonal boat ramp at Bear Lake:

- Community boat ramp: A sloping, stabilized roadway constructed on the shoreline for the purposes of launching watercraft from trailers by a group of residential, adjacent upland owners or a homeowners' association that possesses a common area adjacent to sovereign land.
- Individual boat ramp: A sloping, stabilized roadway constructed on the shoreline for the purpose of facilitating access for an individual adjacent upland owner.
- Seasonal boat ramp system: Any product or device used to gain access over soft soils and marshy areas of sovereign land that is portable in design and can be completely removed at the end of the season for storage on upland property.

Figure 2-47. Permanent boat ramp at Bear Lake.

Community boat ramps are the preferred management strategy for boat ramp structures at Bear Lake because they reduce potential impacts to shoreline habitat, vegetation, wildlife, visual resources, and cultural resources when compared to the use of unregulated boat ramps or individual boat ramps. However, community boat ramps are not feasible in some areas, and individual boat ramps may be authorized on a case-by-case basis.

FFSL implemented seasonal boat ramp system permitting to prevent materials used to increase traction and accessibility (e.g., tires, wood) during shoreline launching from being left in place or becoming flotsam, which has historically resulted in public safety and navigational hazards.

Table 2-18 provides information on obtaining authorizations for community and individual boat ramps, as well as seasonal boat ramp systems. FFSL's management strategy and specific requirements and stipulations for ramp structures at Bear Lake were previously established in the 2017 Appendix F Supplement to the 2009 Bear Lake CMP (FFSL 2009). Non-permitted ramps in existence before the 2017 Appendix F Supplement may be authorized as long as the ramp owner applies for and obtains the appropriate permit from FFSL and pays the associated application and permit fees.

Table 2-18. Boat Ramp Permitting

Permitting	Permanent Community Boat Ramps*	Permanent Individual Boat Ramps	Seasonal Boat Ramp Systems
Who may apply	Adjacent upland owners or a homeowners' association with an adjacent, upland common area.	Landowners of upland, residential parcels directly adjacent to sovereign land designated as Class 1 or 2.	Landowners of upland, residential parcels directly adjacent to sovereign land designated as Class 1 or 2.
Requirements	Must create a community ramp association responsible for construction and maintenance and assumption of all liability. Members do not need to be contiguous landowners to form an association. Each participating landowner must submit proof of legal landownership. Community ramp association can collect fees from participating landowners but cannot charge fees for public access. Permanent boat ramps will only be considered for adjacent upland owners who are in the process of or have completed an adjudication of the boundary between sovereign land and their parcel.	Must first consider the community boat ramp approach. Permanent, individual boat ramps will only be authorized when the community boat ramp option is infeasible due to the layout of existing development and lack of shared access to the shoreline, or a lack of interest from nearby landowners.	Allowed during the period beginning May 1 and ending October 31 of each year. All seasonal boat ramp systems must be removed from sovereign lands between November 1 and April 30. Examples of seasonal boat ramp systems include pierced steel planking or Marston Mat, roll-out polyester matting, aluminum matting, and high-density polyethylene geoblocks. Boat ramp systems must be easily deployed/retrieved and constructed of durable materials that will not degrade or contribute to the water quality deterioration.
Application process	Complete a general permit application form. Submit a signed and notarized copy of a community ramp association agreement, including notarized signatures of all participating landowners. The agreement must state that participants are entering into an agreement to operate and maintain a community ramp and include a statement of assumed liability. Submit detailed designs and drawings of the proposed boat ramp approved and stamped by a qualified licensed professional.	Complete a general permit application form. Submit proof of ownership of the adjacent property and a plat map or similar document illustrating the lack of shared access to the shoreline. Submit detailed designs and drawings of the proposed boat ramp.	Complete a general permit application form. Submit an application package with a non-refundable application fee and a refundable permit fee. Submit detailed designs, drawings, or photographs of the proposed seasonal boat ramp system.
Maximum density	Two community boat ramps per 1,000 linear feet of shoreline in Class 5 and 6 areas	Not applicable	Not applicable
Other regulatory approvals	May require local building permits or authorization from the USACE. May require a Water Quality Certification from DWQ. Applicants must demonstrate that the appropriate approvals and permits are being or have been obtained.	May require local building permits or authorization from the USACE. May require a Water Quality Certification from DWQ. Applicants must demonstrate that the appropriate approvals and permits are being or have been obtained.	May require approval from other regulatory agencies depending on the type and size of boat ramp system, location, and other factors. Agencies that may have jurisdiction include DSP, DOR, USACE, and DWQ. Applicants must demonstrate that consultation with other agencies has occurred, if applicable.

* Not considered commercial entities by FFSL.

PERMANENT BOAT RAMPS

To receive an authorization for a permanent ramp (community or individual), the applicant must demonstrate a need for improved access. FFSL must also determine that the proposed site is suitable for placement of a permanent ramp.

General permits issued by FFSL for permanent ramps have a maximum term of 10 years and may be renewed for an additional 10-year term, assuming the ramp is in compliance with requirements and has been properly maintained. To renew a permit, the permittee must submit a written request to FFSL at least 60 days prior to the expiration date of the original permit.

Permanent boat ramps also require approval from the USACE and may be covered through Nationwide Permit 36, which authorizes the construction of ramps in waters of the United States as long as the ramp structure meets specific criteria. If the Nationwide Permit 36 criteria are met, the boat ramp would not require the issuance of an individual permit by USACE. DWQ also requires that those seeking federal permits, such as a Section 404 Nationwide Permit, apply separately to their 401 Water Quality Certification program to ensure that federally licensed activities will be conducted in compliance with applicable Utah discharge and water quality requirements.

FFSL generally prefers the use of pre-cast concrete slabs or concrete mats rather than cast-in-place concrete ramps because the overall impact to soils, shoreline habitat, and other natural resources is typically lower. However, FFSL will consider a cast-in-place ramp if properly designed and if construction can be completed during periods of low water elevations so dewatering can be avoided to the extent practicable. FFSL will also consider ramps constructed of gravel and stone (large rock or riprap). These ramps may be less expensive than concrete but can be a challenge to maintain and are better suited for the launching of small, lightweight watercraft. Asphalt ramps are prohibited because of their potential for harmful environmental impacts and inability to withstand wave erosion, ice flows, and other harsh conditions.

Any excavation must be limited to the area necessary for site preparation, and all excavated material must be removed from sovereign land to an area that has no waters of the United States.

Permanent Boat Ramp Design Considerations

Design considerations for permanent boat ramps are as follows:

- No fill material or ramp structure should be placed in special aquatic sites, including wetlands, and any disturbance should be avoided in areas identified by FFSL as restricted or protected.
- Ramps should not exceed 20 feet in width unless authorized by the USACE.
- Discharge of concrete, rock, crushed stone, or gravel into forms or in the form of pre-cast concrete planks/slabs should not exceed 50 cubic yards unless specifically authorized by the USACE.
- Ramps should be constructed as close as possible to a 90° angle to the existing shoreline.
- Ramp slope should not exceed a maximum of 15%.
- Passage on sovereign land by the general public should not be hindered by the ramp.
- Silt curtains/fences should be used during ramp construction for any ramp within 100 feet of the water's edge. Additional site-specific erosion control measures may be required by FFSL, DWQ, or the USACE.
- Cast-in-place ramps should have a minimum concrete thickness of 6 inches and be reinforced with #4 steel rebar in an 18 × 18–inch grid or smaller. The preferred concrete compressive strength is a minimum of 4,000 pounds per square inch. Concrete should be placed on a 6-inch-thick compacted leveling course of 3/4-inch to 0-inch aggregate base. Appropriate finishes should be used for each concrete surface to provide adequate traction for vehicles and pedestrians, and any use of grooves should be designed to channel water and debris to the sides of the ramp.
- For cast-in-place concrete ramps, 2-foot-deep cutoff walls should be constructed down both sides and across the lower end of the cast-in-place portion of the ramp to help protect it from being undermined by erosion.
- A riprap apron should be placed at the toe and along both sides of the ramp to prevent scour and undercutting during power loading and unloading of motorized boats. Riprap should be placed on a layer of geotextile fabric. Riprap diameter should comply with UDOT guidelines for erosion control (typically D50).
- For pre-cast ramps, plank or panel lengths must not exceed 30 feet and should generally be a minimum of 8 inches thick. Interlocking tongue-and-groove planks or panels should be used to eliminate gaps between planks or panels that can expose the aggregate base to erosion. Smaller pre-cast planks less than 10 feet long and 2 feet wide may be used to span smaller areas and may be less than 8 inches thick if the plank thickness is sufficient to prevent it from breaking apart. Applicants proposing to use smaller planks must submit manufacturer specifications illustrating suitability for the proposed use and location.
- Pre-cast planks or panels and concrete mats must be anchored using minimum 0.5-inch rebar anchor stakes that are a minimum of 36 inches long. Anchor stakes should be placed at intervals in accordance with manufacturer specifications.

SEASONAL BOAT RAMP SYSTEMS

To receive an authorization for a seasonal ramp system, the proposed site must be in an area approved for the launching of watercraft using motorized equipment (see Recreation section). Multiple property owners may share the use of a single seasonal structure, but the permittee cannot charge for this use.

Seasonal boat ramp systems are generally permitted for a 3-year term and may be renewed for an additional 3-year term as long as the ramp remains in compliance with requirements and is properly maintained. To renew a permit, the permittee must submit a written request to FFSL at least 60 days prior to the expiration date of the original permit.

As is the case with seasonal docks and buoys, seasonal ramp systems must be completely removed from sovereign land between November 1 and April 30 of each year. Motorized equipment may be used to deploy and retrieve seasonal structures but only within portions of sovereign land designated by FFSL as open to motorized access and launching/retrieval of watercraft. If FFSL, a partner agency, or the permittee deem that a seasonal ramp system is unsafe or unsuitable, the owner (at the owner's expense) must completely and permanently remove all components of the seasonal ramp system.

Seasonal Boat Ramp System Design Considerations

Design considerations for seasonal boat ramp systems are as follows:

- Seasonal boat ramp structures should not exceed 15 feet in width.
- Seasonal boat ramp structures must not be placed more than 200 feet below the OHWM of 5,923.65 feet.
- Each structure must be anchored to the shoreline using anchor pins that are at least 36 inches deep. Each separate structure or component must be anchored securely so that it does not break free or become compromised during periods of high water.
- A placard constructed of durable materials must be securely affixed to each seasonal structure and include at least the first five letters of the permittee's last name, followed by the last three digits of the permit number (e.g., Nesbi282).
- Anchoring of seasonal structures using anchor lines is permitted as long as the anchor lines are not elevated above the lake surface and are clearly marked with flagging such that a reasonable person would be able to see the location of the anchor line from a distance of 10 yards.
- Seasonal structures must be placed on top of the soil surface. Dredging and excavation are not authorized for the placement of these structures. Removal of rocks and vegetation is only allowed to the extent necessary to safely secure the structure.

Utility Corridors

Utility corridors are rare on Bear Lake sovereign lands but may include water pipelines, sewer pipelines, gas pipelines, fiber optic lines, and/or powerlines. They can be below grade (buried) and above grade (aboveground). Overhead clearance requirements for utility lines on sovereign lands are outlined in Utah Administrative Code R652-70-1800.

Outfall Structures

Outfall structures include storm drain outlets, irrigation return flows, and cooling water outlets. Although this infrastructure is rare on Bear Lake sovereign lands, FFSL has permitted several outfall structures on other sovereign lands.

The Clean Water Act prohibits the discharge of pollutants through point sources such as outfall structures into waters of the United States without an NPDES permit. In Utah, the NPDES program is administered by DWQ. DWQ issues Utah Pollutant Discharge Elimination System (UPDES) permits for point source discharges. The permits define discharge limits, monitoring and reporting requirements, and other specified conditions. DWQ has issued three UPDES stormwater permits near the planning area: Garden City for the 300 West waterline (UTR386295; construction stormwater), Kilgore Companies dba LeGrand Johnson for Bear Lake Ready Mix (UTR010510; industrial stormwater), and Rich County for Cisco road improvements (UTD387101; construction stormwater).

Canals and Irrigation Ditches

Canals are artificial waterways constructed for irrigation or navigation purposes. Irrigation ditches are small trenches typically constructed for irrigation or drainage. A number of canals and ditches are located near Bear Lake outside the planning area (Table 2-19, Figure 2-48) (DWRi 2014); one of these canals extends into the planning area (Swan Creek Canal).

Table 2-19. Canals and Ditches Near the Planning Area

Canal or Ditch Name	Owner	Approximate Location	Maximum Flow (cubic feet/second)	Source
Swan Canal	Round Valley Dam & Canal Company	Swan Creek to the Idaho border	35	Swan Creek
Swan Creek and Hodges Canal	Swan Creek Canal Company	Swan Creek to West 200 North	35	Swan Creek
Swan Creek Canal	Swan Creek Canal Company	West 200 North Road to West Lake Edgehills Drive	15	Swan Creek
Hodges Canal	Hodges Irrigation Company	West 200 North Road to south of Gus Rich Point	15	Swan Creek
Upper Meadowville Canal	Meadowville Canal Company	Meadowville to Round Valley drive	5	Big Springs, Jebo, Tuft, and Cheney Canyons
Lower Meadowville Canal	Meadowville Canal Company	South of Meadowville to Round Valley Drive	5	Big Springs
Round Valley North Ditch	Round Valley Dam & Canal Company	West of West Round Valley Drive to Round Valley Drive	5	Laketown Big Creek, Big Springs
Round Valley South Ditch	Round Valley Dam & Canal Company	West of West Round Valley Drive to near Laketown	5	Laketown Big Creek, Big Springs

Source: DWRi (2014).

Figure 2-48. Hodges Canal near the planning area.

Roads

During peak recreation periods, roads near the planning area experience traffic congestion and safety issues, affecting the recreation experience on sovereign lands. The Bear Lake Corridor Study (a collaborative effort between UDOT and local stakeholders, including FFSL, Garden City, the Bear Lake Regional Commission, BRAG, and Rich County) assessed issues along US-89 and SR-30, developed conceptual solutions, and created a plan to guide future expenditures (Fehr and Peers and H.W. Lochner 2015). US-89 and SR-30 are the most important travel corridors on the west and southwest sides of Bear Lake. Issues that were considered during the study included traffic congestion, access management, bypass options, parking, safety, pedestrian mobility, on-road cycling, visitor wayfinding, and beach access. A list of potential transportation improvements was developed through the study, including turn lanes, road shoulder widening, new intersection design, and trail extensions (Fehr and Peers and H.W. Lochner 2015).

In 2017, the Utah legislature approved funding for transportation improvements in areas of recreation and tourism activity with significant congestion (Senate Bill 277). Four areas were identified for further evaluation after a prioritization process under UDOT's recreation hotspots program, one of which was Bear Lake (UDOT 2018). UDOT, along with local stakeholders, then evaluated the set of transportation improvements developed in the Bear Lake Corridor Study. Four projects were chosen for implementation: improving access to the Bear Lake State Park Marina, upgrading the intersection at US-89 and SR-30, improving center turn lanes at SR-30 and Buttercup Lane, and improving center turn lanes at US-89 near the KOA campground. A fiscal and economic study has been completed for three of the four proposed projects (UDOT 2018). The turn lanes at the KOA campground have been completed.

Lake Level Effects

In terms of infrastructure, changing lake levels primarily impact marinas, boat ramps, docks, and parking on roads near the planning area. As lake levels decrease, the five marinas on the west side of Bear Lake become inaccessible for most watercraft at some point. The approximate lake level elevation at which each marina becomes inaccessible for most watercraft, in decreasing order, is shown in Figure 2-49.

The lake levels in Figure 2-49 generally assume an average depth of 2 feet of water in the marina for boat accessibility. The marinas start becoming inaccessible for most watercraft at a lake level of approximately 5,917 feet.

Figure 2-49. Lake level effects on marinas in the planning area.

Permanent boat ramps also become inaccessible for most watercraft as lake levels decrease. The approximate lake level elevation at which key boat ramps become inaccessible for most watercraft, in decreasing order, is shown in Figure 2-50.

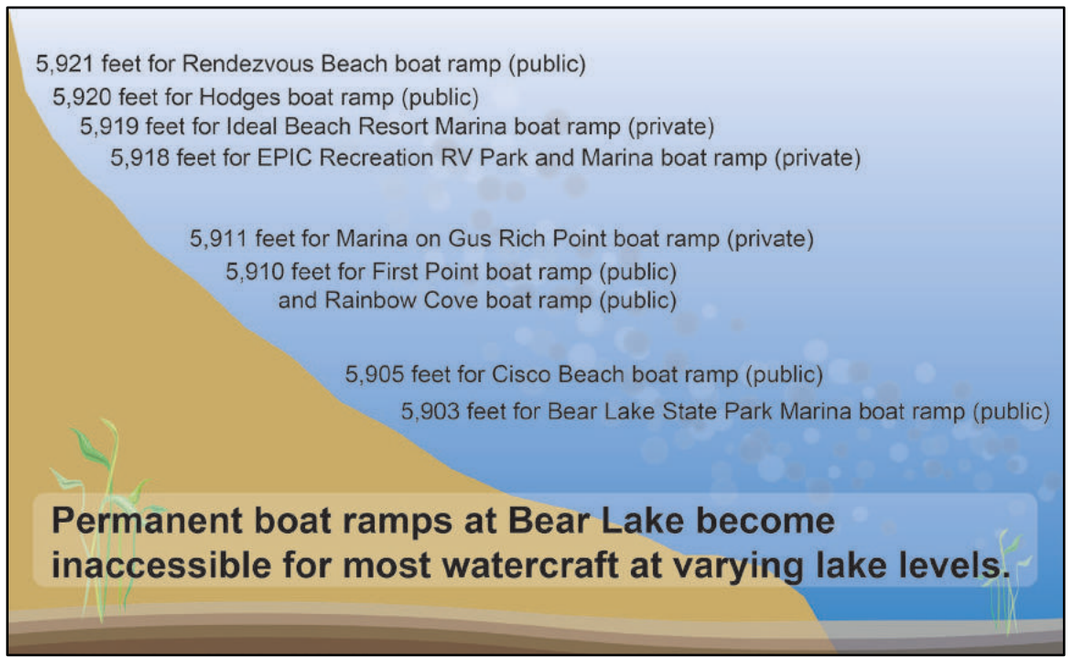


Figure 2-50. Lake level effects on boat ramps in the planning area.

These lake levels add 2 feet to the measured or extrapolated elevation at each boat ramp's end (in some cases, calculated lake levels were adjusted based on observational data). Four of the nine key boat ramps (Rendezvous Beach, Hodges, Ideal Beach Resort Marina, and EPIC Recreation RV Park and Marina) are inaccessible to most watercraft by the time lake levels drop to the median lake level of 5,912 feet. Three of the remaining five boat ramps (Marina on Gus Rich Point, First Point, and Rainbow Cove) are accessible for most watercraft until

the lake drops to approximately 5,910 feet. The boat ramps at Bear Lake State Park and Cisco Beach remain accessible the longest with dropping lake levels.

Changing lake levels do not affect floating docks because they sit on the surface of the lake. However, piers or permanent docks are typically built on piles sunk into the lakebed and can be left dry as lake levels decrease.

Roads near the planning area can also be affected by changing lake levels. With increasing lake levels, the availability of lakebed parking decreases and cars are forced to park along the roads rather than on the lakebed. This can cause crowding along the affected road and create unsafe conditions for both recreationists and for motorists driving on the road. With decreasing lake levels, more lakebed is available for parking and crowding along roads becomes less of a concern. For the CMP, lakebed parking is defined as parking below the OHWM on sovereign lands and includes a 100-foot buffer from the water elevation line.

Further Reading

Bear Lake Corridor Study (Fehr and Peers and H.W. Lochner 2015)
Bear Lake Recreation Hotspot Project Prioritization (UDOT 2018)

GIS Data Layers

Bear Lake Sovereign Lands, Boat Ramps, Canals, FFSL Authorizations, Lake Level Contours, Lake Use Classes, Marinas, Motorized Access, UPDES Permits, UPDES Stormwater Permits

Cultural Resources

A *cultural resource* is defined as "a building, structure, district, [archaeological] site, or object that is historically significant" (Hardesty and Little 2000:161). Some cultural resources may also be referred to as historic properties. The National Historic Preservation Act defines *historic property* as "any prehistoric or historic district, site, building, structure, or object included on, or eligible for inclusion on, the National Register, including artifacts, records, and material remains relating to the district, site, building, structure, or object" (54 United States Code 300308).

Prehistory and History of the Bear Lake Region

Evidence of prehistoric human occupation in the eastern Great Basin begins at the end of the Ice Age and continues until the period of Euro-American exploration and settlement. Lifeways varied considerably over this approximately 13,000-calendar-year-long span of time, both in response to environmental changes and perhaps also as a result of the migration of groups into and out of the region. Archaeological investigations in Utah indicate prehistoric peoples used the lands near Bear Lake, including the Bear River Range to the west, Bear Lake Plateau to the east, and Round Valley to the south. Recorded sites in the area date to the Archaic and Late Prehistoric periods, but no long-term habitation sites have been recorded. During the Archaic period (6000–150 B.C.), people made a living as hunters and foragers focused on lakeshores and wetlands but also began to diversify their diets and expand into higher elevation settings (Madsen et al. 2005). During the subsequent Formative period (150 B.C.–A.D. 1450), Fremont populations began to practice agriculture while also continuing to harvest wild plant and animal resources at varying rates (Madsen et al. 2005; Madsen and Schmitt 2005); no sites dating to this period have been recorded in the Bear Lake region. The Late Prehistoric period (A.D. 1450–1776), which is represented by one site in the area, is characterized by a return to foraging and a focus on both wetland habitats and upland resources (Madsen and Schmitt 2005; Simms 1990).

There is evidence of the Shoshone people using Bear Lake as a summer camping ground and fall hunting area prior to Euro-American settlement of the area, based on accounts of Euro-American trappers and traders. The Shoshone held two rendezvous at the south end of Bear Lake in 1827 and 1828 that both Euro-Americans and Native Americans attended. Based on ethnographic studies, Shoshone gatherings typically occurred in the late summer and early fall around harvests and communal hunts and were an opportunity for festivals and religious ceremonies. The area's importance is underscored by a request from the Shoshone Chief Washakie that early settlers affiliated with The Church of Jesus Christ of Latter-day Saints (LDS) avoid the southern part of Bear Lake Valley (Parson 1996).

The plentiful fish, wild game, timber, and grass available within Bear Lake Valley made it attractive to LDS settlers, despite the long, cold winters. The towns of St. Charles, Fish Haven, Bloomington, Montpelier, Ovid, and Bennington were all settled in 1864 north and west of the lake, in Idaho. Within a year, however, LDS settlers moved to the south end of the lake and established Meadowville and Laketown. In 1866, Charles Rich, the local Indian agent and leader of the LDS settlers, came to an agreement with Chief Washakie to settle the southern Bear Lake Valley. By 1868, many Shoshone people had been relocated to the Uinta Wind River Reservation, although some Shoshone continued to gather at the lake at least into the early 1870s. Garden City was established in 1878 by Phineas Cook and was one of the latest settlements around the lake; a canal was dug in 1877 to support the proposed community, now known as Hodges Canal. Travel into the valley was difficult until a road was built through Logan Canyon to Saint Charles in 1869. Upkeep of the initial route was difficult and it was rerouted toward Garden City in 1880; this road became US-89. Another canal was completed by 1889 to reliably supply water to Laketown (Parson 1996).

The promotion of Bear Lake as a recreational area began almost immediately, beginning with efforts by Joseph C. Rich, Charles Rich's son, in the 1890s to publicize the area and his hot springs resort. Once automobile travel became popular and World War I created an economic boom, additional resorts opened between 1914 and 1918, including Lakota near Swan Creek and the Ideal Beach Amusement Company south of Garden City. There were already claims on the lake water for agricultural irrigation, but around this same time, Dingle Canal was excavated on the north end of the lake and then a pumping station was built at Camp Lifton by UP&L to produce hydroelectric power. These measures lowered lake levels, impacting the resorts around the shoreline; however, economic factors in the 1920s and 1930s also suppressed tourism to the area. Increased prosperity post–World War II once again led to the buildup of recreational properties around the lake in the 1950s and 1960s, including the construction of Bear Lake State Park Marina by the state in 1965–1966. Concerns over impacts to fish habitat from recreation, irrigation, and power generation activities prompted a fisheries study by Utah State Agricultural College in the late 1950s and early 1960s that grew into Utah State University's Bear Lake Laboratory, which worked on improving fish habitat. The recreational industry around the lake saw another boom in the 1970s and into the 1980s (Parson 1996).

Previously Documented Resources

Previously documented cultural resources in the planning area are either prehistoric or historic resources. *Prehistoric* cultural resources refer to any site, feature, structure, or artifact that predates Euro-American contact in Utah (A.D. 1776). Based on existing data, previously documented prehistoric sites surrounding Bear Lake consist of open campsites and artifact scatters. Few prehistoric sites have been documented in the planning area; however, very little of the area around Bear Lake has been surveyed for cultural resources. For this reason, undocumented sites are likely to exist within and adjacent to the planning area.

Historic resources, as defined in the United States by federal law, refer to any site, feature, structure, or artifact that dates from A.D. 1500 through 50 years before present. In Utah, the Historic period dates from A.D. 1776, when Dominquez and Escalante reached Utah Lake, to 50 years before present. According to existing data, previously documented historic sites near Bear Lake consist of canals, roads, transmission lines, buildings, structures, and artifact scatters. Many historic resources, a number of which are classified as historic properties, have been identified within the communities of Garden City, Pickleville, and Laketown, dating from the 1890s through the 1960s. Historic properties adjacent to Bear Lake—the Logan Canyon/Telephone Road (along US-89; Figure 2-51), Hodges Canal, and numerous historic buildings in Garden City and Pickleville—have been determined eligible for the National Register of Historic Places but have not yet been listed.

The types of cultural resources that could be found at Bear Lake are shown and described in Figure 2-52 and Figure 2-53. Based on the previously documented cultural resources, the relatively small number of completed cultural resource surveys in the planning area, and local knowledge, there are likely additional cultural resources in the planning area that have not been identified.

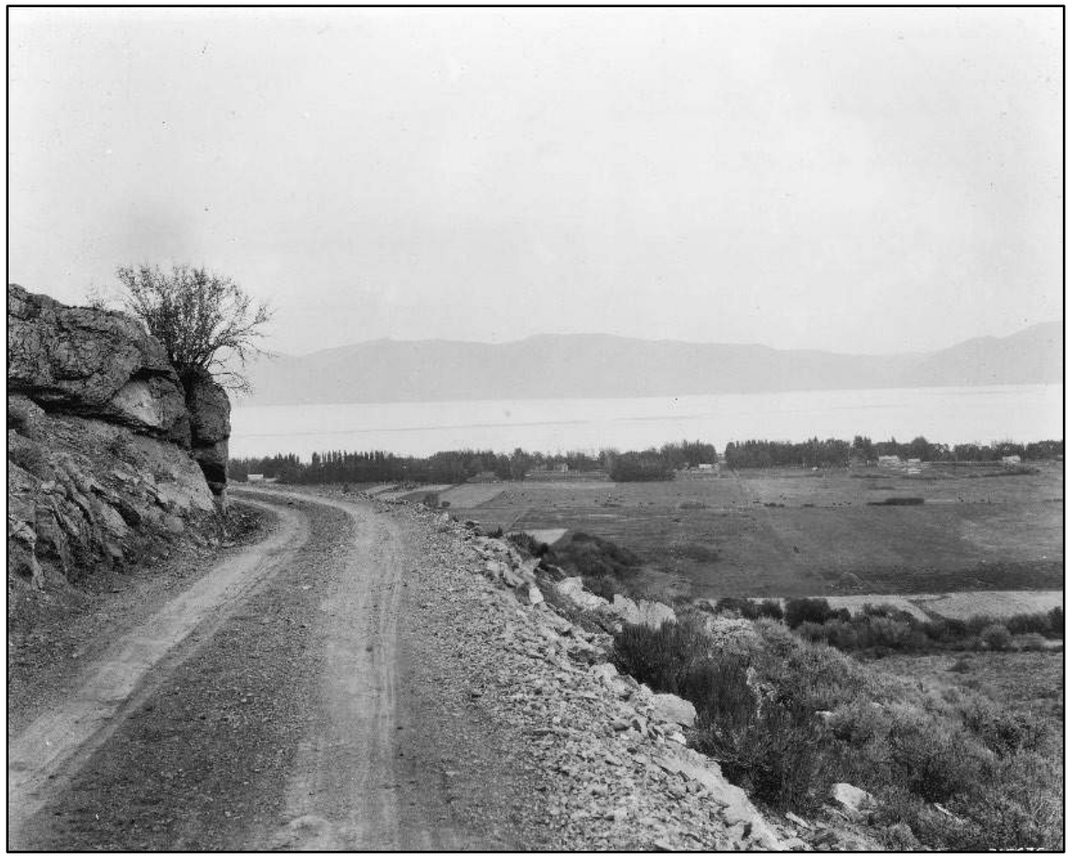
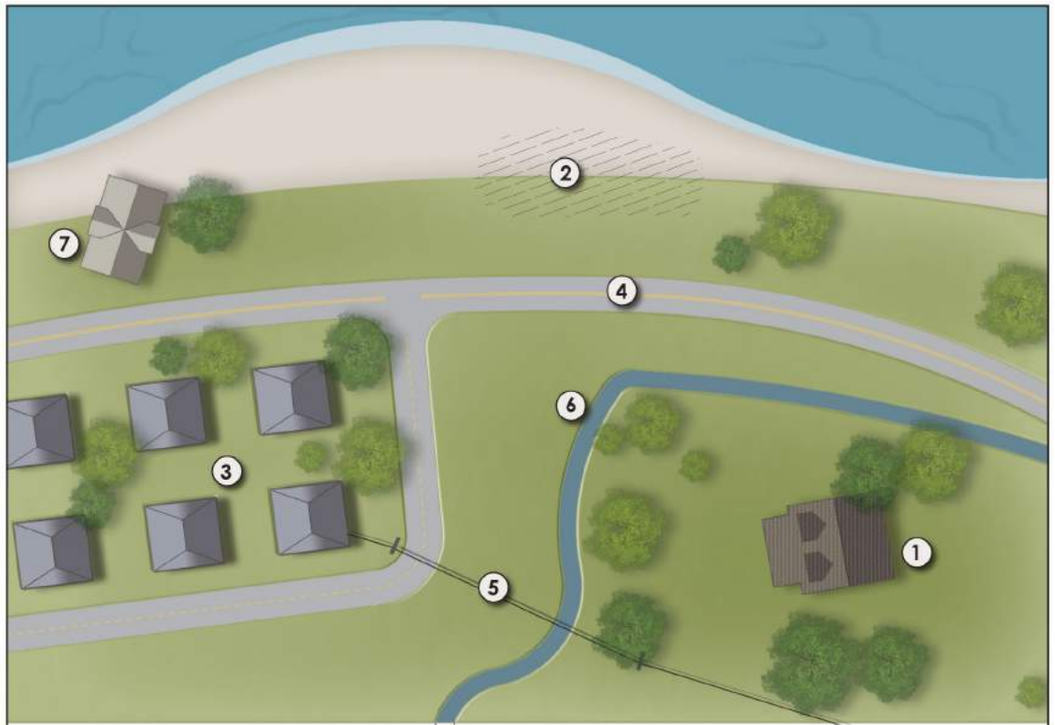


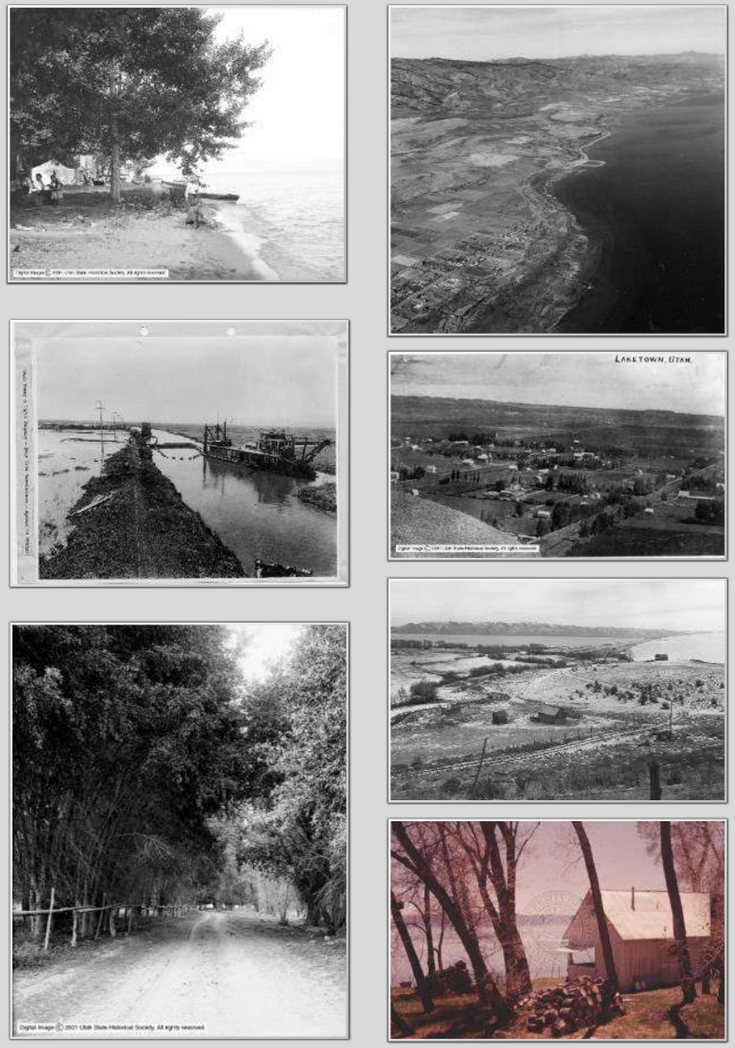
Figure 2-51. View of Bear Lake and Garden City from Logan Canyon Road, 1930s. Permission from Special Collections and Archives, Merrill-Cazier Library, Utah State University.



Legend

1. Historic homestead/cabin
2. Archaeological surface site (e.g., prehistoric and historic campsites)
3. Historic recreation community
4. Historic road
5. Historic utility line
6. Historic canal
7. Historic residence

Figure 2-52. Plan view showing types of possible cultural resources in and near the planning area.



Artifact Scatters

Artifact scatters can have both historic and prehistoric artifacts, historic homesteads and cabins, and trash scatters. Scatters can appear on the ground surface but can also be several inches to several feet below the surface.

Campsites

Prehistoric peoples often camped around bodies of water such as Bear Lake, and historic herding practices also required camping. However, recreational use is the most likely reason for historic campsites in the planning area. Prehistoric and historic campsites, although dispersed, are likely to exist near the shore of Bear Lake.

Canals and Diversions

Canals are important to the history of Utah because they provided, and in many cases still provide, water for crops grown nearby or flood abatement, e.g., Hodges Canal. Canals vary in size and shape.

Historic Buildings and Structures

Buildings can provide good examples of a specific architectural style or can be connected with important state and national history. Historic buildings and structures near the shores of Bear Lake range from private homes to public spaces and provide a look at historic recreational activity around the lake.

Roads

Transportation was a determining factor in the settlement and development of historic communities, and roads can be connected with important state and national history. Early, unimproved roads are often realigned or rerouted as later improvements are made, and they may take the form of abandoned swales or segments of roadbed alongside modern roads.

Utilities

Utilities include telephone, electric, sewer, water, and transmission lines. Utility lines can be placed above grade or can be buried.

Notes:

Photographs from left to right, top to bottom: Campers on Bear Lake shoreline, 1912*, Bear Lake Marina*, Utah Power and Light hydraulic dredge*, Laketown Utah (ca. 1915)*, road along Bear Lake, 1912*, Bear Lake roads, 1940s†, cabin on lake shoreline, 1951*

* = Courtesy of the Antiquities Section of the Utah Division of State History.

† = Used by permission, Special Collections & Archives, Merrill-Cazier Library, Utah State University.

Figure 2-53. Types of cultural resources at Bear Lake.

Regulatory Guidelines

Protection of cultural resources is an important consideration when planning projects on Bear Lake sovereign lands. State law (Utah Code 9-8-401) requires the protection of prehistoric and historic cultural resources on state lands. In addition, Utah Code 65A-3-1(2)(f) indicates that a person is guilty of a Class B misdemeanor and liable for civil damages if they appropriate, alter, injure, or destroy any historical, prehistorical, or archaeological resource on state lands.

FFSL is responsible for the management of cultural resources on state sovereign lands. Utah Code 9-8-404 requires state agencies (e.g., FFSL) and developers using state funds to take into account how their expenditures or undertakings will affect historic properties. In this case, historic properties refer to cultural resource sites that are listed or have been recommended eligible for the National Register of Historic Places. Utah Code 9-8-404 also authorizes the Public Lands Policy Coordinating Office to review comments made by SHPO and mediate disputes between a state agency and SHPO. Human remains found on state lands are protected by state laws (Utah Code 9-9-403). If human remains are found, they must be left in place; doing otherwise is a third degree felony in Utah. They should also be first reported to local law enforcement agencies. The Utah State Native American Graves Protection and Repatriation Act provides a process through which the remains of indigenous people can be repatriated and reburied.

Lake Level Effects

Cultural resources in the planning area can be affected by lake levels. Historic cultural resources close to the shoreline, especially along the western and southern shorelines, have the highest potential to be impacted by high lake levels, which could degrade and potentially destroy the historic character of these resources. If flooding of resources along the lake shoreline occurs at high water levels, SHPO should be alerted so that they can determine whether historic properties have been impacted.

Further Reading

A History of Rich County (Parson 1996)
Ancient Peoples of the Great Basin and Colorado Plateau (Simms 2016)
Archaeological values and resource management (Lipe 2009)
Great Basin Indians: An Encyclopedic History (Hittman 2013)
Idaho State Parks (Just 2017)
Thinking about Cultural Resource Management: Essays from the Edge (King 2002)

GIS Data Layers

Canals

Visual Resources

Introduction

Bear Lake's scenic qualities derive from the distinctive turquoise-blue color of its water, its sandy and rocky shorelines, and the mountain ranges that parallel the lake to the east and the west. Bear Lake is the single largest scenic feature as viewed from the visitor center near the summit of Logan Canyon. The mountain ranges surrounding the lake (the Bear River Range on the west and the Preuss Range and Bear Lake Plateau on the east) create an enclosed panoramic landscape that focuses viewers' attention on the flat plane of the turquoise-blue lake (Figures 2-54 and 2-55).

Figure 2-54. View of the western shoreline of Bear Lake looking northwest at Garden City and the Bear River Range. Photograph by Steve Greenwood.

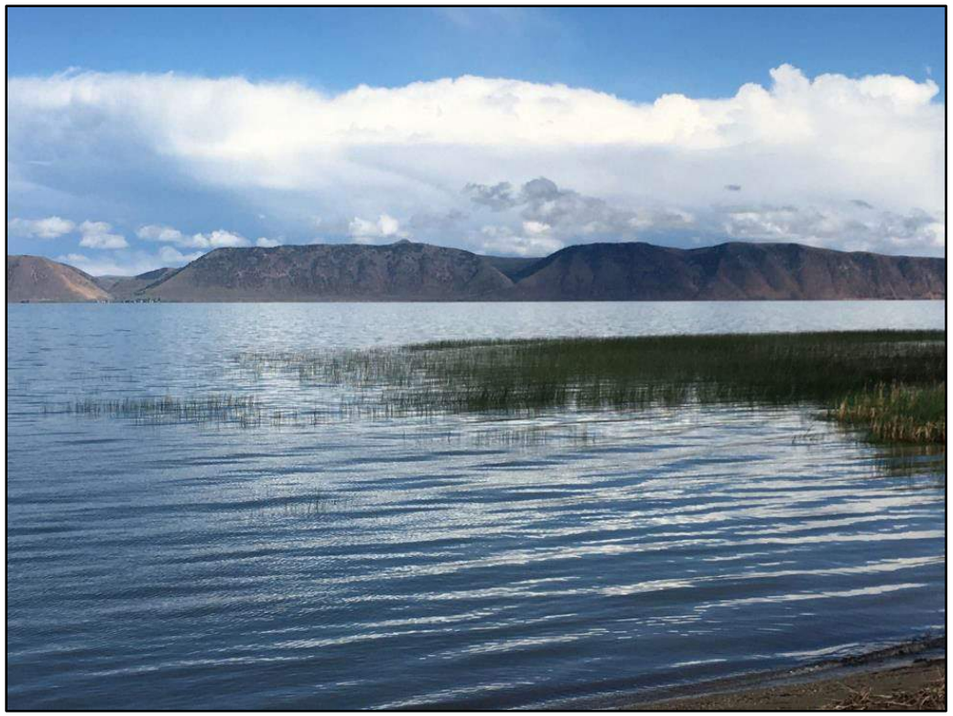


Figure 2-55. View of the east side of Bear Lake looking at the Bear Lake Plateau.

The reason for the lake's distinctive turquoise-blue color, as well as the visual and physical characteristics of the lake's shoreline, are described in the sections below.

Why Bear Lake's Water is so Turquoise-Blue and Clear

Bear Lake is known for its intense turquoise-blue color, which results from abundant suspended microscopic particles of white-colored calcium carbonate (lime) that reflect the water's natural blue color (Davis and Milligan 2011). The calcium carbonate particles are derived mainly from the abundant limestone of the Bear River Range. A reflected blue sky on a sunny day can enhance the blue of the lake, whereas overcast gray skies impart more of an aquamarine or turquoise color (Davis and Milligan 2011). The turquoise color of Bear Lake and the water's clarity are shown in Figures 2-56 and 2-57. Figure 2-57 shows Bear Lake's turquoise color on a different day with different lighting.

Figure 2-56. Bear Lake's unique turquoise color and water clarity. Photograph by Marc Piscotty.

Bear Lake is free from many of the impurities found in other lakes, such as algae, which can reduce lake water's transparency or affect its color. Algal blooms can be caused by an abundance of nutrients, such as nitrogen and phosphorous (nutrient loading to Bear Lake is discussed in the Water Quality section). The low levels of nitrogen and phosphorous in Bear Lake severely limit algal growth, keeping its water clean and blue. The lake's high concentration of calcium carbonate also helps to tie up nutrients, chiefly phosphorus, so that nutrients are less available to algae. Lake color and transparency may also be affected by decaying plant matter, submerged vegetative growth, and nonpoint source pollution.

Figure 2-57. Bear Lake's unique turquoise color.

Bear Lake Shoreline

The flatness of the Bear Lake Valley at the north and south ends of the lake results in large, sandy shorelines in these locations. Elsewhere, the shorelines range from sandy to rocky, with the character of the shoreline changing from season to season because of fluctuations in lake level.

The northwest corner of the lake generally experiences small, low-energy waves, resulting in mud and silt at the water's edge. The western, southwestern, and eastern shorelines of the lake generally experience much stronger wave energy and steeper slopes, resulting in greater particle sizes along the shoreline, especially on the eastern shoreline (Davis and Milligan 2011).

The abruptness of the eastern Bear Lake Fault zone shapes the eastern edge of the lake. Shorelines here are narrow and have headlands of rock and boulders (Figure 2-58). Coves between the headlands are rimmed by water-smoothed, rounded, and flattened beach rocks. Some flat areas can be found between the narrow shorelines where streams exiting the canyons of the plateau meet the lake and deposit wedges of sediment. Wave action and currents have smoothed out broad, arc-shaped deltas that fan out into the lake at North and South Eden Canyons and at Indian Creek (Davis and Milligan 2011). The rocky shorelines quickly transition downslope to gravels, shells, sand, and mud to a depth of 25 to 30 feet below the lake surface.

Figure 2-58. A narrow shoreline along eastern Bear Lake.

The shorelines around the lake also include human-made structures, such as boat ramps, docks, campgrounds, and cabins, that affect the natural scenic qualities of the lake. These human-made structures are more prevalent on the western and southern shorelines than on the eastern shoreline.

Lake Level Effects

When the lake is at higher lake levels, more of the sandy shorelines at the north and south ends of the lake are inundated. More of the rocks and larger particles on the west, southwest, and east sides of the lake are also inundated. The large expanse of water covers some of the less visually appealing elements, such as boat ramp structures, mud, silt, and trash. Vegetation established on the lakebed may be inundated and start to decay. The

inundated shorelines reduce opportunities to view the lake from the shoreline because many shorelines are under water. On the Utah portion of the lake, approximately 407 acres of shoreline is exposed at a lake level of 5,917 feet.

At the lower lake levels, more sandy shorelines are exposed at the north and south ends of the lake. The broad, shallow northwestern shore between Fish Haven and St. Charles has more exposed sheets of sand and snail shells. More mud and silt are visible at the northwest corner of the lake. There are more exposed rocks and other larger particles on the west, southwest, and east sides of the lake, especially along the eastern shore. Exposed rocks, mud (muck), silt, and structures (e.g., boat ramps) are less visually appealing to residents and visitors to the lake. However, larger sandy shorelines are more visually appealing. Vegetation on the lakebed may dry out and die if water sources are lacking. On the Utah portion of the lake, approximately 1,924 acres and 4,169 acres of shoreline are exposed at lake levels of 5,910 and 5,903 feet, respectively.

No data are currently available regarding the potential effects of changing lake levels on the clarity or turquoise-blue color of the lake. In general, changing lake levels are not expected to significantly affect the chemical composition of the lake because chemicals are transported with the water flowing into and out of the lake. However, the clarity of the northern portion of the lake can temporarily be affected by increased sediment or turbidity introduced into the lake from elevated spring flows via Mud Lake during high runoff years. In addition, although nutrient input is generally reduced by the physical and chemical properties of Bear Lake, the assimilative capacity for nutrients has not been quantified, and it is possible that primary productivity could increase in the warm and shallow areas of the lake at low lake levels (see Water Quality section).

Further Reading

Bear Lake State Park Resource Management Plan (Utah Division of State Parks and Recreation 2005)

Bear Lake Valley Blueprint and Toolkit (Envision Utah 2010)

Documenting America's Scenic Treasures: The National Park Service Visual Resource Inventory (Sullivan and Meyer 2016)

Landscape Aesthetics. A Handbook for Scenery Management (USFS 1995)

Scenic Regulations (Tahoe Regional Planning Agency 2021)

Visual Resource Management (BLM 1984)

Why is Bear Lake So Blue? and Other Commonly Asked Questions (Davis and Milligan 2011)

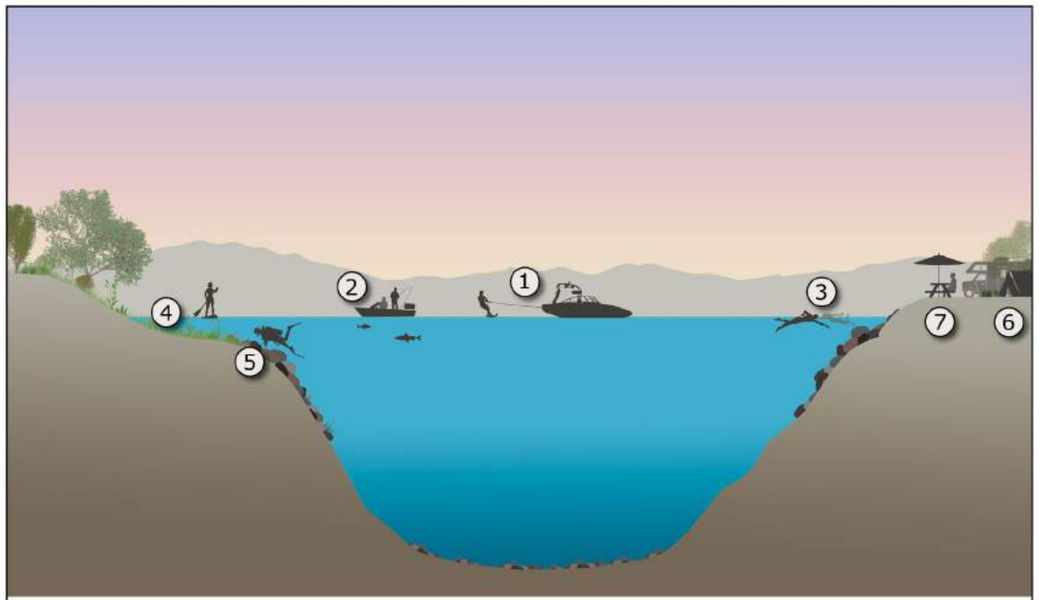
GIS Data Layers

Lake Level Contours, Lake Shoreline Overview, Lake Use Classes, Visual Resource Management Classes

Recreation and Access

Introduction

Bear Lake is a highly popular recreation destination in northern Utah. Recreational activities in and adjacent to the planning area consist of boating, waterskiing, swimming, picnicking, sunbathing, scuba diving, fishing, camping, hunting, hiking, biking, wildlife watching, historic interpretation, photography, and viewing the scenic beauty of the landscape (Figures 2-59 and 2-60). Each season lends its own characteristics and recreational opportunities to the lake.



Legend

1. Boating and waterskiing
2. Fishing
3. Swimming
4. Stand up paddleboarding
5. Scuba diving
6. Camping
7. Picnicking

Figure 2-59. Cross section showing some of the recreation types in the planning area.

Figure 2-60. Various water sports at Bear Lake.

Because the shoreline and bed of Bear Lake are state-owned sovereign lands, they are open to public access as long as no trespassing occurs across private land. All shoreline, beaches, and lakebed below 5,923.65 feet of elevation are open to the public, including those adjacent to private property. The general public can access the lake through patronage of private commercial businesses or through areas open to the public. Improved public access points at Bear Lake, including boat ramps, are shown on the GIS spatial data viewer. A number of lodges and resorts exist along the lake that provide guests with additional access to the shoreline. Recreation equipment rentals (e.g., boats, jet skis, stand-up paddleboards, and boat accessories) and fishing outfitters are available in the area. Commercial operators, outfitters, and guides are required to have an authorization from FFSL.

Good public access (the ability to approach and use Bear Lake) fosters stewardship and support for the protection and enhancement of Bear Lake. Access should account for and tie into local and regional transportation networks (i.e., other trails and public transit) where possible. Access must be balanced to protect the lake. Too many access points can damage the lake ecosystem and recreational experience; too few access points can limit opportunities to experience the lake, create crowding at particular areas, and reduce the public support for and use of the lake. For these reasons, spacing of access points is important. Careful planning can help preserve opportunities for access that have not yet been developed. Although there are no recommended distances between access points, FFSL will take into account safety, the number and type of existing access points, the presence of private land, roads, lake use class, and other factors when deciding how close access points should be placed along the lake shoreline.

Several annual events are held on the shorelines of the Utah portion of Bear Lake. Garden City hosts the annual Raspberry Days festival the first weekend in August. The 3-day festival includes the Little Miss Berry Princess contest, a craft fair, parade, rodeo, 5-kilometer run, pancake breakfast, dances, and ends with fireworks on the shores of the lake and a boat light parade. The Bear Lake Monster Winterfest is held in January each year coinciding with Bonneville cisco spawning. Events include the Monster Cisco Disco Tournament, where anglers can cut holes through the ice (if the lake is frozen) or stand along the shoreline in shallow water (if the lake is not frozen) and use hand-held dip nets to catch Bonneville cisco on the eastern shoreline of Bear Lake, and the Monster Plunge, a group plunge into the lake's icy waters. Current recreational opportunities and lake access are described in the following sections.

Bear Lake State Park

Bear Lake State Park, established in 1962 and managed by DSP, provides a number of public access points on the Utah portion of Bear Lake. The state park consists of the Bear Lake State Park Marina on the western shore of the lake, the Rendezvous Beach recreation area on the southern shore of the lake (Figure 2-61), and five distinct recreation areas on the eastern shore of the lake. Bear Lake State Park also owns an undeveloped section of land on the southwest corner of the lake. Amenities at Bear Lake State Park are described in Table 2-20. Fees are charged for the use of all facilities, including day use, through a fee station or self-serve fee envelopes. Fees vary seasonally and with the day of the week during prime season. The park has a concession operator that offers rentals (e.g., boats, jet skis, wakeboards, kayaks), lodging (i.e., cabins), fast food, and other services.

Figure 2-61. Entrance to Bear Lake State Park, Rendezvous Beach.

Table 2-20. Bear Lake State Park Facilities

Recreation Amenity	West Side	Rendezvous Beach					East Side				
	Marina	Day Use Beach Area	Willow Campground	Birch Campground	Cottonwood Campground†	Big Creek Campground	First Point§	South Eden	Cisco Beach	Rainbow Cove	North Eden¶
Advance reservation	X	X	X	X	X	X		X			
Visitor center	X										
Ranger station	X	X	X	X	X	X			X		
Picnic tables	X	X	X	X	X	X	X	X	X	X	X
Shade shelter	X	X	X	X		X			X		X
Restrooms (vault toilets on the east side)	X	X	X	X	X	X	X	X	X	X	X
Showers	X	X	X	X	X	X					
Fish cleaning station	X										
Boat ramp	X	X					X		X	X	
Boat dry storage	X				X						
Bike trail	X						X	X	X	X	X
Concessionaire	X	X									
Cabins	0	0	0	0	0	5‡	0	0	0	0	0
Individual camp sites	0	0	0	60	23	46	0	20	59	13	11
Group-use camp sites	1 (day use)	2 (day use)	3	0	3	1	0	2	0	0	0

Source: Droesbeke (2020a); DSP (2021).
Notes: All of the recreation areas listed in this table provide access to Bear Lake.
For non-quantitative data, X = present and an empty cell = absent.
* The group day-use pavilion can be reserved but other facilities are first come, first serve.
† Tent use only. Shade shelters at group-use camp sites.
‡ Operated by concessions.
§ Day use only.
¶ The North Eden facility is currently (2021) under construction for beach restoration and day use parking. Campground improvements will also be made.

The Bear Lake State Park Marina is located on the west side of the lake, just north of Garden City on US-89. The marina facilities include a seven-lane concrete boat ramp, sewage service dock, boat slip moorage (355 slips), boat slip overnight rental (21 slips), and a group day-use pavilion. The marina also moors 361 boats on a season-long basis and offers a fenced-in dry storage area. It has a government agency dock where boats are moored by FFSL (1 boat), DSP (2 boats), DWR (1 boat), Garden City Fire Department (1 boat), Bear Lake County Sheriff (1 boat), and the Coast Guard (1 boat). The Bear Lake State Park visitor center is located at the marina. An expansion for the marina is currently being evaluated.

Rendezvous Beach is located on the southern shore of the lake near Laketown on SR-30. It has four campgrounds (Willow, Birch, Cottonwood, and Big Creek) and a large day-use beach area with two reservable group day-use pavilions. The Birch and Big Creek campgrounds have full power, water, and sewer hookups; Willow Campground has an RV dump station. Rendezvous Beach offers a long, gradually sloping, sandy beach popular with the public.

Bear Lake State Park areas located on the eastern shore of the lake (accessed from North Cisco Road) include four primitive campgrounds at South Eden, Cisco Beach, Rainbow Cove, and North Eden, as well as concrete boat ramps at First Point, Cisco Beach, and Rainbow Cove. South Eden has water and RV power hookups at each campsite. Cisco Beach is a popular area to fish for Bonneville cisco when they are spawning in shallow waters in January. It is also used for scuba diving in the summer months, although this use has diminished in recent times. As a safety precaution for divers, the use of a vessel is prohibited from July 1 through Labor Day in the area adjacent to Cisco Beach, starting at the entrance station and extending approximately 1/4 mile south, when it is marked with buoys (Utah Administrative Code R651-205-14).

Bear Lake State Park does not have OHV trails or riding areas within the park. OHVs can be transported into the park on trailers but must follow the same rules as other motor vehicles while in the park. OHVs are not allowed on the park's beach areas (unless otherwise posted during low water years). Placement of water way markers (except a diver's flag) or any permanent or anchored objects in the park are only permissible with written authorization from DSP (Utah Administrative Code R651-204-1).

Annual visitation to Bear Lake State Park has steadily grown from a low of 229,669 in 2010 to a high of 638,808 in 2020, which is a 178% increase (Figure 2-62). July was typically the month with the highest visitation during this time period, except for 2013 when the highest visitation was recorded in August (Figure 2-63) (DSP 2021). These data do not include visitor use associated with hotels, resorts, or other types of private lodging, camping, and day-use facilities. Visitor use at private facilities has likely increased more rapidly than at Bear Lake State Park because of the conversion of private residences to vacation rentals in the last decade, coupled with the construction of new resort facilities.

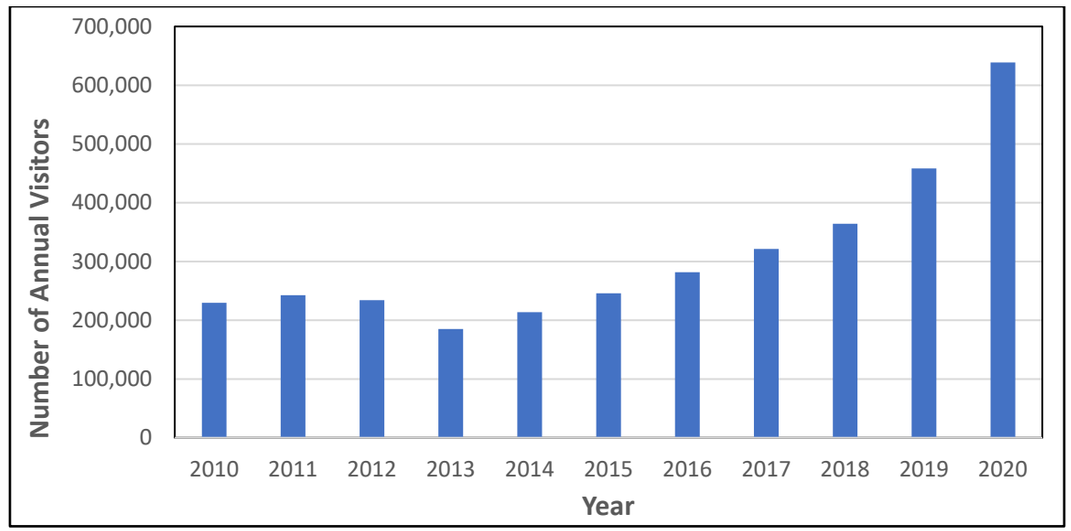


Figure 2-62. Annual visitation to Bear Lake State Park from 2010 to 2020 (DSP 2021).

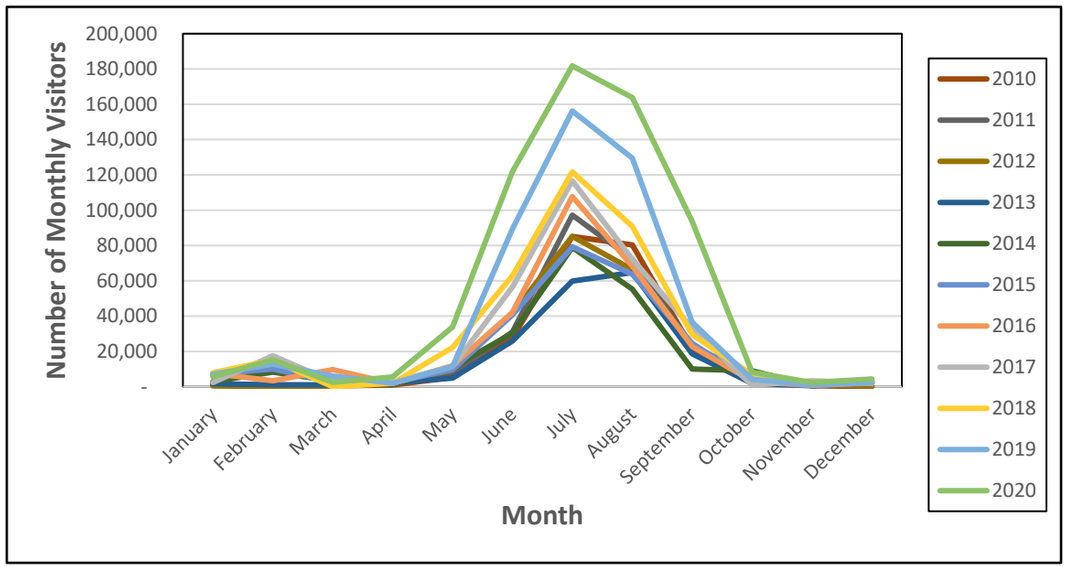


Figure 2-63. Monthly visitation to Bear Lake State Park from 2010 to 2020 (DSP 2021).

Garden City and Other Areas

Outside of Bear Lake State Park, the lake can be accessed using several public access points, parking areas or turnouts along highways adjacent to the lake, Garden City Park (pedestrian access), and a number of roads. Public boat ramps, improved public access points, and campgrounds are shown on Figure 2-64. These amenities are also shown on the GIS data viewer.

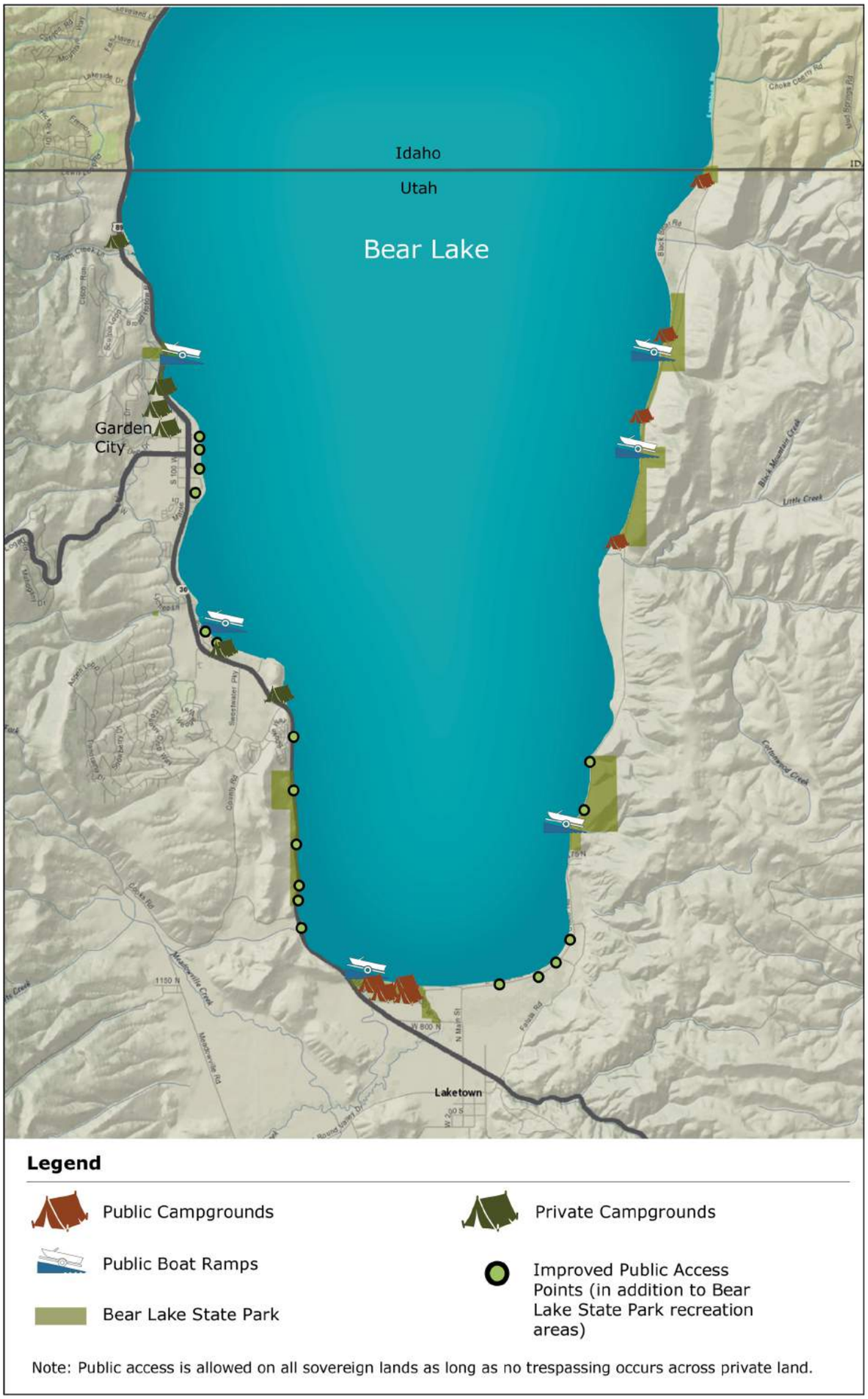


Figure 2-64. Boat ramps, improved public access points, and campgrounds in the planning area.

Table 2-21 provides a list of public recreation access areas at Bear Lake.

Table 2-21. Public Recreation Access Areas at Bear Lake

Recreation Access Areas	Access Type	Amenities
Garden City		
200 North	Direct road access	None
75 North	Direct road access	P
150 South	Direct road access	P
Garden City Park	Through the park	P, Beach, Restrooms
1850 South (Hodges boat ramp)	Direct road access	Boat Ramp
1970 South	Direct road access	None
Southwest Shoreline (between Gus Rich Point and Rendezvous Beach)		
East of Edgemont Drive	Vehicle turnout access	P, Beach
South of Edgemont Drive	Vehicle turnout access	P, Beach
Central southwest shoreline	Vehicle turnout access	P, Beach
North of Meadowville Road (1)	Vehicle turnout access	P, Beach
North of Meadowville Road (2)	Vehicle turnout access	P, Beach
Bear Lake Rest Area (UDOT)	Parking lot access	P, Beach, Restrooms
Southeast and East Shorelines		
Cisco Road access 1	Direct road access (county public right-of-way)	None
Cisco Road access 2	Direct road access (county public right-of-way)	None
Cisco Road access 3	Direct road access (county public right-of-way)	None
Cisco Road access 4	Direct road access (county public right-of-way)	None
East Shore South*	Vehicle turnout access	Beach
East Shore North*	Vehicle turnout access	Beach

* Although these access areas are in Bear Lake State Park, they provide free public access to the lake.
Note: Parking on the lakebed at access points may be available depending on lake water levels.

P Adjacent or Nearby Parking
Beach
Restrooms
Boat Ramp

As illustrated in Table 2-21, Garden City manages lake access at a number of locations. When lake levels are low, visitors may be allowed to park on the sovereign lands lakebed by entering through the Garden City access roads and gates and paying an access fee or purchasing an annual pass. Parking lots for Garden City lake access are also present in some areas, as shown in Table 2-22. In the past, Garden City has also operated a shuttle during the peak recreation season to take visitors directly to the lake from parking areas on 50 South and 150 South. Shoreline access is always free for walk-in visitors through the Garden City gates.

Table 2-22. Garden City Parking Areas

Garden City Parking Area Location	Capacity
75 North (west and east of SR-30)	82 stalls
50 South (west of SR-30)	94 stalls
150 South	68 stalls
350 South	36 stalls
Garden City Park (420 South)	90 stalls
Lakebed parking (near 150 South)	As lake water levels allow

Source: Fehr and Peers and H.W. Lochner (2015).
Note: All parking areas are east of SR-30 (Bear Lake Boulevard) unless otherwise noted.

It is also common for Bear Lake visitors to park vehicles adjacent to SR-30 (Figure 2-65). In many areas, SR-30 has a wide gravel shoulder that allows room to parallel park. In some areas, perpendicular or 45-degree parking is common. Many recreationists use the southwest shoreline area because of the lack of fees and the proximity of the lake to the road. During periods of high visitation, parked cars along SR-30 often crowd the road and create unsafe conditions for recreationists and for motorists driving on the road. It is illegal to park within 15 feet of the pavement, and UDOT has posted signs along the southwest shoreline accordingly.

Figure 2-65. Vehicles parked along Utah State Route 30.

FFSL manages parking on sovereign lands (lakebed parking); UDOT manages parking on roads above sovereign lands. FFSL has issued an authorization for Garden City to manage parking in certain sovereign land areas near the city; however, FFSL retains oversight of these sovereign land areas.

Camping

In addition to camping opportunities at Bear Lake State Park in Utah, a number of privately owned campgrounds are on the western side of the lake:

- Marina Side KOA, Garden City (amenities include RV sites, tent sites, cabins, a snack bar, a camping kitchen, bike rentals, pool, playground, miniature golf, and a dog park)
- Trail Side KOA, Garden City (amenities include RV sites, tent sites, cabins, a camping kitchen, playground, basketball court, and dog park)
- Blue Water Resort, Garden City (amenities include an RV park, hotel, cabins, beach house, pool, playground, and watercraft rentals)
- Conestoga Ranch, Garden City (amenities include glamping tents and Conestoga wagons)
- EPIC Recreation RV Park and Marina, south of Garden City (amenities include an RV park, marina, playground, beach, and watercraft rentals; also operates a private rental facility at Ideal Beach Resort Marina)
- Bear Lake Venture Park, north of Garden City (amenities include RV sites, tent sites, and a playground)

Pursuant to Utah Code 65A-3-1 and Utah Administrative Code R652-70-2300, overnight camping is not allowed on Bear Lake sovereign lands (i.e., the lakebed or shoreline). Campfires, charcoal grills, and fireworks are also not allowed.

Trails

Portions of multiple hiking and biking trails are adjacent to or depart from locations near Bear Lake (though generally not on sovereign lands). Rich County's trail guide illustrates a number of trail routes near Bear Lake and provides trail details such as distance, elevation, location, and recommended trail use (Rich County 2018). Trails near Bear Lake are listed in Table 2-23 and shown on the GIS data viewer.

Table 2-23. Trails Near Bear Lake

Trail Name	Total Length (miles)	Difficulty	Trail Use
Kramer Trails	2.15	Moderate	Hiking, biking, equestrian, OHV
Swan Peak	1.1	Difficult	Hiking
Swan Flat Road	4.0	Easy	Hiking, biking, equestrian, OHV
Garden City Canyon	4.8	Moderate	Hiking, biking, equestrian, OHV
Bear Lake Legacy Pathway	7.8	Easy	Hiking, biking
Hodges Canyon	5.2	Moderate	Hiking, biking, equestrian, OHV
Richardson Canyon	4.4	Easy	Hiking, biking, equestrian, OHV
Sweetwater View	3.75	Moderate	Hiking, biking, equestrian, OHV
Limber Pine Trail	0.95	Easy	Hiking
Peter Sinks	7.7	Moderate	Hiking, biking, equestrian, OHV
Sinks Road (Hells Hollow-Danish Dugway)	22.5	Easy	Hiking, biking, equestrian, OHV
Temple Canyon (Temple Fork)	16.8	Moderate	Hiking, biking, equestrian, OHV
Cottonwood Canyon (Laketown Road)	19.4	Easy	Hiking, biking, equestrian, OHV
New Canyon (Forest Road 121)	15.7	Easy	Hiking, biking, equestrian, OHV
Twin Peak Road (Otter Creek Road, Little Creek Road)	13.5	Easy	Hiking, biking, equestrian, OHV
Eastern Interlaken	9.9	Moderate	Hiking, biking, equestrian, OHV
Shoshone Trail System	Unknown	Varies	Primarily OHV but also hiking, biking, and equestrian

Source: Rich County (2018).

The Bear Lake Legacy Pathway is a paved, non-motorized trail connecting popular recreation sites at Bear Lake to Garden City and Laketown. Two segments are currently complete: the Garden City Segment (from Bear Lake State Park Marina to past Gus Rich Point) and the Southeast Segment (a section on the southeast corner of Bear Lake).

Several trail plans have been developed for the Bear Lake area, including the *Bear Lake Legacy Pathway, Pathway Concept Plan* (National Park Service 2012), *Garden City Parks and Trails Plan* (Envirocentric Design 2014a), and the *Rich County Trails Plan* (Bear Lake Regional Commission and BRAG 2018). These plans are discussed in Chapter 1, along with other planning documents that address trails.

Fishing and Hunting

Bear Lake is renowned for the Bear Lake BCT (a native species) and trophy lake trout (an exotic species). Angling success is highest in the fall, winter, and spring months. Trolling and jigging from boats is popular, along with ice fishing in the winter. Bonneville cisco are harvested in mid-January by dipnetting through ice holes or by wading if the lake is not frozen. Fishing guide services and fishing information are available at locations in Garden City, Laketown, and Bear Lake State Park in Utah.

DWR regulates fishing on the Utah portion of Bear Lake. Anyone 12 years or older must have a Utah fishing license; however, a valid Idaho fishing license is also accepted (DWR 2021b). Harvest is limited to two trout.

Before 2022, anglers were required to release Bear Lake BCT if the fins were intact, but fish with clipped fins (hatchery raised) could be kept. The fin clip regulation protected naturally recruited fish, but there is now sufficient natural recruitment of Bear Lake BCT due to the screening of irrigation diversions, improved access to spawning streams, and new instream water flows. On January 1, 2022, the DWR and Idaho Department of Fish and Game retired the fin clip regulation after careful research and monitoring. DWR and Idaho Department of Fish and Game believe that removing the regulation (allowing more harvest of Bear Lake BCT) will improve the fishery while providing balance to the predator-prey relationship between the piscivorous trout and the endemic Bonneville cisco and Bear Lake sculpin (Tolentino 2022).

Dipnetting of Bonneville cisco must occur with hand-held dipnets that have an opening 18 inches or less in size. There is no restriction on the size of ice holes for fishing Bonneville cisco. When fishing for any species other than Bonneville cisco, ice hole openings are restricted to a size of 18 inches or less.

Catch and release fishing is allowed in parts of Big Spring Creek and Swan Creek as long as artificial flies and lures are used. In Big Spring Creek, fishing can occur from the Lamborn Diversion downstream to Bear Lake and out into the lake 1,000 feet, or as buoyed. In Swan Creek, fishing can occur from the headwater spring downstream to Bear Lake and out into the lake 1,000 feet, or as buoyed. Fishing is closed in these areas from April 15 until 6:00 a.m. on the second Saturday of July (DWR 2021b).

Hotspots for fishing on Bear Lake include the Bear Lake State Park Marina, the Bear Lake State Park Marina rock piles, Garden City, Gus Rich Point, the rock pile near Gus Rich Point, Rendezvous Beach, Val's Pump, First Point boat ramp, 2nd Point, South Eden Canyon, Cisco Beach, and Rainbow Cove boat ramp.

A limited amount of waterfowl hunting occurs on Bear Lake. At a minimum, all hunters must obtain a basic hunting license from DWR to hunt on private or public lands in Utah. Waterfowl hunters over the age of 16 must also possess a federal migratory bird hunting and conservation stamp (DWR 2019b). An authorization from FFSL is required for any hunting blinds constructed on Bear Lake sovereign lands.

DWR also manages specific fishing and hunting access areas in Utah. Two types of access areas are managed by the agency:

- Walk-in-access (WIA) areas are tracts of private land on which the agency has leased hunting, trapping, or fishing privileges for public recreation (an authorization number is required). Landowners enrolled in the WIA program receive monetary compensation and may also qualify for habitat restoration projects. In most cases, access to WIA properties is limited to foot traffic only.
- Wildlife management areas (WMAs) are single tracts of land owned by DWR, or two or more tracts of land owned by DWR, that are close to each other and managed as a single unit. WMAs are often managed to protect wildlife habitat and public access.

There are two WIAs and one WMA near Bear Lake (shown on the GIS data viewer).

The East Bear Lake WIA is a hunting property accessible by foot or horseback only (except on public roads). It is open August 15 to January 31 and is located near the southeast portion of the lake. Species in this WIA include bobcat (*Lynx rufus*), cottontail rabbit (*Sylvilagus nuttallii*), coyote, dusky grouse (*Dragapus obscurus*), ruffed grouse (*Bonasa umbellus*), moose, mule deer, pronghorn, and Rocky Mountain elk.

The RTeichert WIA is a 3,197-acre hunting and 2-mile-long fishing property east of Bear Lake in South Eden Canyon. It is open year-round and is accessible by foot or horseback only. Species in the RTeichert WIA include chukar (*Alectoris chukar*), grey (Hungarian) partridge (*Perdix perdix*), mourning dove (*Zenaida macroura*), greater sage-grouse, cottontail rabbit, cutthroat trout, mule deer, pronghorn, and Rocky Mountain elk.

The Swan Creek WMA comprises approximately 700 acres of land from 6,400 to 7,000 feet of elevation overlooking Bear Lake on its west side. It provides important winter range and hunting opportunities for Rocky Mountain elk, moose, and mule deer. Other wildlife in the WMA include upland species such as ruffed grouse and dusky grouse. The Swan Creek WMA offers activities such as hunting, OHV riding, hiking, fishing, and wildlife watching. The area is closed to the public seasonally to protect wintering wildlife.

Boating and Recreational Use Regulations

STATE BOATING ACT

Bear Lake is a popular destination for motorized (e.g., pontoon boats, ski boats, wakeboard boats, fishing boats, jet skis) and non-motorized (e.g., kayaks, stand-up paddleboards, canoes) watercraft. DOR has primary responsibility for boating safety on the Utah portion of Bear Lake under Utah's State Boating Act (Utah Code 73-18). DOR and DSP personnel work closely with the local Rich County sheriff's office to respond to search and rescue needs at Bear Lake.

Motorized boats and sailboats must be registered with the Utah Division of Motor Vehicles and must carry liability insurance while operating on Utah waters (motorboats with engines less than 50 horsepower and airboats are exempt from the insurance requirement). Canoes, kayaks, and other vessels not propelled by motor or sail are not required to register. Utah's State Boating Act requires all boats to carry at least one wearable, approved personal flotation device (life jacket) for each person on board (Utah Code 73-18-8). Children under 13 years of age must always wear a life jacket. Boat operators towing water skiers, wakeboards, or other devices must have an observer at least 8 years old on board to watch and communicate with the skier. All persons being towed must wear a life jacket and towing is allowed only between sunrise and sunset.

Personal watercraft (PWC) are defined in the State Boating Act as motorboats that are less than 16 feet in length; propelled by a water jet pump; and designed to be operated by a person sitting, standing, or kneeling on the vessel (e.g., jet skis). PWCs may not be operated between sunset and sunrise on Bear Lake (Utah Code 73-18-15.3). The State Boating Act requires completion of a youth (ages 12–18) boating safety course to operate PWC (Utah Code 73-18-15.2). Life jackets are required for those driving PWCs. Stand-up paddleboards, kayaks, and canoes also must have at least one life jacket for each person on board, as well as a spare paddle, bail bucket, and whistle (a spare paddle and bail bucket are not required for stand-up paddleboards).

Utah's State Boating Act provides vessel navigation and steering laws for avoiding collisions, passing, overtaking another vessel, sailboats, and persons riding on the bow of a boat. The following regulations on wakeless speed are also provided in the boating act (Utah Code 73-18-15.1):

> The operator of any vessel may not exceed a wakeless speed when within 150 feet of the following:
>
> - Another vessel
> - A person in or floating on the water
> - A water skier being towed by another boat
> - A water skier that had been towed behind the operator's vessel unless the skier is still surfing or riding in an upright stance on the wake created by the vessel
> - A water skier that had been towed behind another vessel and the skier is still surfing or riding in an upright stance on the wake created by the other vessel
> - A shore fisherman
> - A launching ramp
> - A dock
> - A designated swimming area

In addition, the operator of a motorboat is responsible for any damage or injury caused by the boat's wake. The State Boating Act also outlines the duties of an operator involved in an accident.

FFSL REGULATIONS

Utah Code 65A-2-7 states that FFSL shall designate state lands along SR-30 from EPIC Recreation RV Park and Marina (Spinnaker Marina) southward approximately 4 miles to Rendezvous Beach as an area for the ongoing development of facilities for boating, fishing, beach going, swimming, parking, picnicking, and other recreational activities as funding allows.

As described in Chapter 1, Utah Code 65A-2-6 establishes requirements for boat launching on state lands. A permit is required to launch or retrieve a motorboat on state lands surrounding Bear Lake. Further, a permit authorizes a person to launch or retrieve a motorboat if 1) the person owns private property adjacent to state lands surrounding Bear Lake or has a legal right to use private property adjacent to state lands surrounding Bear Lake, and the person accesses the water from that private property, or 2) the person accesses the water from a recorded point of public access that allows motorized vehicle traffic.

To administer this statute, FFSL adopted specific rules for management of Bear Lake sovereign lands (Utah Administrative Code R652-70-2300). These regulations address recreation on Bear Lake sovereign lands and are discussed below.

BEAR LAKE MOTORIZED ACCESS

Motorized vehicle use on state sovereign lands is typically prohibited by state law and administrative rules. One exception has been the use of motorized vehicles on the Bear Lake lakebed, which was first legally allowed in the mid-1990s (although it was common practice before this time). The Bear Lake lakebed is currently open to motorized vehicles unless posted as closed. Motorized access on Bear Lake sovereign lands is governed by Utah Code 65A-3-1(3), Utah Administrative Code R652-70-2300, this Bear Lake CMP, and the *Bear Lake Motorized Access Plan* (FFSL 2015). Key rules to know for motorized vehicles on the lakebed are in the sidebar box on this page.

Rules to Know

Key Rules for Motorized Vehicles on the Lakebed

- Areas of the shoreline may be closed to motorized access.
- The speed limit is 10 miles per hour.
- Use of motorized vehicles is prohibited between 10 p.m. and 7 a.m.
- Parallel travel along the water's edge is limited to a maximum distance of 500 yards.
- Travel is not allowed within 100 feet of the water's edge.
- Operating a motorized vehicle in the waters of Bear Lake is prohibited *except* when launching watercraft.
- Vehicles must park at least 100 feet from the water's edge.

FFSL's *Bear Lake Motorized Access Plan* identifies appropriate areas for motorized vehicles based on the physical and biological characteristics of the shoreline, the potential for conflict between motorized and non-motorized access in high use areas, and the demand for motorized access in different areas of the lake (FFSL 2015). As funding becomes available, FFSL intends to create a resource management plan specifically for motorized access at Bear Lake to replace the current *Bear Lake Motorized Access Plan*.

Under the current *Bear Lake Motorized Access Plan*, the Bear Lake shoreline has been classified into three zones with different sets of guidelines for the use of motorized vehicles (FFSL 2015). The three zones were created with lake levels in mind and may be modified as needed. The three zones are Zone 1: Open to Motorized Access (shown in green on Figure 2-66), Zone 2: Managed Motorized Access (shown in yellow on Figure 2-66), and Zone 3: Closed to Motorized Access (shown in red on Figure 2-66). The zones can be viewed on the GIS data viewer in more detail. In Zone 2, managed motorized access is allowed, but additional restrictions apply. Examples of Zone 2 areas include Bear Lake State Park Marina, Rendezvous Beach, the area around 150 South in Garden City, Blue Water Beach, and Ideal Beach Resort. In Zone 3, motorized access, including beach launching, is not allowed, generally because of the presence of sensitive ecological resources such as spawning substrates and critical tributary riparian areas. Although the *Bear Lake Motorized Access Plan* has been consistently applied for the last several years, an adaptive management approach has been necessary to respond to changing conditions and fluctuating lake levels. Areas may be opened or closed to motorized access to fulfill the Public Trust and management responsibilities of FFSL. For the most current information regarding motorized vehicle access at Bear Lake, please refer to FFSL's website.

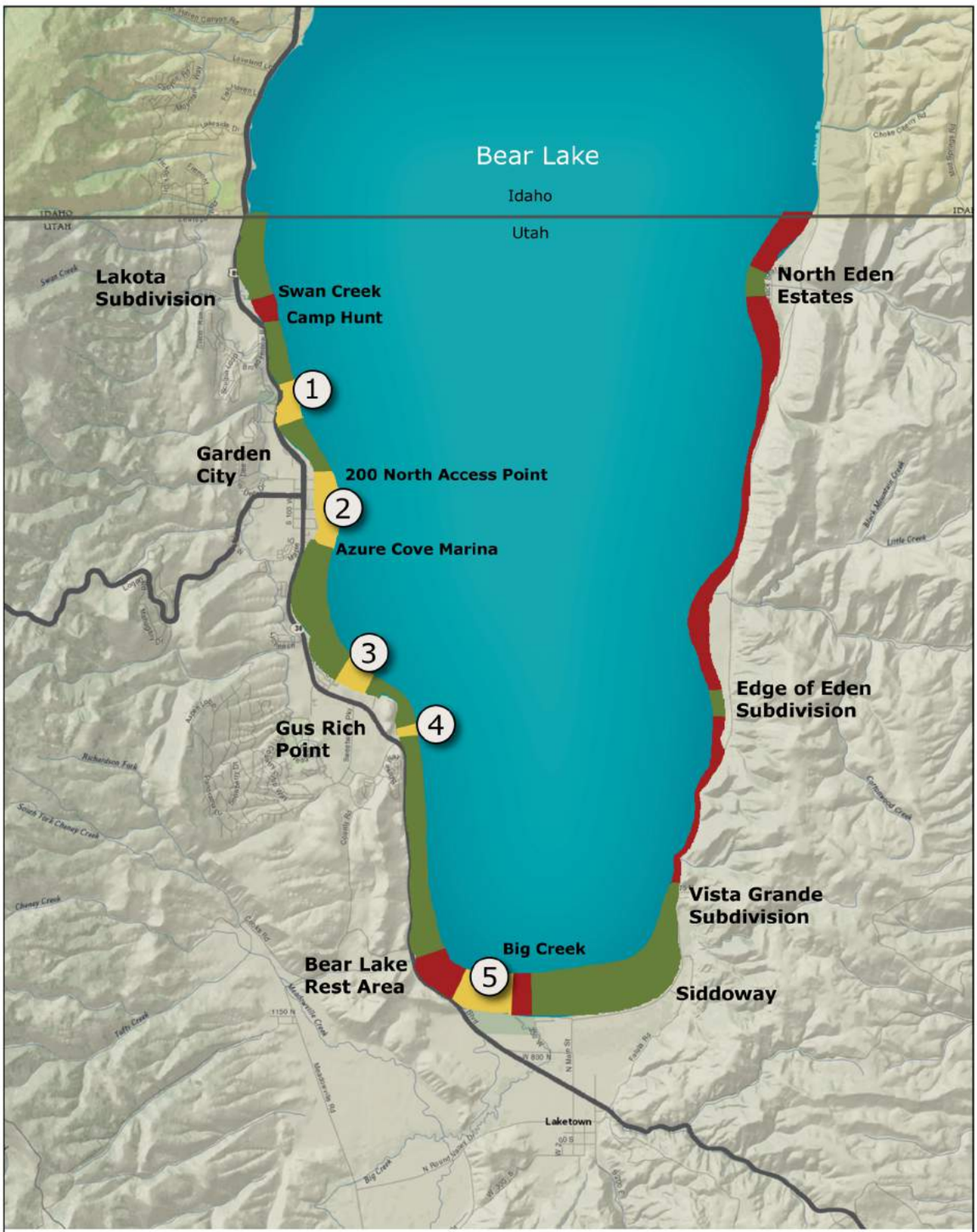


Figure 2-66. Motorized access plan zones.

Beach Launching Guidelines

Guidelines for beach launching include the following (FFSL 2019; Utah Code 65A-2-6; Utah Administrative Code R652-70-2300):

- Drive and launch at your own risk. Soft sand and other hazards exist in many areas of the lakebed.
- A beach launching permit is required to launch or retrieve a motorboat on state lands surrounding Bear Lake. To receive a permit, the online Mussel-Aware Boater Program must be completed, and a multiple use annual decontamination certification form must be received by DSP (who issues beach launching permits; see Chapter 1). The permit is valid for 1 year.
- It is the responsibility of the permit holder to know and follow current rules and any restrictions specific to the area of launching. Areas closed to motorized vehicles are also closed to beach launching.
- The beach launching permit and annual decontamination certification form must be displayed in a visible location on or in the launch vehicle at all times. Launch vehicles must be parked a minimum of 100 feet from the water's edge (any standing water).
- Beach launching permits are non-transferable. Photocopied, shared, or "borrowed" permits will not be accepted.
- Beach launching permits are for the sole purpose of launching and retrieving a motorboat. They do not authorize the use of motorized vehicles or parking in areas designated as closed to those uses.

Recreation Management Concerns

The primary management concerns for recreation are 1) the increasing number of visitors to Bear Lake (Figures 2-67 and 2-68) and 2) fluctuating lake levels. As visitor numbers increase, conflicts between different types of users (e.g., motorized vs. non-motorized, residents vs. non-residents) become more likely. Recreation areas and infrastructure such as shorelines, campgrounds, marinas, boat ramps, and parking lots become more crowded. In addition, too many recreation users can negatively affect the lake's resources and ecological functions. Fluctuating lake levels are discussed in the following Lake Level Effects section.

More infrastructure will likely be required at Bear Lake to accommodate growing recreational use. Education and outreach efforts may need improvement to better inform Bear Lake visitors of FFSL's jurisdiction and applicable rules and regulations. In addition, new measures may need to be considered to protect the lake's ecological health in the context of increasing visitation.

Figure 2-67. Crowding at Rendezvous Beach.

Figure 2-68. Crowding at a beach in Garden City. Photograph by Wes Thompson. Used with permission.

Lake Level Effects

The recreation capacity of sovereign lands is affected by the water level elevation of Bear Lake. As discussed in the Infrastructure section, infrastructure such as marinas, boat ramps, and docks becomes inaccessible at certain elevations as lake levels drop, reducing water-based recreational access. However, the availability of shorelines for recreation increases as lake levels drop from the high elevation of 5,923 feet. The receding waterline allows more access for day use and lakebed parking, which increases the capacity for land-based recreation activities. For example:

- At a lake elevation of 5,917 feet, approximately 407 acres of shoreline is exposed.
- At a lake elevation of 5,912 feet, approximately 1,385 acres of shoreline is exposed.
- At a lake elevation of 5,910 feet, approximately 1,924 acres of shoreline is exposed.
- At a lake elevation of 5,903 feet, approximately 4,169 acres of shoreline is exposed.

These data are for the Utah portion of Bear Lake only.

The lakebed when exposed can become mucky in places and can contain saturated dead organic matter, making access more difficult for adjacent upland owners and the general public and also negatively affecting the visual aesthetics of the shoreline. The dead organic matter can also attract deer flies, which are biting pests.

Lakebed parking is particularly important for land-based recreation accessibility and minimizing safety conflicts on nearby roads (due to crowding). Despite these benefits, the availability of more shoreline can also result in user conflicts and safety concerns from increased use of OHVs and motor vehicles. At lake levels of approximately 5,915 feet and higher, no lakebed parking is available in the Garden City area or the southwest shoreline area. Parking at Rendezvous Beach becomes available at approximately 5,916 feet. At lake levels of approximately 5,917 feet and higher, no lakebed parking is available in the southeast shoreline area. These lake levels include a 100-foot buffer from the water line because parallel travel is not allowed within 100 feet of the water's edge.

Further Reading

Bear Lake Legacy Pathway. Pathway Concept Plan (National Park Service 2012)
Bear Lake State Park Resource Management Plan (Utah Division of State Parks and Recreation 2005)
DSP Boating webpage (DSP 2021)
Fishing Guidebook (DWR 2021b)
Garden City Parks and Trails Plan (Envirocentric Design 2014b)
Rich County Trails Guide (Rich County 2018)
Utah Waterfowl 2019-20 Guidebook (DWR 2019b)

GIS Data Layers

Bear Lake Sovereign Lands, Bird Habitat Conservation Areas, Boat Ramps, Campgrounds, DWR-Managed Access, eBird Locations (Hotspots), Improved Public Access Points, Lake Level Contours, Lake Use Classes, Landownership, Marinas, Motorized Access, Navigational Hazards, State Parks, Trails

Public Safety and Enforcement

Introduction

Several public safety concerns at Bear Lake are shown in Figure 2-69. Typical safety issues at Bear Lake include the following:

- Conflicts between different types of users (e.g., a boater could injure a swimmer with a propeller.)
- Crowding on the lake or its recreation infrastructure (e.g., an accident between a boat and jet ski or a vehicle accident on a boat ramp)
- Crowding along roads or at parking areas (e.g., a vehicle-pedestrian accident)
- Navigational hazards (e.g., natural debris, buoys, or docks)
- Missing safety equipment (e.g., life jackets, fire extinguishers, bailing devices, adequate ventilation)

- Lack of proper safety procedures (e.g., speeding, drinking and driving, waterskiing without an observer, ignoring the weather)
- Lack of sufficient knowledge and/or preparation to adequately respond to severe weather events and changing lake conditions.

FFSL works with agencies and entities having jurisdiction over these issues to ensure public safety.

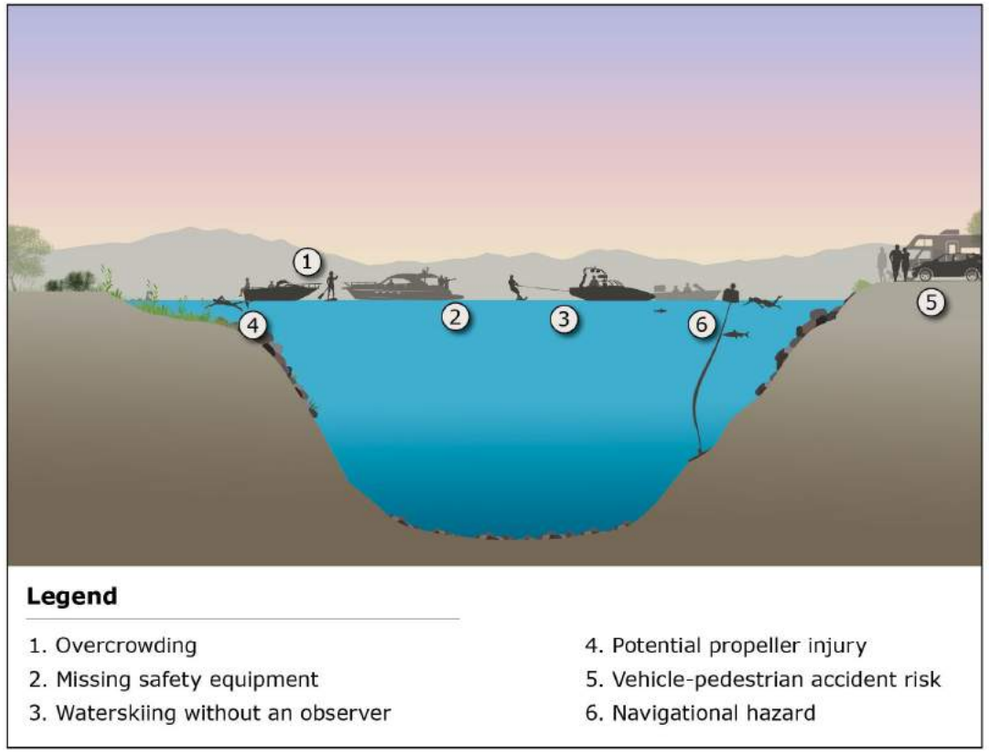


Figure 2-69. Cross section showing potential public safety concerns in the planning area.

Responsible Entities

STATE AND COUNTY

Law enforcement is complicated at Bear Lake because of multiple overlapping jurisdictions. In Utah, FFSL has law enforcement responsibility on Bear Lake sovereign lands. DSP has primary law enforcement responsibility at Bear Lake State Park. DOR has primary responsibility on the Utah portion of Bear Lake for enforcing Utah's State Boating Act (Utah Code 73-18) and the Utah Off-Highway Vehicle Act (Utah Code 41-22). Utah State Park Rangers are certified Category 1 Peace Officers in the state and can perform law enforcement functions as needed and requested.

The Rich County sheriff's office provides general law enforcement and is responsible for search and rescue; DSP has an agreement with the Rich County sheriff to provide primary search and rescue activities on the Utah portion of the lake. Search and rescue activities are generally coordinated from the Bear Lake State Park Marina. There is also an agreement in place for DSP to work with the Bear Lake County sheriff in Idaho to provide search and rescue assistance on the Idaho portion of the lake (Droesbeke 2020b). Search and rescue trainings are usually conducted annually.

DWR enforces wildlife law and fishing and hunting regulations on the Utah portion of Bear Lake, and also assists in general law enforcement as requested.

As discussed in Chapter 1, Idaho has counterparts to Utah agencies that have jurisdiction at Bear Lake, including the IDL, IDPR, and the Idaho Department of Fish and Game. These agencies have law enforcement responsibilities on the Idaho portion of Bear Lake. Bear Lake County sheriff's office in Idaho has a marine division to promote safe boating through boater education and patrols. The marine division is also responsible for water rescue, boating accident investigation and rescue, and recovery diving on the Idaho portion of Bear Lake.

FEDERAL

The Coast Guard administers a national recreational boating safety program and works with National Association of State Boating Law Administrators to administer and enforce state boating laws (see Chapter 1). The Coast Guard allows each state to enforce the recreational boating safety laws for the portion of the lake in their state; however, the Coast Guard retains the authority to enforce commercial boating and guiding activities on Bear Lake because these activities cross into both states. This includes captain licensing and may include vessel inspections for boats carrying passengers for hire on Bear Lake (Droesbeke 2020b). The Coast Guard assists with safety and search and rescue activities on the lake. It also publishes guidance on navigation rules and essential markers (buoys and beacons), offers free vessel safety checks, and provides information on boating under the influence, carbon monoxide hazards, life jackets, float plan preparation, safety, and recalls.

Federal law requires the owner or operator of a recreational vessel to file a boating accident report with the state reporting authority (DSP in Utah) if the owner is involved in an accident that results in a death, an injury that requires medical treatment beyond first aid, a disappearance that indicates death or injury, damage totaling $2,000 (lower in some states), or destruction of the boat. Accident reporting forms can be found on the Coast Guard's website.

Hazardous Materials Spills

If a hazardous materials spill were to occur in or around Bear Lake, it would be handled by the fire district in which it occurred (e.g., the Garden City Fire District) (Wahlberg 2021). The fire district would be responsible for initiating mitigation efforts and containment until a clean-up firm could be brought on scene, usually by the company responsible for the spill. If the spill exceeds a minimum release threshold, the fire district would contact the Bear River Health Department to follow up with the clean-up firm to ensure that remediation is completed in a proper manner and time frame. The fire district may also inform the Utah Department of Environmental Quality depending on the nature of the spill (Wahlberg 2021).

Lake Level Effects

Significant public safety issues can occur when lake levels are relatively high and lakebed parking is limited. As mentioned in the Infrastructure and Recreation sections, parked cars crowd roads during periods of peak visitation, especially along SR-30 between Gus Rich Point and the Bear Lake Rest Area (see Figure 2-65) and along US-89 north of the Bear Lake State Park Marina. Recreationists getting in and out of vehicles are often too close to the highway, and motorists driving on the highway may have difficulty seeing pedestrians, creating the potential for a pedestrian-motorist accident or a vehicle accident. At lower lake levels, more parking can occur on the lakebed and crowding along SR-30 is typically less of a problem. However, more motorized vehicles on the lakebed can create a different set of user conflicts and safety issues.

An additional consideration is that low lake levels can make some recreational infrastructure inaccessible and lead to crowding in areas where infrastructure remains accessible, particularly at public boat ramps.

Further Reading

Coast Guard Boating Safety webpage (U.S. Coast Guard 2021)
DSP Boating webpage (DSP 2021)

GIS Data Layers

Lake Level Contours, Landownership, Navigational Hazards, Political Boundaries

Education and Outreach

Education and outreach are important components of successfully managing the planning area because they provide direction to user groups for appropriate use and activities at Bear Lake, clarify FFSL's jurisdiction and management authority, and foster public understanding of the lake and the need to protect it. In addition, educating and communicating with other Bear Lake management entities and stakeholders through the dissemination of research data and analysis can improve their understanding of the ecosystem and enhance cooperative management and stewardship of its resources.

User groups that benefit from educational and outreach efforts about Bear Lake are listed in Figure 2-70.

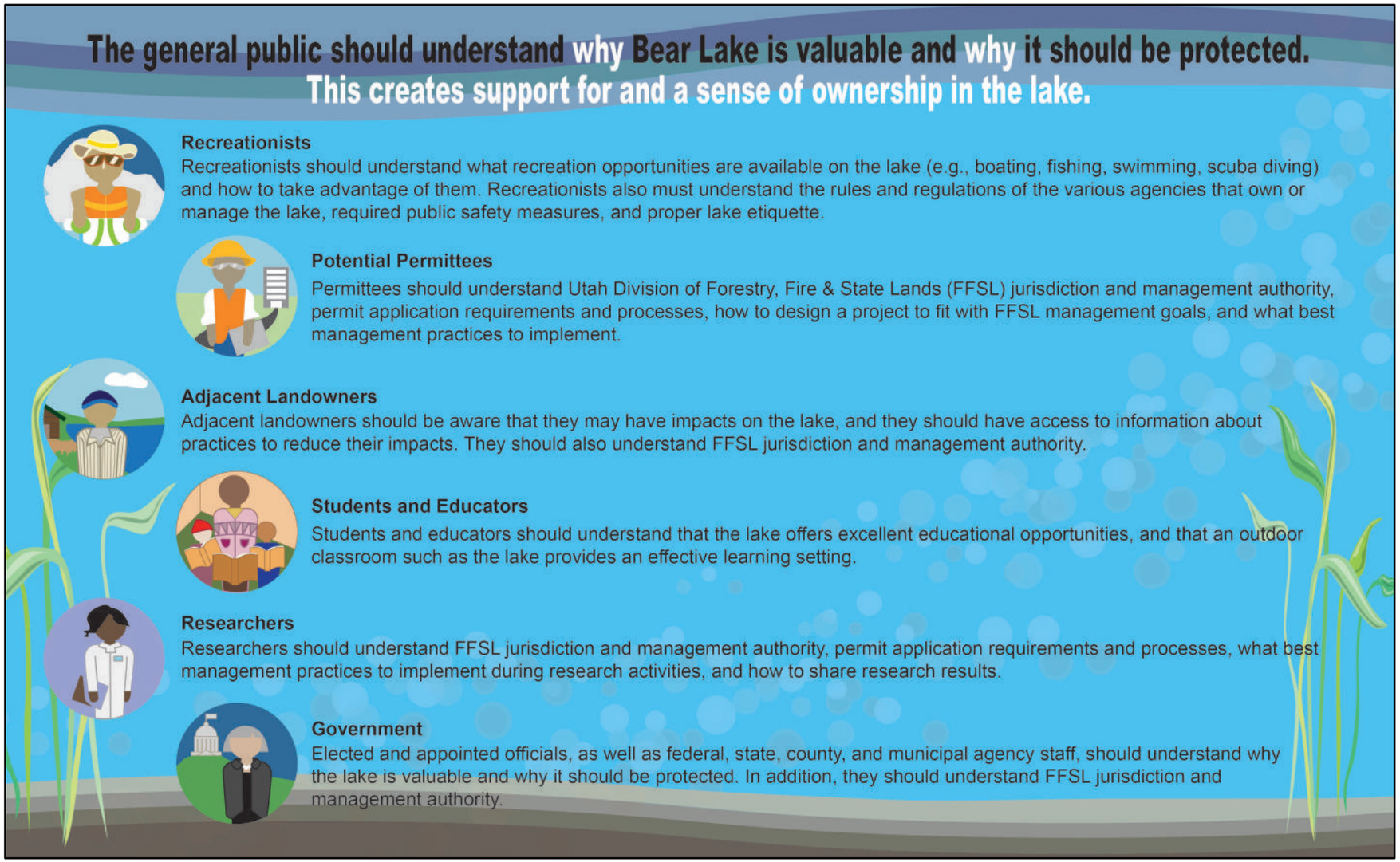


Figure 2-70. Bear Lake user groups.

Educational and Outreach Materials

Several entities provide educational materials about Bear Lake. These include FFSL, Bear Lake State Park, Bear Lake Valley Convention and Visitors Bureau, Bear River Heritage Area, Bear Lake Regional Commission, Bear River Commission, Bear River Watershed Information System, Bear Lake Watch, USGS Utah Water Science Center, and the Bear Lake National Wildlife Refuge.

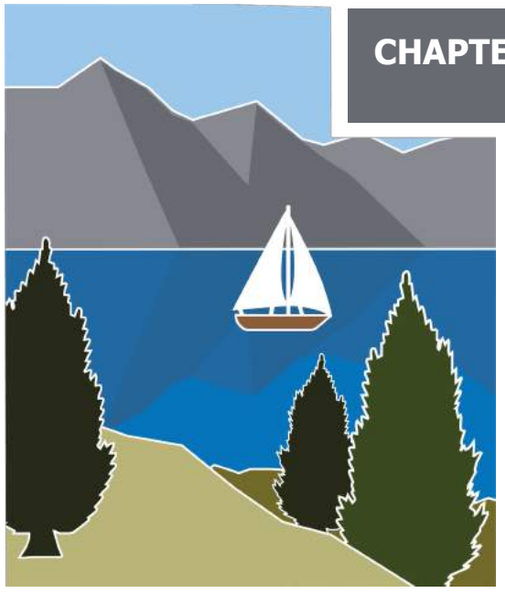
Comments from the public outreach process in late 2019 indicated a need to better educate recreationists using the lake. Education is needed about respecting private property rights, properly handling trash, applicable rules and regulations, lake etiquette, and other topics. Education could occur through new signage at popular public boat ramps or public access points, by working with commercial businesses at Bear Lake and nonprofit groups like Bear Lake Watch, and through the FFSL permitting processes. Figure 3-13 in Section 3.5 contains FFSL's suggestions for stewardship and lake etiquette.

Bear Lake does not currently have a coordinated signage system. Interpretive and informational signing could help increase public knowledge about the lake's ecosystem, lake regulations, lake etiquette, access, safety, and recreational opportunities. For these reasons, FFSL would support the implementation of a coordinated signage system in the planning area.

In general, signs should be easy to spot, easy to maintain, consistent, and adaptable to lake levels. Interpretive signs could be distributed at key locations (such as public boat ramps or public access points) to provide educational information about lake regulations and etiquette, the history of Bear Lake (including indigenous peoples), wildlife and habitat restoration and protection efforts, unique ecological features, and local culture. All signs should fulfill a need, command attention, convey a clear and simple meaning, and command respect from lake users. However, signs should be carefully placed and should not detract from the natural environment, viewsheds, or aesthetic beauty.

Research

Research on Bear Lake is often conducted and may require FFSL authorization for access and equipment installation. Researchers may be associated with universities, other educational facilities, private or public entities, non-profit organizations, or government agencies. FFSL encourages research on Bear Lake and supports partnerships with organizations doing research, such as Utah State University, DWR, and USGS.



CHAPTER 3 – MANAGEMENT FRAMEWORK

3.1 Introduction

This chapter focuses on strategies that FFSL can implement to manage the Bear Lake resources described in Chapter 2. Management strategies consist of goals and objectives that guide management actions and decisions. The identified goals and objectives include multiple opportunities for FFSL to coordinate with a diverse set of partners and stakeholders at Bear Lake. Collectively, strategies discussed in this chapter are designed to facilitate FFSL's management of Bear Lake sovereign lands in accordance with the Public Trust Doctrine and multiple-use, sustained-yield principles as provided in Utah Administrative Code R652-2-200 and Utah Code 65A-2-1. In cases where FFSL does not have direct management authority over a particular element of the lake, FFSL will seek to coordinate with other agencies and partners that do have such authority.

The management strategies in this chapter are organized by resource and follow the same order as in Chapter 2. Each resource section includes a list of desired future conditions as well as management strategy tables with goals; objectives; and applicable management, permitting, and intersecting agencies. Beneath each table, specific management considerations for each of the three lake level management zones are identified. These management considerations, when combined with current available information, are intended to inform adaptive management that responds to fluctuating lake levels. Finally, BMPs have been identified for the resources and included as separate figures.

Where resource management issues overlap, management goals are included in the resource section most pertinent to the objectives for achieving the goal.

Managing for the Public Trust

As described in Chapter 1, in managing for the Public Trust, the State of Utah "recognizes and declares that the beds of navigable waters within the state are owned by the state and are among the basic resources of the state, and that there exists, and has existed since statehood, a public trust over and upon the beds of these waters. It is also recognized that the public health, interest, safety, and welfare require that all uses on, beneath or above the beds of navigable lakes and streams of the state be regulated, so that the protection of navigation, fish and wildlife habitat, aquatic beauty, public recreation, and water quality will be given due consideration and balanced against the navigational or economic necessity or justification for, or benefit to be derived from, any proposed use" (Utah Administrative Code R652-2-200). The following management strategies reflect FFSL's commitment to the Public Trust when considering specific projects, decisions, and applications for authorizations:

- Navigation: FFSL will strive to maintain or improve navigation on Bear Lake. Decisions concerning lake management will consider mitigation and removal of existing navigational hazards as well as parameters for new projects to allow for or facilitate navigation.
- Fish and wildlife habitat: FFSL will strive to maintain, enhance, or restore aquatic, wetland, riparian, and terrestrial fish and wildlife habitat associated with the lake.
- Aquatic beauty: FFSL will strive to maintain or improve aesthetic conditions at Bear Lake, recognizing that Bear Lake's aquatic beauty and visual resources are highly valued.
- Public recreation: FFSL will consider and support diverse, balanced recreation activities and facilities while working to ensure the long-term protection and viability of Public Trust resources.
- Water quality: FFSL will support the State of Utah's water quality standards and actively work with partners to preserve water quality at Bear Lake.

FFSL will follow applicable law, including statutes, regulations, and legal doctrines, when implementing management strategies.

Use Classes and Use Determinations

As described in Chapter 1, Utah Administrative Code R652-70-200 provides that sovereign lands may be classified based on their current and planned uses and includes definitions for six potential classes. FFSL uses these classes to guide management activities and decisions for Bear Lake sovereign lands. Table 3-1 lists and describes the use classes.

Table 3-1. Use Classes for Utah Sovereign Lands

Use Class	Description
Class 1	Manage to protect existing resource development uses
Class 2	Manage to protect potential resource development options
Class 3	Manage as open for consideration of any use
Class 4	Manage for resource inventory and analysis
Class 5	Manage to protect potential resource preservation options
Class 6	Manage to protect existing resource preservation uses

Source: Utah Administrative Code R652-70-200

Note: Class 3 is not applied to the Bear Lake CMP planning area because the lake is intensively used and has no areas open for consideration of any use. Class 4 is also not applied to the Bear Lake CMP planning area because previous resource inventory and analysis at Bear Lake provide adequate information to classify all Bear Lake sovereign lands.

Figure 1-10 in Chapter 1 and the online GIS spatial data viewer show how these use classes are applied to Bear Lake sovereign lands.

From a management perspective, FFSL recognizes that different activities have different impacts on sovereign lands. Table 3-2 lists common proposed actions (i.e., actions, activities, and projects) requiring FFSL authorization and provides guidance for applicants seeking an easement, general permit, ROE, or other authorization. This table is not intended to be an exhaustive list of all potential actions, uses, or regulatory approvals. Proposed actions not listed in Table 3-2 will be reviewed by FFSL on a case-by-case basis to arrive at an appropriate use determination.

Use determinations for proposed actions consist of allowable, potentially allowable, and not allowable. **All of the proposed actions in Table 3-2 require FFSL authorizations**. An *allowable* use determination does not require site-specific analysis in most cases, but the project will still be reviewed for adherence to rules, regulations, this CMP, and applicable BMPs. For *potentially allowable* use determinations, a site-specific analysis will generally be required to determine project feasibility and any necessary mitigation opportunities or requirements. The site-specific analysis will consider the potential beneficial and adverse impacts of the proposed project to Bear Lake resources. Certain BMPs should be incorporated into project design to minimize adverse impacts to sovereign lands. For *not allowable* use determinations, the proposed use will generally not be authorized without amending the Bear Lake CMP and undergoing the associated public notification and agency review process. The suitability of proposed easements, general permits, ROEs, and other authorizations will also be considered in the context of existing authorizations to avoid potential conflicts between uses where possible. Finally, under certain jurisdictions such as CWA permit conditions, some proposed actions may not be authorized regardless of FFSL lake use class or use determination.

Table 3-2. Use Determinations for Proposed Actions by Lake Use Class

Proposed Actions *All proposed actions in this table require FFSL authorizations.*	**Class 1**	**Class 2**	**Class 5**	**Class 6**	**Other Possible Regulatory Approvals**
Vegetation Management on Shoreline					
Shoreline stabilization (i.e., bioengineering)	A	A	A	A	USACE and DWQ
Shoreline stabilization (i.e., seawall, breakwaters, jetties)	P	P	P	P	USACE and DWQ
Seasonal mowing*	A	A	A	A	–
Removal of dead biomass or accumulated material (e.g., debris, muck)	A	A	P	P	–
Dredging†	P	P	P	P	USACE

Proposed Actions *All proposed actions in this table require FFSL authorizations.*	Class 1	Class 2	Class 5	Class 6	Other Possible Regulatory Approvals
Herbicide treatment	P	P	P	P	DWQ and EPA
Vegetation planting and propagule harvesting (e.g., willow whips)	A	A	A	A	–
Vegetation removal that includes ground disturbance	A	A	P	P	USACE
Education and Research					
Scientific research instruments	A	A	A	A	–
Survey and monitoring activities	A	A	A	A	–
Habitat Management					
Aquatic habitat structures and fisheries habitat modifications	A	A	A	A	USACE, DWR, and USFWS
Wildlife habitat (e.g., nesting structures)	A	A	A	A	USACE, DWR, and USFWS
Aquatic invasive species treatment	A	A	A	A	DWR
Infrastructure and Recreation					
Marinas	P	P	P	P	USACE and DWQ
Community boat ramps (permanent)	A	A	P	P	USACE and DWQ
Individual boat ramps (permanent)	P	P	N	N	USACE and DWQ
Seasonal boat ramp systems	A	A	N	N	USACE, DWQ, DSP, or DOR
Permanent docks and piers (e.g., fixed platforms, shoreline docks)	A	A	P	P	USACE, DSP, or DOR
Seasonal docks and piers (e.g., swim platforms, portable piers)	A	A	A	A	USACE, DSP, or DOR
Mooring buoys	A	A	A	A	USACE, DSP, or DOR
Regulatory markers or informational buoys	A	A	A	A	USACE, DSP, or DOR
Other recreation structures (permanent)	P	P	P	P	–
Other recreation structures (temporary/seasonal)	P	P	P	P	–
Motorized access	A	A	N	N	DSP or DOR
Campfires and fireworks	N	N	N	N	–
Navigational hazard removal	A	A	A	A	–
Irrigation pumps and related infrastructure	A	A	A	A	DWRi
Outfall or return flow structures	P	P	P	P	DWQ
Below-ground or buried utilities[†]	A	A	P	P	–
Emergency Actions					
Emergency spill response and cleanup	A	A	A	A	Local fire districts

Notes: A = allowable; P = potentially allowable with certain conditions; N = not allowable. All proposed actions in this table require FFSL authorizations.

Class 3 is not applied to the Bear Lake CMP planning area because it is intensively used and has no areas open for consideration of any use. Class 4 is also not applied to the Bear Lake CMP planning area because previous resource inventory and analysis at Bear Lake provides adequate information to classify all Bear Lake sovereign lands.

[*] Mowing is generally only allowed from July 1 until the end of February.

[†] In the interest of supporting the Public Trust, dredging and utilities proposed by private landowners will generally not be permitted.

Desired Future Conditions

A *desired future condition* provides a resource benchmark that FFSL seeks to accomplish through the implementation of the CMP and associated goals and objectives. The Bear Lake CMP identifies desired future conditions for ecosystem resources, water resources, socioeconomics, and community resources. The management goals and objectives in this chapter provide ways to work toward the desired future conditions. It is important to recognize that Bear Lake is a highly managed, constrained system. Desired future conditions must take this into account and acknowledge that restoration to an earlier condition may be unrealistic in some cases.

Management Goals and Objectives

Management goals and objectives reflect FFSL's need to protect and sustain the Public Trust resources while also providing for their reasonable beneficial use. Each goal is supported by several specific objectives to help achieve the goal. Where FFSL may not have jurisdiction or has concurrent jurisdiction, objectives may consist of coordination, cooperation, or general support. FFSL will work proactively and cooperatively with other management agencies, permitting agencies, intersecting agencies, interested partners, and stakeholders to implement applicable management goals and objectives. Management goals and objectives apply to all lake use classes unless otherwise specified.

Interagency Coordination

Effective coordination and communication among different agencies are vital to ensuring the overall health and long-term viability of Bear Lake and its resources. For the purposes of developing the Bear Lake CMP management strategies, the government agencies involved fall into one or more of the following three categories depending on their participation in each unique resource issue:

1. Management agency: A management agency is directly responsible for the management of a particular resource. As mandated through Utah Code, administrative rule, or agency objectives, a management agency is responsible for on-the-ground management and/or monitoring.
2. Permitting agency: A permitting agency is responsible for authorizing Bear Lake resource-related permits. For example, FFSL, DWQ, and DWRi can each issue permits for projects in or adjacent to Bear Lake. Each permitting agency has the potential to impact the resource through permit authorizations, including mitigation. A permitting agency is responsible for monitoring permit compliance.
3. Intersecting agency: An intersecting agency is an agency that does not have direct responsibility for managing a particular resource or permitting activities on Bear Lake but is tangentially related. The decisions of an intersecting agency may directly or indirectly impact a particular resource. In addition to federal and state agencies, an intersecting agency can include a tribal government, county government, municipal government, and a regional planning organization. These agencies often have tools, data, and information that can help FFSL make well-informed management decisions. Intersecting agencies may be responsible for research and/or monitoring at a broad scale.

Although adjacent upland owners, businesses, special interest groups, local universities, and other stakeholders may not be listed as responsible parties for each goal, FFSL is interested and available to discuss resource-specific matters with any concerned individual or entity.

Best Management Practices

Implementation of BMPs for resources helps avoid or minimize impacts to Bear Lake sovereign lands and Public Trust resources. BMPs may range from using approved plant lists and seed mixes for revegetation to design specifications for boat ramps. Those seeking an FFSL authorization should review related BMPs in the Bear Lake CMP during their project planning process and demonstrate in the application documents which BMPs are

incorporated, how they will be implemented, and/or why they are not practicable. BMPs may change over time based on available information or technology. FFSL may deviate from the BMPs as written in this CMP on a case-by-case basis. For BMPs relevant to land uses outside sovereign lands, readers can review supplemental literature, e.g., *Riparian Buffer Design Guidelines for Water Quality and Wildlife Habitat Functions on Agricultural Landscapes in the Intermountain West* (Johnson and Buffler 2008), or consult other sources of technical information such as the local offices of the NRCS.

Lake Level Management Considerations

FFSL recognizes that the upper portion of Bear Lake from 5,902 to 5,923.65 feet is operated as a water storage reservoir for irrigation and flood control purposes, which results in lake level fluctuations beyond the natural fluctuations caused by variable weather and climatic conditions. Therefore, the management framework presented in this CMP addresses impacts from fluctuating water levels on lake resources.

Lake level management considerations are provided for resources where applicable and where sufficient information exists regarding potential impacts. The lake level management considerations use the following lake level management zones:

- High: 5,918 to 5,923 feet
- Medium: 5,912 to 5,917 feet
- Low: 5,903 to 5,911 feet

As described in Chapters 1 and 2, these lake level management zones were derived through the development of the lake level resource matrix (see Appendix A) and analysis of daily historical lake levels from January 1, 1990, to October 12, 2020. When reviewing the lake level management considerations in this chapter, refer to the lake level resource matrix for additional information.

FFSL has no authority or ability to maintain the lake at a constant level, and applicants may be asked to consider the impacts of a proposed project at high, medium, and low lake levels.

3.2 Ecosystem Resources

Desired future conditions for ecosystem resources are as follows:

- A sustainable lake ecosystem supporting diverse, healthy populations of native and desirable plant, wildlife, and fish species, with limited constraints from undesirable invasive and nonnative species. Particular emphasis should be placed on supporting healthy populations of Bear Lake's endemic fish.
- Preservation of areas providing important habitat or ecosystem services (e.g., riparian communities, native vegetation, littoral cobble habitat, and wetlands).
- Restoration or enhancement of degraded areas to improve overall ecological function and condition.

As discussed in Chapter 1, Section 1.13, lake use classes are applied to specific locations on Bear Lake sovereign lands based on a variety of parameters. Table 3-3 describes what the lake use classes mean for ecosystem management.

Table 3-3. Lake Use Classes and Ecosystem Management

Lake Use Class	What the Use Class Means for Ecosystem Management
Class 1	High potential for actual loss or degradation of ecosystem resources and fish and wildlife habitat due to authorizations and existing developed uses. High potential may also exist for restoring fish and wildlife habitat and improving vegetation communities because more intensive management may be allowed.
Class 2	Potential for future loss or degradation of ecosystem resources and fish and wildlife habitat due to additional authorizations and new developed uses. High potential may also exist for restoring fish and wildlife habitat and improving vegetation communities because more intensive management may be allowed.
Class 5	Potential for future enhancement or additional protective measures for ecosystem resources and fish and wildlife habitat.
Class 6	Emphasis on protection and conservation of ecosystem services and fish and wildlife habitat. Ongoing opportunities for habitat improvement projects.

Note: The availability and condition of fish and wildlife habitat directly impact the viability of fish and wildlife species.

Fish and Wildlife Habitat

Fish and wildlife habitat is one of the Public Trust resources that FFSL is mandated to protect. Table 3-4 presents management goals and objectives for fish and wildlife habitat that are common to all applicable classes. Figure 3-1 provides a list of BMPs for fish and wildlife habitat in the planning area.

Table 3-4. Fish and Wildlife Habitat Goals and Objectives

Fish and Wildlife Habitat Goal 1: Protect and sustain habitat on Bear Lake sovereign lands.
Objective: Cooperate with agencies and partners to identify and maintain areas with high fish and wildlife habitat value, including riparian areas, littoral cobble habitat, and wetlands.
Objective: Seek to minimize habitat fragmentation from various uses and authorizations, especially in areas with high fish and wildlife habitat value; cluster authorizations that result in habitat impacts whenever possible.
Objective: Prioritize habitat protection efforts on areas with healthy native plant communities.
Objective: Cooperate with agencies and partners to collect additional data to determine how fluctuating lake levels may influence key fish and wildlife habitats.
Objective: As part of the authorization process, consider the cumulative impacts of past, present, and future projects and uses on adjacent fish and wildlife habitat through consultation with the agencies listed below.
Objective: Identify and protect areas providing habitat for SGCN and USFWS avian focal species.
Management Agencies: FFSL, DSP, DWR, and USFWS
Permitting Agencies: FFSL, DWQ, DWRi, USACE, and USFWS
Intersecting Agencies: Local municipalities, IDL, IDPR, and Idaho Department of Fish and Game
Fish and Wildlife Habitat Goal 2: Restore and enhance habitat on Bear Lake sovereign lands.
Objective: Identify areas where fish and wildlife habitat could be enhanced or restored on sovereign lands.
Objective: Support restoration and enhancement of wetlands and riparian areas in appropriate locations.
Objective: Protect and, if possible, enhance or restore littoral cobble habitats on sovereign lands.
Objective: Support removal of structures that may degrade habitat on sovereign lands.

Management Agencies: FFSL, DSP, DWR, and USFWS
Permitting Agencies: FFSL, DWQ, DWRi, USACE, and USFWS
Intersecting Agencies: Local municipalities, IDL, IDPR, and Idaho Department of Fish and Game
Fish and Wildlife Habitat Goal 3: Support habitat restoration or enhancement on lands adjacent to Bear Lake.
Objective: Coordinate with agencies and partners on projects that are adjacent to and benefit habitat on sovereign lands.
Objective: Cooperate with agencies and partners to inventory adjacent lands where restoration or enhancement could benefit fish and wildlife habitat.
Management Agencies: FFSL, DSP, DWR, and USFWS
Permitting Agencies: Local municipalities, DWR, USACE, and USFWS
Intersecting Agencies: Rich County, SITLA, IDPR, Idaho Department of Fish and Game, BLM, and tribal governments
Fish and Wildlife Habitat Goal 4: Manage invasive and noxious weed species on Bear Lake sovereign lands and cooperate with adjacent upland owners to manage invasive and noxious weed species on their property.
Objective: Continue the ongoing inventory and mapping of invasive and noxious weed occurrences in the planning area.
Objective: Identify dispersal vectors for invasive and noxious weeds in the planning area.
Objective: Target and treat invasive and noxious weeds (especially phragmites, tamarisk, purple loosestrife, spotted knapweed, curly-leaf pondweed, and Eurasian watermilfoil) in the planning area.
Objective: Use inventory and mapping data to better understand how fluctuating lake levels influence the distribution and spread of invasive and noxious weeds.
Objective: Identify, coordinate with, and provide outreach and technical support to adjacent upland owners who are interested in treating invasive and noxious weed species on their property that may impact sovereign land resources.
Management Agencies: FFSL, DSP, and UDAF
Permitting Agencies: FFSL, DWQ, and EPA
Intersecting Agencies: Local municipalities, Rich County, SITLA, Idaho State Department of Agriculture, BLM, and NRCS

High (5,918–5,923 feet)	Medium (5,912–5,917 feet)	Low (5,903–5,911 feet)
Lake levels are generally beneficial or sustainable for endemic and native fish, aquatic, riparian, open water wetland, and benthic macroinvertebrate habitats. Non–open water wetland habitats on sovereign land may be less sustainable. **Management Considerations**: Inventory and monitor non–open water wetland habitats to identify potential changes in extent and composition.	Lake levels are generally beneficial or sustainable for aquatic, riparian, open water wetland, and non–open water wetland habitats. Endemic fish littoral cobble habitat begins to experience adverse impacts. Tributary habitat for Bear Lake BCT reaches the minimum lake level needed for tributary access. **Management Considerations**: Inventory and monitor littoral cobble habitats and spawning tributaries. Balance motorized recreation access, lakebed parking, and other shoreline uses with the protection of habitats that may be experiencing adverse impacts.	Endemic fish littoral cobble habitat is adversely impacted. Tributary habitat for Bear Lake Bear Lake BCT likely becomes disconnected from the lake in the absence of mitigating actions. Benthic macroinvertebrate habitat is reduced. Open water and non–open water wetland habitats are reduced and potentially experience adverse impacts. Riparian habitat likely becomes disconnected from the lake and may be adversely impacted. **Management Considerations**: Inventory and monitor all impacted habitats. Support efforts to secure instream flows for spawning and rearing tributaries. Balance motorized recreation access, lakebed parking, and shoreline use with protection of habitats that may be experiencing impacts.

Best Management Practices

Identify and use appropriate native or desirable species when revegetating disturbed areas or conducting restoration or enhancement activities (see Chapter 2, Table 2-4).

Implement measures to reduce the introduction and spread of invasive and noxious weed species during project construction and maintenance, such as equipment washing and inspection.

Take measures to protect undisturbed areas, maximize open space, and minimize surface disturbance in project designs.

Seek to limit negative impacts to the shoreline and protect shoreline stability.

Implement erosion and sediment control measures (e.g., silt fencing and straw wattles) during project construction to protect aquatic, wetland, and riparian habitats.

Figure 3-1. Best management practices for fish and wildlife habitat in the planning area.

Fish and Wildlife Species

Table 3-5 presents management goals and objectives for fish and wildlife species that are common to all applicable classes. Figure 3-2 provides a list of BMPs for fish and wildlife species in the planning area.

Table 3-5. Fish and Wildlife Species Goals and Objectives

Fish and Wildlife Species Goal 1: Support healthy populations of native and desirable nonnative fishes and bird species.
Objective: Coordinate with agencies and partners to encourage the preservation, enhancement, and restoration of a diversity of fish and bird habitats that include adequate cover, spawning areas and nesting sites, and food supply.
Objective: Support the inventory, monitoring, and research of fish and bird populations with agencies and partners.
Objective: Support DWQ aquatic wildlife–related beneficial uses and compliance with numeric criteria for pollutants.
Objective: Promote the protection of endemic and native fish species, taking into consideration lake level fluctuation impacts on available littoral cobble habitats and access to spawning and rearing tributaries.
Objective: Promote the protection of sovereign land areas providing habitat for the SGCN bird, mammal, fish, amphibian, insect, crustacean, and mollusk species listed in Chapter 2, Table 2-6.
Objective: Seek to manage for consistency with other agency management plans for fish and wildlife species (e.g., the *Bear Lake Fisheries Management Plan* [Tolentino et al. 2015] and the *Bonneville Cutthroat Trout Range-Wide Conservation Agreement and Strategy* [DWR 2019a]).
Objective: Consider SGCN; USFWS avian focal species; Utah PIF priority species; and the aquatic, wetland, and riparian habitat indicator species described in Chapter 2 when trying to establish and achieve habitat-related management goals (e.g., enhancement, restoration).
Management Agencies: FFSL, DSP, DWR, and USFWS
Permitting Agencies: FFSL, DWQ, DWRi, USACE, and USFWS
Intersecting Agencies: Local municipalities, IDL, IDPR, and Idaho Department of Fish and Game
Fish and Wildlife Species Goal 2: Work to ensure that management actions and decisions are consistent with the long-term protection and, where possible, enhancement of SGCN.
Objective: Seek to avoid or minimize adverse impacts on SGCNs and their key habitats during the authorization process.
Objective: Seek to avoid or minimize project impacts that could compound existing threats to SGCN species during the authorization process (see Chapter 2, Table 2-6 for specific threats).
Objective: Recognize that the cumulative impacts of development and recreation at Bear Lake could be detrimental to SGCN species.
Objective: Support inventories of mollusk and amphibian SGCN species in the planning area.
Management Agencies: FFSL, DSP, DWR, and USFWS
Permitting Agencies: FFSL, DWQ, DWRi, USACE, and USFWS
Intersecting Agencies: Local municipalities, IDL, IDPR, and Idaho Department of Fish and Game
Fish and Wildlife Species Goal 3: Support efforts to sustain healthy populations of native terrestrial wildlife species on lands adjacent to Bear Lake.
Objective: Coordinate with agencies and partners to encourage projects adjacent to sovereign lands that benefit terrestrial wildlife species.
Objective: Promote the preservation, enhancement, and restoration of a diversity of habitats on adjacent lands that include adequate cover, reproductive sites, and food supply for terrestrial wildlife.
Objective: Support inventory, monitoring, and research of terrestrial wildlife populations on adjacent lands with agencies and partners.
Management Agencies: FFSL, DSP, DWR, and USFWS
Permitting Agencies: Local municipalities, DWR, and USFWS
Intersecting Agencies: Rich County, SITLA, IDPR, Idaho Department of Fish and Game, BLM, and tribal governments
Fish and Wildlife Species Goal 4: Support the control and/or eradication of existing aquatic invasive species, and discourage the introduction of new aquatic invasive species to Bear Lake (e.g., quagga mussel).
Objective: Work toward the control or eradication of aquatic invasive species in the lake through coordination with DWR and other agencies and partners.
Objective: Coordinate with DWR on public awareness programs and other strategies for keeping aquatic invasive species out of Bear Lake.

Objective: Coordinate with DWR and support development of a rapid response plan should quagga mussels or other aquatic invasive species be discovered in Bear Lake.

Management Agencies: FFSL, DSP, and DWR

Permitting Agencies: FFSL, DWQ, DWR, and USACE

Intersecting Agencies: Local municipalities, Idaho State Department of Agriculture, USFWS, Bear Lake Regional Commission, and PacifiCorp

High (5,918–5,923 feet)	Medium (5,912–5,917 feet)	Low (5,903–5,911 feet)
Lake levels are generally beneficial or sustainable for endemic and native fish species, aquatic species, riparian species, open water wetland species, and benthic macroinvertebrates. Non–open water wetland species may have less available habitat. Riparian noxious weeds and invasive species may be less likely to spread; however, submerged aquatic noxious and invasive species tend to thrive. **Management Considerations**: Inventory and monitor non–open water wetland habitats. Monitor and treat submerged aquatic noxious weeds and invasive species.	Lake levels are generally beneficial or sustainable for aquatic, riparian, open water wetland, and non–open water wetland species. Endemic fish species experience adverse impacts from loss of littoral cobble habitat. Access to spawning and rearing tributaries for Bear Lake BCT becomes more difficult below 5,914.7 feet. At 5,912 feet, the tributaries become disconnected from the lake and access is lost. Riparian noxious weeds and invasive species may be more likely to spread. **Management Considerations**: Inventory and monitor endemic and native fish species. Monitor and treat riparian noxious weeds and invasive species as needed.	Endemic fish species are adversely impacted from significant loss of littoral cobble habitat. Bear Lake BCT are adversely impacted from loss of access to spawning and rearing tributaries. Benthic macroinvertebrates experience habitat loss. Habitat for riparian species becomes disconnected from the lake, and riparian species may experience adverse impacts. Habitat for wetland species may start to decrease, and wetland species may experience adverse impacts. Riparian noxious weeds and invasive species may spread. **Management Considerations:** Inventory and monitor endemic and native fish species. Support efforts to secure instream flows for spawning and rearing tributaries. Monitor and treat riparian noxious weeds and invasive species as needed. Balance motorized recreation access, lakebed parking, and shoreline use with the protection of wetland and riparian species.

Best Management Practices

Minimize project impacts to fish species through appropriate project siting (e.g., avoidance of littoral cobble habitats).

Implement erosion and sediment control measures during project construction to maintain water quality and protect fish species.

Prevent the introduction of aquatic noxious and invasive species through proper cleaning of all construction equipment and vehicles.

Fuel project-related equipment and vehicles away from the lake to protect water quality and fish species. Develop a contingency plan to control any petroleum products or hazardous materials spills.

Do not stockpile project-related materials (fill, revetment rock, pipe, etc.) in the lake's waters.

When possible, schedule in-water construction activities to avoid endemic fish spawning periods and spawning locations.

Consult with state, federal, and local partners, such as the USFWS, to ensure that activities take into account the specific needs of different fish and wildlife species in or near the planning area.

Consider and apply seasonal bird nesting guidelines described in *Utah Field Office Guidelines for Raptor Protection from Human and Land Use Disturbances* (Romin and Muck 2002) during project implementation.

Refer to DWR key habitats and consult with state and federal wildlife partners when planning restoration projects in and along the lake (Utah Wildlife Action Plan Joint Team 2015).

Use the *Utah Partners in Flight Avian Conservation Strategy Version 2.0* (Parrish et al. 2002) to identify priority bird species and conservation actions that may be applicable to sovereign land management decisions and activities.

Consider *Utah Wildlife Action Plan* SGCN; USFWS avian focal species; Utah PIF priority species; and the aquatic, wetland, and riparian habitat indicator species described in Chapter 2 when working to achieve habitat-related goals such as enhancement or restoration.

Follow DWR's *Utah Decontamination Protocols To Minimize Risk for Introduction or Spread of Aquatic Invasive Species* (DWR 2012).

Use appropriate integrated pest management techniques and follow all rules, regulations, and best practices for herbicide and pesticide applications to avoid or minimize any impacts from vegetation or pest management activities.

Figure 3-2. Best management practices for fish and wildlife species in the planning area.

3.3 Water Resources

Desired future conditions for water resources are as follows:

- A sustainable lake system with preservation of vertical and horizontal thermal layer stratification; protection of the pelagic food web; maintenance of seasonal variation in instream flows; and maintenance of groundwater inputs via tributary base flows, springs and seeps, and direct groundwater discharge.
- Improved naturalized flows, where possible, while acknowledging the constraints of using Bear Lake as a water storage reservoir and its tributaries for irrigation.
- Preservation of Bear Lake's unique water chemistry and oligotrophic nature.
- Improved water quality and reduction of nonpoint source pollution loads.
- Recognition that a warming climate is projected to result in higher temperatures, declining snowpack water storage, and reduced soil water storage and that available water supply could be compromised.

As discussed in Chapter 1, Section 1.13, lake use classes are applied to specific locations on Bear Lake sovereign lands based on a variety of parameters. Table 3-6 describes what the lake use classes mean for water resources management.

Table 3-6. Lake Use Classes and Water Resources Management

Lake Use Class	What the Use Class Means for Water Resources Management
Class 1	Higher potential for existing structures or authorizations and uses to negatively impact water resources. Most uses are allowed in this class.
Class 2	Potential for installation of new structures or implementation of other authorizations or uses that could have a negative effect on water resources. Most uses are allowed in this class.
Class 5	Potential for future protection of water resources. Emphasis is on preserving existing healthy water resources and maintaining the opportunity to protect water resources. Certain authorizations and uses require more review than in Classes 1 and 2 (e.g., permanent docks, community boat ramps).
Class 6	Protection of water resources. Fewer authorizations and uses are allowed. Certain authorizations and uses may require more review than in Classes 1 and 2 (e.g., permanent docks, community boat ramps).

Hydrology

Table 3-7 presents management goals and objectives for hydrology that are common to all applicable classes. Figure 3-3 provides a list of BMPs for hydrology in the planning area.

Table 3-7. Hydrology Goals and Objectives

Hydrology Goal 1: Understand how inflows and outflows impact lake processes and habitats.
Objective: Support research of inflows and outflows to determine levels that sustain the lake's ecosystem resources, especially aquatic habitats and endemic and native fish species.
Objective: Support efforts to measure inflows and improve the accuracy of water budgeting/accounting for the lake.
Objective: Collaborate with and encourage agencies and partners to promote beneficial inflow and outflow regimes within the constraints of Bear Lake's use as a water storage reservoir and the use of its tributaries for irrigation (particularly regimes supporting the life history requirements of native and endemic fish species).
Management Agencies: FFSL
Permitting Agencies: FFSL, DWQ, DWRi, and USACE
Intersecting Agencies: DWRe, SITLA, IDL, Idaho Department of Water Resources, BLM, FEMA, FERC, USGS, Bear River Commission, Bear Lake Regional Commission, and PacifiCorp
Hydrology Goal 2: Recognize the importance of groundwater inputs in supporting healthy lake processes.
Objective: Support and partner in research that seeks to better understand groundwater inputs to Bear Lake, including tributary base flows, springs and seeps, and direct groundwater discharge.
Objective: Collaborate with agencies and partners to protect identified sources of groundwater inputs such as springs and seeps.
Objective: Support improvement of the accuracy of the Bear Lake water budget and the component that is represented by groundwater inputs.
Management Agencies: FFSL
Permitting Agencies: FFSL, DWQ, DWRi, EPA, and USACE
Intersecting Agencies: DWRe, Idaho Department of Water Resources, USGS, and Bear Lake Regional Commission

Hydrology Goal 3: Consider the effects on lake hydrology when evaluating authorizations on sovereign lands.

Objective: Review and consider the placement and design of new infrastructure during the authorization process to limit its impacts on the movement and distribution of water.

Objective: Evaluate existing infrastructure and consider removal or modification of structures impeding the natural movement and distribution of water.

Management Agencies: FFSL

Permitting Agencies: FFSL, DSP, DWQ, and USACE

Intersecting Agencies: IDL and IDPR

Hydrology Goal 4: Support restoration efforts that integrate lake processes.

Objective: Consider potential impacts to lake hydrology when permitting restoration efforts. For example, restoration of a particular area should not impede normal water movement and distribution.

Objective: Consider the needs of the larger lake system when designing specific restoration efforts.

Management Agencies: FFSL, DSP, DWR, and USFWS

Permitting Agencies: FFSL, DWQ, USACE, and USFWS

Intersecting Agencies: Local municipalities, SITLA, IDL, IDPR, Idaho Department of Fish and Game, BLM, and Bear Lake Regional Commission

Hydrology Goal 5: Recognize that the changing climate and increasing consumptive use of water may alter the inflow and outflow regime at Bear Lake.

Objective: Collaborate with agencies and partners to anticipate and respond to changing inflows and outflows.

Objective: Seek to understand climate change impacts to the Bear Lake ecosystem by supporting studies that identify projected changes at the lake; implement mitigation strategies to reduce negative effects.

Objective: Encourage and support water conservation efforts.

Objective: Support agencies and partners using creative solutions to reduce water consumption.

Management Agencies: FFSL, DWRe, and DWRi

Permitting Agencies: FFSL, DWQ, DWRi, and USACE

Intersecting Agencies: SITLA, IDL, Idaho Department of Water Resources, BLM, FEMA, FERC, USGS, Bear Lake Regional Commission, Bear River Commission, and PacifiCorp

Hydrology Goal 6: Consider how water management decisions for Bear Lake impact other sovereign land bodies (i.e., Bear River and Great Salt Lake.)

Objective: As part of management decision-making, consider the potential beneficial and adverse impacts of decisions for Bear Lake on the larger ecosystem (i.e., Bear River and Great Salt Lake).

Objective: Coordinate with agencies and partners to encourage projects that benefit the Public Trust resources on other sovereign lands connected to Bear Lake (i.e., Bear River and Great Salt Lake).

Management Agencies: FFSL

Permitting Agencies: FFSL, DWQ, DWRi, and USACE

Intersecting Agencies: Local municipalities, counties, DWRe, EPA, FERC, BRAG, Bear Lake Regional Commission, Bear River Commission, tribal governments, and PacifiCorp

High (5,918–5,923 feet)	Medium (5,912–5,917 feet)	Low (5,903–5,911 feet)

Further research is needed to determine the effects of fluctuating lake levels on hydrology.

Management Considerations: Support applicable research.

Best Management Practices

Use bioengineering techniques when possible. These techniques consist of construction methods using live plants, alone or combined with dead or inorganic materials, to produce living, functioning systems to prevent erosion, control sediment, and provide habitat.

Seek to minimize impacts on hydraulic, hydrologic, and scour/erosion conditions for new projects and require or employ appropriate engineering analyses when needed.

Replace and/or enhance shoreline vegetation disturbed by construction.

Structures should be adequately toed down below the design scour depth or grade control should be provided to limit long-term scour.

Figure 3-3. Best management practices for hydrology in the planning area.

Limnology

Table 3-8 presents management goals and objectives for limnology that are common to all applicable classes. Figure 3-4 provides a list of BMPs for limnology in the planning area.

Table 3-8. Limnology Goals and Objectives

Limnology Goal 1: Improve understanding of Bear Lake's limnological processes.
Objective: Support studies to better understand lake circulation and sediment processes and how they are impacted by fluctuating lake levels.
Objective: Support research on the potential impacts of climate change on the lake's limnology.
Objective: Support studies to better understand the lake's benthic invertebrates and the pelagic food web, specifically the phytoplankton community.
Management Agencies: FFSL
Permitting Agencies: FFSL, DWQ, DWRi, and USACE
Intersecting Agencies: Local municipalities, DWR, DWRe, IDL, Idaho Department of Water Resources, and PacifiCorp
Limnology Goal 2: Recognize the importance of Bear Lake's unique water chemistry and oligotrophic nature**.**
Objective: Support research to identify threats to the lake's unique water chemistry and color.
Objective: Support research to identify threats to the lake's natural limnological conditions (e.g., vertical stratification and oligotrophy).
Management Agencies: FFSL
Permitting Agencies: FFSL and DWQ
Intersecting Agencies: Local municipalities, IDL, Idaho Department of Environmental Quality's Water Quality Division, and PacifiCorp
Limnology Goal 3: Consider any potential impacts to the lake's limnological processes when evaluating authorizations on sovereign lands.
Objective: Evaluate the placement and design of new infrastructure during the application process to limit negative impacts to lake limnology.
Management Agencies: FFSL
Permitting Agencies: FFSL and DWQ
Intersecting Agencies: Local municipalities, DWR, IDL, and Idaho Department of Environmental Quality's Water Quality Division

High (5,918–5,923 feet)	Medium (5,912–5,917 feet)	Low (5,903–5,911 feet)
Further research is needed to determine the effects of fluctuating lake levels on limnology. **Management Considerations**: Support applicable research.		

Best Management Practices
Limit activities in and adjacent to the lake that could impact sediment transport and sediment balance in the lake.
Seek to minimize any potential adverse impacts from projects on limnological processes such as scour, erosion, aggregation, or degradation of sediment features and require or employ appropriate engineering analyses when needed.

Figure 3-4. Best management practices for limnology in the planning area.

Water Quality

Water quality is one of the Public Trust resources that FFSL is mandated to protect. Table 3-9 presents management goals and objectives for water quality that are common to all applicable classes. Figure 3-5 provides a list of BMPs for water quality in the planning area.

Table 3-9. Water Quality Goals and Objectives

Water Quality Goal 1: Support DWQ in meeting water quality standards that protect the beneficial uses designated for Bear Lake.
Objective: Coordinate with DWQ to maintain compliance with numeric criteria for parameters of concern and Utah Water Quality Act regulations (Utah Administrative Code R317).
Objective: Communicate new project proposals to DWQ to support compliance with existing water quality standards.
Objective: Require water quality certifications and provisions per Utah Administrative Code R317-15. The purpose of certification is to ensure that the federally permitted or licensed activities will be conducted in a manner complying with applicable discharge and water quality requirements to maintain the chemical, physical, and biological integrity of waters of the United States within the state.

Objective: Promote maintenance and improvement of existing water quality in Bear Lake and in tributaries that drain into Bear Lake.

Objective: Consider potential water quality impacts during the authorization process.

Objective: Work with agencies and partners to educate adjacent landowners on the use of BMPs to protect water quality.

Management Agencies: FFSL

Permitting Agencies: DWQ

Intersecting Agencies: DWRe, IDL, Idaho Department of Environmental Quality's Water Quality Division, Bear River Health Department, and PacifiCorp

Water Quality Goal 2: Work with agencies and partners to minimize pollutant loads to Bear Lake.

Objective: Collaborate with agencies and partners to identify and address nonpoint source pollution loads to the lake.

Objective: Coordinate with municipal stormwater management agencies, agricultural landowners, recreation users, homeowners with septic tanks, and other entities that discharge to reduce pollutant loads to the lake.

Objective: Support efforts to identify the potential impact of septic systems to water quality in Bear Lake, and work with agencies and other partners to support requirements for sewer system connections and/or alternative septic or on-site treatment facilities that avoid water quality impacts from new development.

Objective: Support research to characterize the water quality of groundwater entering Bear Lake to quantify pollutant loads delivered via groundwater inputs.

Management Agencies: FFSL and DSP

Permitting Agencies: DWQ, DWRi, and USACE

Intersecting Agencies: Local municipalities, Bear Lake Special Service District, Rich County, IDL, Idaho Department of Environmental Quality's Water Quality Division, BRAG, Bear Lake Regional Commission, Bear River Health Department, tribal governments, and PacifiCorp

Water Quality Goal 3: Support the protection and restoration of wetlands and riparian areas in and around Bear Lake.

Objective: Recognize the importance of wetlands and riparian areas for their filtering functions and support their long-term health and sustainability through protection and restoration.

Objective: Consider the effects on wetland and riparian hydrology and connectivity when evaluating authorizations on sovereign lands.

Objective: Inventory and map wetlands and riparian areas on sovereign lands to study how they change with fluctuating lake levels.

Objective: Support and encourage wetland and riparian corridor protection and restoration efforts adjacent to sovereign lands. Assist with development of a list of priority wetland and riparian areas that could be protected or restored when these efforts would benefit the Bear Lake ecosystem.

Management Agencies: FFSL

Permitting Agencies: FFSL and DWQ

Intersecting Agencies: Local municipalities, Rich County, DWR, SITLA, IDL, IDPR, BLM, and tribal governments

Water Quality Goal 4: Work to better understand the relationship between fluctuating lake levels and water quality in Bear Lake.

Objective: Support collection and analysis of water quality data on Bear Lake.

Objective: Support studies at Bear Lake on the relationship between water quality and lake levels.

Objective: Support research of sediment dynamics at Bear Lake, including the influence of lake levels on sediment movement.

Objective: Support research on how water quality in Bear River impacts water quality in Bear Lake, and how water quality in Bear Lake impacts water quality in Bear River and Great Salt Lake.

Management Agencies: FFSL

Permitting Agencies: FFSL and DWQ

Intersecting Agencies: DWR, IDL, Idaho Department of Environmental Quality's Water Quality Division, Bear River Health Department, and PacifiCorp

High (5,918–5,923 feet)	Medium (5,912–5,917 feet)	Low (5,903–5,911 feet or less)

Further research is needed to determine the effects of fluctuating lake levels on water quality.

Management Considerations: Support applicable research.

Best Management Practices

Implement erosion and sediment control measures (e.g., silt fencing and straw wattles) during project construction to protect water quality.

Where appropriate, use bioengineering practices for shoreline stabilization.

Treat stormwater with constructed wetlands, bio-swales, and other features where possible.

Comply with any applicable UPDES requirements.

Implement water use efficiencies as common practice.

Take measures to minimize polluted surface runoff whenever possible.

Stabilize shorelines through revegetation, where appropriate, and use vegetated infiltration buffers where possible.

Figure 3-5. Best management practices for water quality in the planning area.

3.4 Socioeconomics

Desired future conditions for socioeconomics are as follows:

- Multiple use management of Bear Lake that understands the drivers of social and economic change in the Bear Lake area and allows for beneficial socioeconomic activity, while safeguarding natural resources and ensuring the long-term protection of Public Trust values.

As discussed in Chapter 1, Section 1.13, lake use classes are applied to specific locations on Bear Lake sovereign lands based on a variety of parameters. Table 3-10 describes what the lake use classes mean for socioeconomics management.

Table 3-10. Lake Use Classes and Socioeconomics Management

Lake Use Class	What the Use Class Means for Socioeconomics Management
Class 1	More existing authorizations or uses, which may contribute to effective multiple use management. Higher potential for the number of existing authorizations and uses to negatively impact lake resources. Most uses are allowed in this class.
Class 2	Potential for new authorizations or uses, which may result in effective multiple use management but also could negatively impact lake resources. Most uses are allowed in this class.
Class 5	Potential for future protection of lake resources; may limit opportunities for multiple use management. Emphasis is on preserving existing lake resources and maintaining the opportunity for additional protective measures. Certain authorizations and uses require more review than in Classes 1 and 2 (e.g., permanent docks, community boat ramps).
Class 6	Protection of lake resources; limits opportunities for multiple use management. Fewer authorizations and uses are allowed, and some require more review than in Classes 1 and 2 (e.g., permanent docks, community boat ramps).

Table 3-11 presents management goals and objectives for socioeconomics that are common to all applicable classes. No best management practices have been identified for socioeconomics.

Table 3-11. Socioeconomic Goals and Objectives

Socioeconomics Goal 1: Allow for multiple use while protecting and sustaining the long-term health of Bear Lake and its associated Public Trust values.
Objective: Evaluate the resource impacts of a proposed use, and encourage the implementation of appropriate BMPs for that resource.
Objective: Consider the cumulative effects of authorizations on the long-term health of Bear Lake and its associated Public Trust values when reviewing new authorizations.
Objective: Promote the development of quantitative metrics to determine the value of Bear Lake non-commodity resources, such as recreation, fisheries, and wetlands.
Objective: Support research to assess the impact of fluctuating lake levels on the economic aspects of infrastructure, recreation, and tourism at Bear Lake.
Management Agencies: FFSL, DSP, and DOR
Permitting Agencies: FFSL and local municipalities
Intersecting Agencies: IDL, IDPR, BRAG, and Bear Lake Regional Commission

Socioeconomics Goal 2: Anticipate and respond to socioeconomic changes that may impact Bear Lake.
Objective: Collaborate with agencies and partners to understand and prepare for population changes in Garden City and Laketown.
Objective: Collaborate with agencies and partners to respond to and effectively manage increasing visitor use of the Bear Lake area.
Objective: Coordinate with agencies and partners to understand how proposed changes in land use could impact Bear Lake resources and surrounding communities.
Objective: Cooperate with local governments to address issues that could impact the resources of Bear Lake (e.g., increasing numbers of second homes and short-term rentals) and to support quality growth.
Objective: Coordinate with Rich County, local municipalities, and adjacent upland owners to help limit or mitigate adverse impacts to Bear Lake resources from future development.
Management Agencies: FFSL, local municipalities, Rich County, DSP, and DOR
Permitting Agencies: FFSL and local municipalities
Intersecting Agencies: IDL, IDPR, BRAG, and Bear Lake Regional Commission

High (5,918–5,923 feet)	Medium (5,912–5,917 feet)	Low (5,903–5,911 feet)
Less shoreline is exposed. Income and employment related to recreation activities that require access to Bear Lake shorelines and lakebed parking may be negatively impacted. Potential for property or structure damage at the highest lake levels. **Management Considerations**: Work with agencies and partners to improve parking and public access options at high lake levels.	Lakebed parking starts to become available in the Garden City area, and along the southwest and southeast shorelines. Access to some marinas and boat ramps begins to be limited, which could have economic impacts to affected businesses. **Management Considerations**: Work with agencies and partners to seek solutions to the lack of lake access at particular marinas and boat ramps.	More shoreline is exposed. Income and employment related to recreation activities that require access to the lake from marinas and boat ramps may be impacted (at low lake levels, three or four of the five marinas cannot be accessed by most watercraft). Almost all of the boat ramps are difficult to access for most watercraft at the lower lake levels in this zone. **Management Considerations**: Work with agencies and partners to seek solutions to the lack of lake access at marinas and boat ramps at low lake levels.

3.5 Community Resources

Desired future conditions for community resources are as follows:

- A sustainable lake ecosystem supporting multiple uses (e.g., recreation, irrigation) that provides access, experiences, and opportunities for a diverse general public.
- Preservation of existing agricultural landscapes and open space bordering sovereign lands.
- An appropriate balance of infrastructure types that allows for equitable and sufficient lake access while protecting public safety and Public Trust resources such as aquatic beauty, fish and wildlife habitat, and navigation.
- Preservation of cultural resources and recognition of prehistoric and historic landscapes.
- Preservation and enhancement of the aquatic beauty of Bear Lake without impairment of multiple uses.
- Protection and enhancement of the recreation experience through creative, proactive management of recreational use.
- Improved recreation and public safety coordination between management agencies with a focus on limiting user conflicts and crowding.
- Improved education and outreach of lake users to promote stewardship of the resource, reduce conflicts, and enhance public safety.

As discussed in Chapter 1, Section 1.13, lake use classes are applied to specific locations along on Bear Lake sovereign lands based on a variety of parameters. Table 3-12 describes what the lake use classes mean for community resources management.

Table 3-12. Lake Use Classes and Community Resources

Lake Use Class	What the Use Class Means for Community Resources
Class 1	Clustering of community resources such as infrastructure and recreation facilities exist or may occur in this class with consideration for safety, practicality, conflicting uses, and resource degradation. Cultural resources may have been disturbed or damaged by existing infrastructure. Class 1 areas tend to be more highly developed and can impact people's perception of aquatic beauty. More infrastructure and recreation structures are allowed than in Classes 5 and 6.
Class 2	Clustering of community resources such as infrastructure and recreation facilities may occur in this class with consideration for safety, practicality, conflicting uses, and resource degradation. Potential for disturbance or damage to cultural resources from new authorizations and uses. Higher potential to impact people's perception of aquatic beauty with additional development. More infrastructure and recreation structures are allowed than in Classes 5 and 6.
Class 5	Preference for authorizations and uses maintaining the potential for future resource preservation and restoration; mitigation is heavily emphasized. Lower potential for disturbance or damage to cultural resources from new authorizations and uses. Lower potential to impact people's perception of aquatic beauty. Certain authorizations and uses require more review than in Classes 1 and 2 (e.g., permanent docks, community boat ramps).
Class 6	Preference for authorizations and uses consistent with existing resource protections. Fewer infrastructure and recreation facility options than in other classes; some authorizations and uses require more review. Lowest potential for disturbance or damage to cultural resources from new authorizations and uses. Lowest potential to impact people's perception of aquatic beauty. New authorizations and uses may have to adhere to stricter mitigation standards.

Agriculture

Table 3-13 presents management goals and objectives for agriculture that are common to all applicable classes. Figure 3-6 provides a list of BMPs for agriculture in the planning area.

Table 3-13. Agriculture Goals and Objectives

Agriculture Goal 1: Support programs to preserve agricultural lands and open space in the Bear Lake area through conservation easements or other tools.
Objective: Support agencies and partners in identifying opportunities for the preservation of agricultural lands and open space in the Bear Lake area.
Management Agencies: UDAF and NRCS
Permitting Agencies: None
Intersecting Agencies: Local municipalities, Rich County, Idaho State Department of Agriculture, and tribal governments
Agriculture Goal 2: Support projects on nearby agricultural lands that apply BMPs and conservation practices to reduce erosion, maintain or improve water quality, and preserve or enhance fish and wildlife habitat.
Objective: Work with private landowners and other agencies to establish, maintain, and improve vegetated buffers to trap sediment, filter nutrients, and provide wildlife habitat.
Objective: Work with nearby landowners and other partners to identify and upgrade any tributary instream structures or agricultural infrastructure that is inefficient or currently impacting water quality or fish and wildlife habitat.
Management Agencies: FFSL and USACE
Permitting Agencies: FFSL, DWQ, DWRi, and USACE
Intersecting Agencies: Local municipalities, Rich County, UDAF, Idaho State Department of Agriculture, NRCS

High (5,918–5,923 feet)	Medium (5,912–5,917 feet)	Low (5,903–5,911 feet)
Because agricultural lands around Bear Lake are above the sovereign lands boundary of 5,923.65 feet, they are unlikely to be directly impacted by fluctuating lake levels and no management considerations for high, medium, or low lake level management zones have been identified.		

Best Management Practices
To avoid creating a navigational hazard, fences to restrain livestock may extend lakeward only to the water's edge or reasonably beyond the water's edge and should only be allowed when there is an extraordinary need. Special consideration must be given to accommodating public access and travel along the shoreline.
Agricultural infrastructure such as pump units and intake lines should have fish screens and be water efficient.
Use vegetative strips as barriers to prevent potential pollutants from running off into surface waters (conservation buffers).
Manage irrigation to increase efficiency and reduce non-point source pollution to ground and surface waters.
Employ practices to conserve and reduce the amount of sediment reaching surface waters (e.g., planting vegetation strips, crop rotation, applied tillage practices, mulching).
Manage grazing to lessen the water quality impacts from livestock (e.g., use off-lake watering systems).
Use various integrated pest management methods (e.g., physical control, chemical control, biological control) to treat weeds and pests while protecting soil, water, and air quality.

Figure 3-6. Best management practices for agriculture in the planning area.

Infrastructure

Table 3-14 presents management goals and objectives for infrastructure that are common to all applicable classes. Figure 3-7 provides a list of BMPs, including design criteria, for infrastructure in the planning area. Infrastructure design considerations for permanent boat ramps and seasonal boat ramp systems can be found in the Infrastructure section of Chapter 2 of the CMP.

Table 3-14. Infrastructure Goals and Objectives

Infrastructure Goal 1: Minimize the impact of new infrastructure on Public Trust and lake resources.
Objective: Avoid creating new navigational hazards or negatively impacting Public Trust resources with infrastructure development.
Objective: Carefully consider placement and spacing of new infrastructure to protect both the recreation experience and lake resources.
Objective: Support infrastructure that is adaptable to lake level fluctuations through the authorization process.
Objective: Promote the restoration of fish and wildlife habitat if impacted during new infrastructure construction through the authorization process.

Objective: Include appropriate BMPs and mitigation in authorizations to reduce impacts to lake resources.
Management Agencies: FFSL, DSP, and DOR
Permitting Agencies: FFSL, DWQ, DWRi, and USACE
Intersecting Agencies: Local municipalities, Rich County, SITLA, IDL, IDPR, BLM, and Coast Guard
Infrastructure Goal 2: Work with other management agencies to address needs for new infrastructure and to improve, replace, or remove older infrastructure that may be impacting lake resources.
Objective: Collaborate with DSP, DOR, and other agencies to evaluate recreation infrastructure condition and determine the need and appropriate location for new infrastructure.
Objective: Understand the purpose and use of existing recreation infrastructure in an area before approving new infrastructure in that area as part of the authorization process. Development should not negatively impact existing recreation infrastructure or prevent future recreational access.
Objective: Avoid impacts to fish and wildlife habitats during infrastructure improvement, replacement, or removal. Restore any impacted habitat through a vegetation or restoration plan.
Management Agencies: FFSL, DSP, DOR, and UDOT
Permitting Agencies: FFSL, DWQ, DWRi, and USACE
Intersecting Agencies: Local municipalities, Rich County, SITLA, IDL, IDPR, Idaho Department of Transportation, BLM, Coast Guard
Infrastructure Goal 3: Encourage the establishment of shared access points in new shoreline developments to facilitate community ramps for landowners if there is a need or desire to access the lake with a permanent structure.
Objective: Work with local municipalities as new shoreline projects arise to evaluate the need for shared access points.
Management Agencies: FFSL, DSP, DOR, and UDOT
Permitting Agencies: FFSL, DWQ, and USACE
Intersecting Agencies: Rich County, IDL, and IDPR
Infrastructure Goal 4: Inform applicants of the potential need to coordinate with other regulatory agencies, such as DWQ and USACE.
Objective: Provide information during the application process and in the Bear Lake CMP about the potential need to obtain permits through other regulatory agencies.
Management Agencies: FFSL
Permitting Agencies: FFSL, DWQ, DWRi, and USACE
Intersecting Agencies: IDL, Coast Guard

High (5,918–5,923 feet)	Medium (5,912–5,917 feet)	Low (5,903–5,911 feet)
All public and private marinas are accessible for most watercraft. Most of the nine public and private boat ramps are accessible, but access to four of the boat ramps becomes difficult for most watercraft as lake levels drop within this zone: Rendezvous Beach public boat ramp (at approximately 5,921 feet), Hodges public boat ramp (at approximately 5,920 feet), Ideal Beach Resort private boat ramp (at approximately 5,919 feet), and EPIC Recreation RV Park and Marina private boat ramp (at approximately 5,918 feet). **Management Considerations**: Support DSP in operating their marinas and boat ramps (e.g., clearing debris).	The public Bear Lake State Park Marina and the private Marina on Gus Rich Point are accessible for most watercraft. Access to the remaining three marinas becomes difficult for most watercraft as lake levels drop within this zone: Azure Cove Marina (private) (at approximately 5,917 feet), EPIC Recreation RV Park and Marina (private) (at approximately 5,916 feet), and Ideal Beach Resort Marina (private) (at approximately 5,916 feet). Rendezvous Beach public boat ramp, Hodges public boat ramp, Ideal Beach Resort private boat ramp, and EPIC Recreation RV Park and Marina private boat ramp are not accessible for most watercraft. The remaining five boat ramps are accessible. **Management Considerations**: Support DSP in operating their marinas and boat ramps. Assist DSP with management of more concentrated use of their marinas and boat ramps (expected as some marina and boat ramp facilities become inaccessible).	The private Marina on Gus Rich Point becomes difficult to access for most watercraft at approximately 5,910 feet. The public Bear Lake State Park Marina becomes difficult to access for most watercraft at approximately 5,904 feet. The remaining marinas are inaccessible for most watercraft. Rendezvous Beach public boat ramp, Hodges public boat ramp, Ideal Beach Resort private boat ramp, and EPIC Recreation RV Park and Marina private boat ramp are not accessible for most watercraft. As lake levels drop within this zone, access for most watercraft becomes difficult at the Marina on Gus Rich Point private boat ramp (at approximately 5,911 feet), the Rainbow Cove public boat ramp (at approximately 5,910 feet), the First Point public boat ramp (at approximately 5,910 feet), the Cisco Beach public boat ramp (at approximately 5,905 feet), and the Bear Lake State Park Marina public boat ramp (at approximately 5,903 feet). Below 5,910 feet, access is difficult for all but two of boat ramps. **Management Considerations**: Support DSP in operating their marinas and boat ramps. Assist DSP with management of more concentrated use of their marinas and boat ramps (expected as many marina and boat ramp facilities become inaccessible). Work with agencies and partners to improve access to marinas and boat ramps at low lake levels. (e.g., dredging).

Best Management Practices

General

Although FFSL does not stipulate a minimum spacing for most infrastructure, the proximity of one facility to another should be considered as part of the permitting process. Utilities can be clustered to minimize disturbance. New utilities crossing any portion of sovereign land should be buried according to the below-grade utility BMPs discussed below. If aboveground utilities must be installed, they should be attached to existing infrastructure and not placed on the lakebed.

New infrastructure should be located in areas to minimize impacts to lake processes and resources.

Habitat impacted during infrastructure construction or removal should be restored during the same growing season as project implementation and as seasonal conditions allow.

Infrastructure should be designed or modified with BMPs to minimize fish entrapment.

Apply bioengineering techniques when possible during infrastructure construction. Use densely rooted, native plant material to protect shorelines and decrease excessive erosion or scour.

During infrastructure construction or removal, obtain appropriate DSP, DWQ, UPDES, USACE, and any other applicable permits. These permits will help prevent adverse effects on lake resources.

Floating docks, swim platforms, and other structures not connected to the shoreline should not be placed further than 500 feet lakeward of the actual water line of Bear Lake or to a water depth that exceeds 6 feet.

Design and Construction of New Below-Grade Utilities

Below-grade utility crossings should be buried at an appropriate FFSL-approved depth and below the typical dredge depth.

The depth should be maintained across the floodplain or beyond a public structure, which will protect the utility from exposure by shoreline erosion.

Design and Construction of New Outfall Structures to Bear Lake

New outfall structures should provide for dissipation of excess energy prior to discharge to the lake.

New outfall structures should have means for removal of settleable solids (e.g., sediment traps) prior to discharge.

New outfall structures should not impede navigation.

Figure 3-7. Best management practices for infrastructure in the planning area.

Cultural Resources

Table 3-15 presents management goals and objectives for cultural resources that are common to all applicable classes. Figure 3-8 provides a list of BMPs for cultural resources in the planning area.

Table 3-15. Cultural Resources Goals and Objectives

Cultural Resources Goal 1: Recognize the importance of cultural resource protection on sovereign lands.
Objective: Seek to protect the integrity and eligibility of cultural resources where development is proposed, including historic and prehistoric resources, archaeological and architectural resources, and traditional cultural properties.
Objective: Consider how future projects using state funds would impact historic properties, according to Utah Code 9-8-404.
Objective: Collaborate with SHPO on the management of known cultural resources on Bear Lake sovereign lands.
Objective: Adhere to Utah Code 9-9-401 through 9-9-406 regarding the discovery of human remains on sovereign lands.
Objective: Consider both the potential benefits and drawbacks of highlighting cultural resources for public education and recreation purposes, while protecting them.
Objective: Develop and implement strategies to educate users about appropriate behaviors while observing and appreciating cultural resources.
Management Agencies: SHPO and tribal governments
Permitting Agencies: None
Intersecting Agencies: FFSL and Idaho SHPO

High (5,918–5,923 feet)	Medium (5,912–5,917 feet)	Low (5,903–5,911 feet)
No cultural resources have been identified for management in the high, medium, or low lake level management zones. Therefore, there are no special management considerations for these zones.		

Best Management Practices

For archaeological surveys, SHPO recommends resurveying areas if the previous survey is 10 or more years old because the older survey may not use current inventory methods and requirements. For archaeological documentation, a full re-record is recommended when a previously documented site has significantly changed, when previous site forms have insufficient information, when notable changes to the site content or structure were identified, or if the current recorder or responsible agency feels a new record is necessary. When a previously documented site has associated records that are still acceptable, but minor changes or the fact that it has been recently visited/evaluated needs to be noted, an update is recommended as sufficient. New segments of linear features (e.g., canals, transmission lines, roads) that already have a Smithsonian Trinomial (a unique identifier assigned to an archaeological site) should be recorded under this category, but not in an abbreviated manner (Utah Division of State History 2019).

Under Utah Code 9-8-307, "any person who discovers any archaeological resources on lands owned or controlled by the state or its subdivisions shall promptly report the discovery to the division." In addition, "any person who discovers any archaeological resources on privately owned lands shall promptly report the discovery to the division [Utah Division of State History]."

Before issuing any permits for projects that have the potential to disturb cultural resources adjacent to, over, or in Bear Lake, SHPO should be notified before a project starts and before a permit is issued. Project notification will also allow FFSL to informally consult with SHPO on how to best complete FFSL's legal responsibilities regarding cultural resources. Treatment of unanticipated discoveries (i.e., cultural resources unexpectedly found during a project) in and along the shoreline of Bear Lake should be discussed during initial consultations to create a plan if these occur. For any Native American consultations, FFSL should follow the Utah Department of Natural Resources consultation plan created per the executive order issued by Governor Herbert on July 30, 2014.

It is illegal to damage, remove, or deface cultural resources.

Figure 3-8. Best management practices for cultural resources in the planning area.

Visual Resources

Aquatic beauty is one of the Public Trust values that FFSL is mandated to protect. Table 3-16 presents management goals and objectives for visual resources that are common to all applicable classes. Figure 3-9 provides a list of BMPs for visual resources in the planning area.

Table 3-16. Visual Resources Goals and Objectives

Visual Resources Goal 1: Minimize impacts to the scenic values of Bear Lake.		
Objective: Consider the impacts of projects on the visual character, water quality, and aquatic beauty of Bear Lake during the authorization process.		
Objective: Consider how light pollution from proposed projects would impact Bear Lake resources and the visitor experience during the authorization process.		
Objective: Identify and require strategies to mitigate visual impacts from surface-disturbing activities, development, and lighting as appropriate.		
Objective: Coordinate with local municipalities, private landowners, and other agencies and partners to minimize impacts to the visual character of Bear Lake outside of sovereign lands but within the Bear Lake viewshed.		
Objective: Manage invasive and noxious weed species as described in Table 3-4.		
Management Agencies: FFSL, local municipalities, and DSP		
Permitting Agencies: FFSL		
Intersecting Agencies: Rich County, SITLA, UDOT, IDL, IDPR, BLM, Coast Guard, BRAG, and Bear Lake Regional Commission		
High (5,918–5,923 feet)	**Medium (5,912–5,917 feet)**	**Low (5,903–5,911 feet)**
Less shoreline is visible. Rocks, mud, silt, and structures (e.g., boat ramps) are covered by the large expanse of water, which may be more visually appealing to some. Vegetation established on the lakebed may be inundated and start to decay. **Management Considerations**: Consider monitoring the lake's clarity (increased sediment or turbidity could be introduced from higher Mud Lake flows). Monitor and treat submerged aquatic and emergent noxious weeds and invasive species.	A moderate amount of shoreline is visible, with some rocks, mud, silt, and structures (e.g., boat ramps) present or more visible. **Management Considerations** Monitor and treat riparian noxious weeds and invasive species. Consider conducting public outreach efforts and collaborative projects to remove trash and debris from the shoreline.	More shoreline is visible. Sandy beaches can be seen, which are more visually appealing. However, more rocks, mud, silt, structures (e.g., boat ramps), and trash are exposed, which are less visually appealing. Vegetation at higher elevations on the lakebed may dry out and die if water sources are lacking. **Management Considerations**: Assess the health of beaches while they are visible. Remove trash and dead vegetation from sovereign lands. Monitor the lake's clarity for evidence of nutrient input. Monitor and treat riparian noxious weeds and invasive species as needed.

Best Management Practices

Whenever possible, site projects in areas that have already been disturbed.

Limit the project footprint and associated surface disturbance to the minimum area necessary to achieve project objectives.

Take measures to avoid or minimize construction impacts on existing vegetation.

Seek to maintain the integrity of healthy vegetative communities.

Revegetate disturbed areas using approved acquired or salvaged native plants and weed-free seed mixes.

Consider topography when siting projects (e.g., locate projects away from prominent topographic features, design projects to blend with topographic forms in shape and placement).

Evaluate structure design for visual impacts.

Minimize the size of cut and fill slopes and reduce earthwork contrasts (e.g., rounding slopes, preserving rocks and trees).

Avoid unnecessary use of graveled and paved surfaces.

Limit the height of structures to the extent possible to achieve project objectives.

Minimize structure contrast by considering non-reflective paints, stains, and materials that match colors in the natural surroundings; burying all or part of the structure; implementing natural vegetative screening; and using native building materials.

All lighting should have a clear purpose and be directed only where needed.

Reduce night sky impacts by eliminating lighting or by shielding lights and choosing warmer, amber-colored lights (limit the use of blue-violet lights).

Use the lowest light level required.

Use controls such as timers or motion detectors to ensure that lights are turned off when not needed.

Minimize lighting usage during construction and operation of a proposed project.

Minimize use of signs and make signs visually unobtrusive.

Implement dust and wind erosion control measures during construction.

Figure 3-9. Best management practices for visual resources in the planning area.

Sources: International Dark-Sky Association and Illuminating Engineering Society (2020); U.S. Department of the Interior (2013).

Recreation and Access

Public recreation and navigation are two of the Public Trust values that FFSL is mandated to protect. Table 3-17 presents management goals and objectives for recreation and access that are common to all applicable classes. Figure 3-10 provides a list of BMPs for recreation in the planning area.

Table 3-17. Recreation and Access Goals and Objectives

Recreation and Access Goal 1: Balance recreation needs, development, and protection of the natural environment and Public Trust resources.
Objective: Minimize the impacts of new recreation infrastructure on Public Trust resources through appropriate design and authorization conditions (e.g., BMPs, mitigation requirements).
Objective: Balance recreational access with the need to protect sensitive areas or wildlife and fish.
Objective: Support the sharing of recreation infrastructure where appropriate to minimize new infrastructure.
Objective: Work to understand the lake's ecological health in the context of increasing visitation; consider assessing the lake's carrying capacity for recreation users at various lake level elevations or in the three lake level management zones.
Objective: Cooperate with local and regional agencies and partners to support sustainable, smart growth and development strategies and environmentally friendly practices (e.g., mixed use centers, green infrastructure, pollution prevention, and water efficiency).
Objective: Coordinate with agencies and partners to make lake etiquette and stewardship materials available to recreation users (see Figure 3-13).
Objective: Seek opportunities to collaborate with adjacent upland owners and user groups on shoreline improvements.
Objective: Consider authorizing muck/debris removal when an applicant can provide a certificate of insurance, can conduct the work without disturbing living vegetation, and can keep all activities between the OHWM and the actual water line (e.g., no equipment would be used in the water).
Management Agencies: FFSL, DSP, and DOR
Permitting Agencies: FFSL, DSP, DWQ, and USACE
Intersecting Agencies: Local municipalities**,** Rich County, DWR, SITLA, IDL, IDPR, BLM, BRAG, and Bear Lake Regional Commission
Recreation and Access Goal 2: Collaborate with partners to address recreation issues and conflicts in the planning area.
Objective: Work with municipalities, DSP, DOR and other partners to seek solutions to the challenges from increasing visitor use and crowding at the lake.
Objective: Work with municipalities, UDOT, and other partners to develop solutions to parking issues that arise during periods of high visitation and/or high lake levels (e.g., parking along SR-30 in the southwest shoreline area).
Objective: Identify ways to reduce overcrowding in small sections of the lake or at particular recreation infrastructure (e.g., encourage use on days with lower levels of recreation).

Objective: Continue to assess how fluctuating lake levels impact various recreation uses and recreation infrastructure at the lake.

Objective: Work to reduce user conflicts through education, signage, designated uses for specific locations, and enforcement of regulations.

Objective: Work to better educate recreation users about motorized vehicle rules, beach launching rules, the current *Bear Lake Motorized Access Plan* (FFSL 2015), and any other plan for motorized access that may be developed in the future.

Objective: Create a resource management plan specifically for motorized access at Bear Lake to replace the current *Bear Lake Motorized Access Plan* (FFSL 2015).

Objective: Consider limiting or prohibiting new recreation authorizations in areas of high recreation conflict.

Objective: Consider adding new restrictions or limitations to existing recreation authorizations to reduce user conflicts.

Objective: Coordinate with DSP and DOR to promote consistency in recreation permitting.

Objective: Coordinate with agencies and partners to discern how climate-related impacts might impact recreation (e.g., more precipitation as rain instead of snow).

Management Agencies: FFSL, DSP, and DOR

Permitting Agencies: FFSL, DSP, and UDOT

Intersecting Agencies: Local municipalities, local and state law enforcement, IDL, IDPR, Coast Guard, and Bear Lake Regional Commission

Recreation and Access Goal 3: Understand recreation infrastructure needs and support appropriate recreation infrastructure development.

Objective: Work with adjacent municipalities, DSP, DOR, and recreation vendors to understand recreation needs and the desired recreation experience at Bear Lake.

Objective: Support the identification of areas where recreation infrastructure is most needed.

Objective: Support siting new recreation infrastructure in areas connecting to trails, campgrounds, and other recreation amenities.

Objective: Consider conflicting uses when developing recreation infrastructure (e.g., boating versus fishing).

Objective: Support the development of planned and new trails where appropriate.

Management Agencies: FFSL and DSP

Permitting Agencies: FFSL, DOR, local municipalities

Intersecting Agencies: IDL, IDPR, BRAG, and Bear Lake Regional Commission

Recreation and Access Goal 4: Integrate recreation and restoration opportunities as appropriate.

Objective: Consider recreation and navigation when approving or designing restoration projects.

Objective: Work to mitigate nonnative and/or invasive species that may impede lake access (e.g., tamarisk, phragmites, Eurasian watermilfoil).

Management Agencies: FFSL and DOR

Permitting Agencies: FFSL, DWR, and UDAF

Intersecting Agencies: Local municipalities, DSP, and NRCS

High (5,918–5,923 feet)	Medium (5,912–5,917 feet)	Low (5,903–5,911 feet or less)
No lakebed parking is available in the Garden City area or along the southwest and southeast shoreline areas. Very little shoreline is available for recreation uses, and activities may become more concentrated. All five public and private marinas are accessible for most watercraft. Most of the public and private boat ramps are accessible, with access to four of the boat ramps becoming difficult for most watercraft as lake levels drop within this zone. **Management Considerations**: Close motorized access to the Garden City area and to the southwest and southeast shorelines. Work with UDOT and other agencies to manage parking above the OHWM.	Lakebed parking becomes available in the southeast shoreline area at approximately 5,916 feet and in the Garden City area and southwest shoreline area at approximately 5,914 feet. A moderate amount of shoreline is available for recreation uses. The public Bear Lake State Park Marina and the private Marina on Gus Rich Point are accessible for most watercraft. Access to the remaining three marinas becomes difficult for most watercraft as lake levels drop within this zone. Four of the public and private boat ramps are not accessible for most watercraft. The remaining five boat ramps remain accessible. **Management Considerations**: Close motorized access to the Garden City area and to the southwest and southeast shorelines until the appropriate lake levels are reached (described above). Monitor and enforce motorized vehicle rules and *Bear Lake Motorized Access Plan* (FFSL 2015) zones on sovereign lands. Monitor and respond to user conflicts on shorelines.	Lakebed parking is generally available along the southwest and southeast shorelines and in in the Garden City area. A large amount of shoreline is available for recreation uses. The private Marina on Gus Rich Point becomes difficult to access for most watercraft at approximately 5,910 feet. The public Bear Lake State Park Marina becomes difficult to access for most watercraft at approximately 5,904 feet. The remaining marinas are inaccessible for most watercraft. Four of the boat ramps are not accessible for most watercraft. As water levels drop within this zone, access becomes difficult for most watercraft at the remaining five boat ramps. **Management Considerations**: Monitor and enforce motorized vehicle rules and *Bear Lake Motorized Access Plan* (FFSL 2015) zones on sovereign lands. Monitor and respond to user conflicts on shorelines.

Best Management Practices
Locate recreation infrastructure in areas that already have human impacts.
Avoid sensitive environments and protect as much native habitat as feasible when installing recreation infrastructure. Enhance completed developments as needed with additional planting of native vegetation.
Choose recreation infrastructure that maintains lake function and fish and wildlife habitat, and that is sustainable and has a low environmental impact.
Account for fluctuating lake levels when planning recreation infrastructure.
Install trash and recycling receptacles near recreation infrastructure.
Consider installing restrooms near high-use recreation infrastructure.
Avoid creating barriers to wildlife movement with new recreation infrastructure.
Maintain aesthetic beauty when designing new recreation facilities.
Support adherence to Americans with Disability Act accessibility guidelines in project designs.
Manage the potential for the spread or colonization of invasive and nuisance species throughout the construction process.
Use NPS's design guide for canoe and kayak launches (NPS 2004), NPS's guidelines for designing and building access sites for carry-in watercraft (NPS and River Management Society 2018), or other relevant guidance as an information source for boat launch specifications and signage. Decision-making should account for local conditions.
Refer to Figure 3-13 for suggested lake etiquette in the planning area.

Figure 3-10. Best management practices for recreation and access in the planning area.

Public Safety and Enforcement

Table 3-18 presents management goals and objectives for public safety and enforcement that are common to all applicable classes. Figure 3-11 provides a list of BMPs for public safety and enforcement in the planning area.

Table 3-18. Public Safety and Enforcement Goals and Objectives

Public Safety and Enforcement Goal 1: Improve boater safety by addressing navigational hazards.
Objective: Seek to identify and remove or mitigate navigational hazards at all lake levels (navigational hazards may appear or disappear as lake levels fluctuate).
Objective: Support removal of temporary navigational hazards such as large woody debris.
Objective: Remove permanent navigational hazards when possible or mitigate them in ways that allow for avoidance.
Management Agencies: FFSL and DSP
Permitting Agencies: FFSL, DWQ, DWRi, and USACE
Intersecting Agencies: Local municipalities, DOR, IDL, IDPR, and Coast Guard
Public Safety and Enforcement Goal 2: Evaluate new authorization applications with public safety in mind and require any needed public safety measures (e.g., for navigation).
Objective: Review new infrastructure design to reduce the potential for navigational hazards or other public safety concerns.
Objective: Include specific public safety measures in authorizations where appropriate.
Management Agencies: FFSL
Permitting Agencies: FFSL
Intersecting Agencies: Local municipalities, DOR, IDL, IDPR, and Coast Guard
Public Safety and Enforcement Goal 3: Address public safety issues in the planning area.
Objective: Support state (Utah and Idaho) and local law enforcement efforts to minimize boater speeding, enforce wakeless speed rules, and encourage proper safety for all recreation users.
Objective: Improve boater safety by promoting safe boating practices, including appropriate safety equipment and preparation, in conjunction with DOR.
Objective: Consider jointly funding additional safety and enforcement personnel with other management agencies.
Management Agencies: FFSL, local and state law enforcement, and DOR
Permitting Agencies: FFSL
Intersecting Agencies: Local municipalities, DSP, IDL, IDPR, and Coast Guard
Public Safety and Enforcement Goal 4: Address safety issues with motorized vehicles in the planning area.
Objective: Coordinate with law enforcement, agencies, and partners to actively manage motorized access on shorelines as lake levels drop.
Objective: Maintain and enforce the clear zone of 100 feet from the water's edge as required by Utah Code 65A-3-1.
Management Agencies: FFSL, local and state law enforcement, DSP, and DOR
Permitting Agencies: FFSL
Intersecting Agencies: Local municipalities, IDL, IDPR, and Coast Guard

High (5,918–5,923 feet)	Medium (5,912–5,917 feet)	Low (5,903–5,911 feet or less)
Lakebed parking is not available. Safety issues may be exacerbated by parked cars crowding roads near the lake. **Management Considerations**: Higher management need on roads. Work with UDOT and other agencies to manage parking. Manage navigational hazards.	Lakebed parking becomes available in the southeast shoreline area at approximately 5,916 feet and in the Garden City area and southwest shoreline area at approximately 5,914 feet. Safety issues with parked cars on roads may be exacerbated until lakebed parking is available. **Management Considerations:** Monitor and respond to user conflicts and safety issues on roads and shorelines. Manage navigational hazards.	Lakebed parking is available in the southeast shoreline area, Garden City area, and southwest shoreline area. User conflict and safety issues typically arise because of more motorized vehicles using the shoreline; crowding may occur on particular shorelines. Less marina and boat ramp infrastructure is accessible for use, which may cause overcrowding and safety issues at the infrastructure that is accessible. **Management Considerations**: Higher management need on shorelines and at infrastructure. Monitor and respond to user conflicts and safety issues on shorelines. Manage navigational hazards and seek opportunities to remove emerging or exposed navigational hazards.

Best Management Practices

Provide education on safe boating practices (e.g., Utah Boating Act regulations, Coast Guard recreational boating safety program).

Use NPS's design guide for canoe and kayak launches (NPS 2004), NPS's guidelines for designing and building access sites for carry-in watercraft (NPS and River Management Society 2018), other agency design standards, and other relevant planning documents as guidance for safe boater access points and consider appropriate signage. Decision-making should account for local conditions.

Design surface trail infrastructure in the planning area with appropriate passing widths. Limit or eliminate blind corners.

Educate adjacent upland owners on defensible space and other measures to protect against fire.

Contact the local health department to report public health concerns. Direct other public safety concerns to local police departments.

Refer to Figure 3-13 for suggested lake etiquette in the planning area.

Figure 3-11. Best management practices for public safety and enforcement in the planning area.

Education and Outreach

Table 3-19 presents management goals and objectives for education and outreach that are common to all applicable classes. Figure 3-12 provides a list of BMPs for education and outreach in the planning area.

Table 3-19. Education and Outreach Goals and Objectives

Education and Outreach Goal 1: Support education and outreach about the importance of Bear Lake and the need to conserve it as a healthy, sustainable ecosystem.
Objective: Support development of information for adjacent upland land and authorization applicants on the importance of a healthy lake ecosystem and how to reduce impacts to the lake.
Objective: Support public awareness and educational and outreach programs about Bear Lake and responsible use.
Objective: Provide education and outreach if requested to agencies, partners, and other groups.
Objective: Include information about fluctuating lake levels in educational and outreach materials.
Management Agencies: FFSL, DSP, and DOR
Permitting Agencies: FFSL
Intersecting Agencies: Local municipalities, DWR, IDL, IDPR, Coast Guard, USGS, BRAG, and Bear Lake Regional Commission
Education and Outreach Goal 2: Expand informational material regarding FFSL's jurisdiction and management responsibilities at Bear Lake.
Objective: Provide potential applicants with important information and considerations (e.g., applicable BMPs) and with a clear authorization process through materials on the FFSL website and other media, and in the Bear Lake CMP.
Objective: Provide adjacent upland owners and other stakeholders with a clear understanding of FFSL's jurisdiction and management responsibilities at Bear Lake through materials on the FFSL website and other media, at locations such as businesses and public facilities, and in the Bear Lake CMP.
Management Agencies: FFSL
Permitting Agencies: FFSL
Intersecting Agencies: Local municipalities, DSP, DOR, and Coast Guard
Education and Outreach Goal 3: Develop and provide information to lake users on stewardship and proper lake etiquette.
Objective: Coordinate with agencies and partners to develop lake etiquette and stewardship materials and disseminate them widely (see Figure 3-13).
Objective: Communicate with agencies responsible for enforcement to confirm their familiarity with the materials and to assist with education and outreach efforts and public awareness programs.
Objective: Increase signage where needed to inform lake users of applicable rules (e.g., motorized access, beach launching).
Management Agencies: FFSL, DSP, and DOR
Permitting Agencies: FFSL
Intersecting Agencies: Local municipalities, IDL, IDPR, Coast Guard, BRAG, and Bear Lake Regional Commission
Education and Outreach Goal 4: Continue to improve cooperation, coordination, communication, and information dissemination between resource agencies and stakeholders.
Objective: Facilitate meetings with user groups as needed to provide information, coordinate, or address issues and challenges.
Objective: Explore additional partnerships with resource agencies and user groups that could mutually improve management of Bear Lake sovereign lands.
Management Agencies: FFSL, DSP, and DOR
Permitting Agencies: FFSL
Intersecting Agencies: Local municipalities, DWR, DWRe, IDL, IDPR, Coast Guard, USGS, BRAG, and Bear Lake Regional Commission
Education and Outreach Goal 5: Be informed about ongoing research efforts on Bear Lake.
Objective: Incorporate data and conclusions from ongoing and completed research into management and planning.
Management Agencies: FFSL, DWR, DWRe, USFWS, DSP, DOR, and USGS
Permitting Agencies: FFSL
Intersecting Agencies: Local municipalities, IDL, Idaho Department of Fish and Game, Idaho Department of Water Resources, and BRAG

High (5,918–5,923 feet)	Medium (5,912–5,917 feet)	Low (5,903–5,911 feet)
Education and outreach needs are not dependent on the high, medium, or low lake level management zones. Therefore, there are no special management considerations for these zones.		

Best Management Practices

Coordinate with other agencies, universities, and conservation organizations to establish partnerships to meet education, outreach, and research goals and objectives.

Regularly identify and share any research needs with appropriate entities that could result in better management of the planning area.

Refer to Figure 3-13 for suggested lake etiquette in the planning area.

Figure 3-12. Best management practices for education and outreach in the planning area.

Figure 3-13 describes suggested lake etiquette in the planning area. These guidelines are suggestions to help provide a positive and safe lake experience and to help protect the lake ecosystem; they are not enforceable rules or requirements.

Suggested Lake Etiquette

Your actions directly impact the experience of others on the lake. The following guidelines can help provide a positive and safe lake experience for everyone, while protecting the health, beauty, and enjoyment of the lake.

General Protocol

Always respect the privacy and rights of private landowners. Some land above the OHWM is private property; do not trespass unless you have permission from the landowners.

Respect the private property of others (boats, docks, swim platforms, toys, etc.).

Respect adjacent upland owners' rights to also use the shoreline.

Be aware that different lake levels may impact where you can park or spend the day.

Pack out all trash and dispose of it or recycle it in appropriate receptacles. Do not dump it into the water or on adjacent land.

Use provided restroom facilities. Never dump sewage into the lake.

Do not feed, disturb, or harass wildlife. Do not trample vegetation.

Be respectful, helpful, and considerate. Avoid confrontational behavior.

Keep voices, music, and other noise at low levels.

Keep pets under control at all times. Clean up all pet waste and pack it out.

If you have multiple vehicles, use off-lakebed parking areas for the extra vehicle to avoid crowding the lakebed and to leave space for others.

Respect any paleontological, cultural, and archaeological sites. Do not disturb these sites. It is illegal to damage, remove, or deface such sites.

Graffiti is prohibited (this includes graffiti on adjacent upland private property or other structures and carving on rocks or trees).

Know your limits. Be aware of dangerous situations and avoid taking excessive risks.

Read the permit guidelines (if one is required) and appropriate agency publications before you arrive.

Marina Manners

Keep your area clean and free of debris.

Assist other boaters who are docking and de-boarding.

Return carts and other equipment intended for common use when you are finished.

Boat Ramp Manners

If the ramp is busy, be patient and wait your turn.

Be ready to launch your boat before moving onto the ramp.

Use the ramp only for loading and unloading of boats from a vehicle or trailer. Complete your launch quickly.

Vehicles should be parked in designated parking areas and never be left unattended on a ramp.

When retrieving your boat, pull it away from the ramp before wiping it down and securing it.

Once your boat is in the water, move it out of the way so that others can launch behind you.

Boating Manners

Be courteous and give others plenty of room.

A wakeless or idle speed is required when operating a boat in a designated slow, wakeless speed area and within 150 feet of another boat, person in the water, a water skier (except those you are towing), shore angler, boat ramp, dock, or designated swimming area. You are responsible for any injury or damage caused by your boat's wake. Boaters who improperly create a wake may be cited with a Class C misdemeanor.

A boat operator must keep a proper lookout by sight and hearing at all times to avoid the risk of collision.

A boat operator is required to operate at a safe speed and distance to have adequate time and distance to avoid a collision with another boat or object.

Meeting head to head: When meeting another boat head-on, each boat should change its course to the right (keeping 150 feet of space between them).

Crossing: When two boats are crossing paths, the boat on the left must slow down and alter its course to allow the other boat to pass.

Overtaking: In overtaking situations (passing from the rear), the boat being passed has the right-of-way. The passing boat is required to alter its course if necessary and stay clear of the other boat by at least 150 feet.

Motorboats must slow to a wakeless speed if they cannot stay at least 150 feet from other boats.

Motorboats should stay clear of sailboats and manually-powered boats and should not create a wake that would cause them trouble. Sailboats and manually powered boats must yield the right-of-way when overtaking motorboats and when a motorboat is adrift or at anchor.

Watch for swimmers and give them plenty of room.

Don't drink and drive.

Know proper anchoring techniques to avoid damaging ecosystems.

Fishing Manners

Do not crowd other anglers.

Honor anglers who arrived before you.

Boaters should yield to wading and shoreline fishermen.

Figure 3-13. Suggested lake etiquette in the planning area.

Sources: Allstate (2019); Utah Division of State Parks and Recreation (2016); Minnesota Department of Natural Resources (2021); Phillips (2014)

3.6 Coordination Framework

FFSL has management jurisdiction on the shoreline and bed of Utah's portion of Bear Lake and is responsible for considering the protection of navigation, fish and wildlife habitat, aquatic beauty, public recreation, and water quality in keeping with the Public Trust. However, multiple cities, two counties (Rich and Bear Lake Counties), two states, and various federal agencies are also involved in management, permitting and compliance, and research in the planning area. Because of this, FFSL sees a need to improve coordination with other agencies and partners. Management must be holistic and cooperative to maintain and improve Bear Lake's ecological health and conserve the Public Trust resources, especially because the lake is used as a storage reservoir. New permitting activities can have important implications for lake resources and lake users. Research data can help in sound decision-making and in evaluating impacts associated with permitting activities.

As demonstrated in this chapter, much of FFSL's responsibility as a manager of Bear Lake sovereign land resources is communication and coordination with other agencies and partners. Coordination between the management, research, and permitting and compliance spheres is essential to achieve comprehensive, integrated lake management. Table 3-20 lists the primary roles of state, federal, and other regulatory and coordinating bodies on Bear Lake.

Table 3-20. Primary Roles of State, Federal, and other Regulatory and Coordinating Bodies in Permitting and Compliance, Management, and Research on Bear Lake

Agency		Permitting and Compliance	Management	Research
Utah Department of Natural Resources	FFSL	X	X	X
	DOGM	X	X	
	DSP/DOR	X	X	
	DWRe		X	X
	DWRi	X		
	DWR	X	X	X
Other Utah agencies	SITLA	X	X	
	UDAF		X	X
	UDOT		X	
	DWQ	X		X
	SHPO	X	X	X
	Bear River Health Department	X		X

Agency		Permitting and Compliance	Management	Research
Idaho state agencies	IDL	X	X	
	IDPR	X	X	
	Idaho State Department of Agriculture	X	X	X
	Idaho Department of Environmental Quality's Water Quality Division	X	X	X
	Idaho Department of Fish and Game	X	X	X
	Idaho Department of Transportation		X	
	Idaho State Historic Preservation Office	X	X	X
	Idaho Department of Water Resources	X	X	X
Federal agencies	FEMA		X	X
	FERC	X	X	X
	NRCS		X	X
	USACE	X		
	BLM	X	X	X
	Coast Guard		X	X
	EPA	X	X	X
	USFWS	X	X	X
	USGS			X
Tribal	Northwestern Band of the Shoshone Nation		X	
	Shoshone-Bannock Tribes of the Fort Hall Reservation		X	
	Ute Indian Tribe of the Uintah and Ouray Reservation		X	
Local government	Rich County, Utah		X	
	Bear Lake County, Idaho		X	
	BRAG			X
Collaborative management groups	Bear River Commission		X	X
	Bear Lake Regional Commission		X	X

Broader geographic coordination should also be considered in management, permitting and compliance, and research for the planning area. FFSL also has jurisdiction on Bear River and Great Salt Lake, which are hydrologically connected to Bear Lake. In some cases, management activities may require implementation at a scale that extends beyond Bear Lake and may include coordination for activities on and near Bear Lake tributaries and other connected water bodies.

Permitting and Compliance Coordination

As previously discussed and illustrated in Chapter 1, Figure 1.2, multiple agencies have jurisdiction over Bear Lake and its immediate environs. Each agency may require a different permit, in part because each is responsible for a different aspect of lake management, e.g., DWRi (water rights) and USACE (placement of fill below the OHWM). To ascertain the level of coordination needed, FFSL has added permitting agencies to Table 3-2 to illustrate where permitting activities may intersect with FFSL authorizations.

Management and Research Coordination

The Utah Department of Natural Resources' divisions and other Utah agencies that manage Bear Lake resources operate with different mandates. Bear Lake resource managers need to be informed of management actions by other divisions and agencies (including federal government agencies) to evaluate the effects on "their" resource within the Bear Lake system and to manage more holistically. Likewise, Utah and Idaho agencies managing the same Bear Lake resources need to coordinate with each other. As discussed in Section 1.11, Utah and Idaho have passed legal resolutions urging cooperation with each other to develop joint expectations for the continued health, beauty, and enjoyment of the lake. For those state agencies that are required to monitor a resource, optimizing and coordinating equipment and personnel among agencies could save time and costs for the state.

Research is also a critical component to understanding impacts associated with projects and management actions on the lake and to making sound decisions. Research data need to be shared with the appropriate management agencies to be helpful. As noted in the objectives and lake level management considerations of this chapter, there is a need for additional research efforts that could help reduce uncertainty associated with resource management. More research is needed on topics such as the following: How do lake level fluctuations impact water quality? How do wetland habitats change with fluctuating lake levels? Is nonpoint source pollution contributing to increased nutrient input? How will climate change impact Bear Lake? Research will also be more comprehensive and efficient if individual scientists partner with other researchers where appropriate to expand the scope and reach of the investigation.

FFSL supports developing a mechanism for better communication between management agencies and with research efforts.

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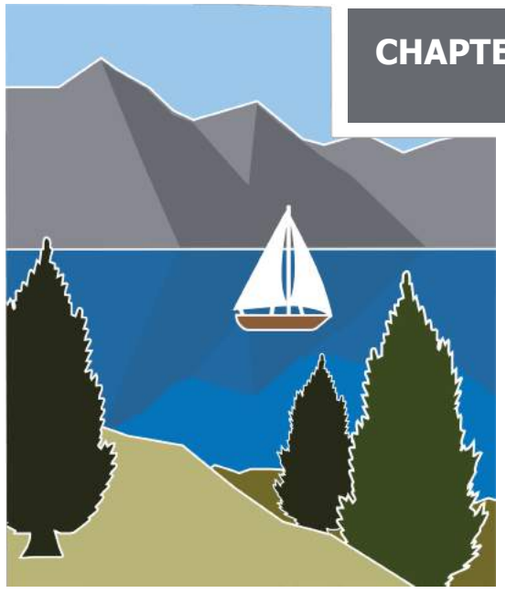

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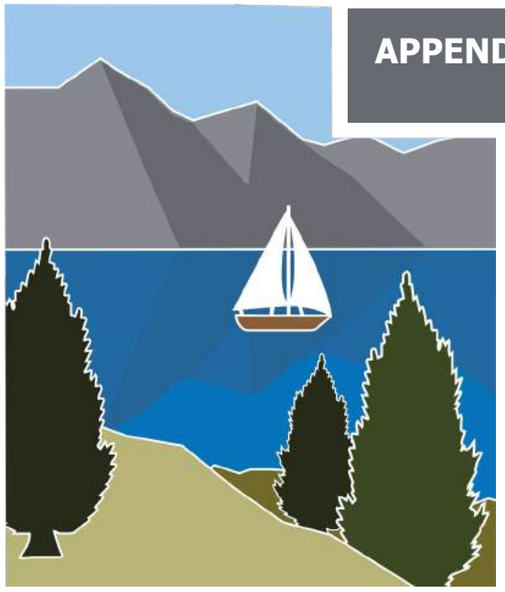
APPENDIX A – LAKE LEVEL RESOURCE MATRIX



A.1 Lake Level Resource Matrix and Management Zones

The Utah Division of Forestry, Fire & State lands has developed three lake level management zones to provide a framework to better understand lake resources and create adaptive management strategies. The process through which the lake level management zones were derived began with the development of the lake level resource matrix for Bear Lake. The matrix on the following page illustrates how resource conditions change with lake levels for key resources. The high, medium, and low zones are defined by the notable changes that resources experience at certain elevations; this information was collected from available data and literature and from stakeholder input. The zones were developed to capture the largest number of resource thresholds or changes across a particular zone and are visually apparent in the matrix. Specific elevations are labeled beneficial or sustainable for the resource or adverse for the resource. The lake level management zones are as follows:

- High: 5,918–5,923 feet
- Medium: 5,912–5,917 feet
- Low: 5,903–5,911 feet

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LAKE LEVEL RESOURCE MATRIX

				ECOSYSTEM RESOURCES									WATER RESOURCES	COMMUNITY RESOURCES																				
				WILDLIFE AND WILDLIFE HABITAT								NOXIOUS WEEDS/ INVASIVE SPECIES		WATER QUALITY	INFRASTRUCTURE AND RECREATION																				
LAKE LEVEL MANAGEMENT ZONES	BEAR LAKE ELEVATION* (feet) (UP&L datum)	TOTAL SHORELINE EXPOSED (acres)	IRRIGATION ALLOCATIONS TO CONTRACT HOLDERS (acre-feet)	Endemic Fish† (% of available littoral cobble habitat for spawning)	Bear Lake Bonneville Cutthroat Trout† (tributaries accessible for spawning and rearing)	Aquatic Habitat (open water)‡ (% of habitat available)	Riparian Habitat§	Wetland Habitat¶		Benthic Macro-invertebrate Habitat# (% of habitat available)	Submerged Aquatic Species (e.g., Eurasian watermilfoil)	Riparian Species** (e.g., tamarisk) (% of new exposed habitat available)	Water Quality Parameters (nutrients, TDS, metals, bacteria)	Marinas†† (accessibility)					Boat Ramps‡‡ (accessibility)									Lakebed Parking (includes a 100-foot buffer from water line)		
								Open Water	Non-open Water					Bear Lake State Park (public)	Azure Cove (private)	Ideal Beach Resort (private)	Gus Rich Point (private)	EPIC Recreation RV Park (private)	Bear Lake State Park (public)	Hodges (public)	Ideal Beach Resort (private)	Gus Rich Point (private)	EPIC Recreation RV Park (private)	Rendezvous Beach (public)	First Point (public)	Cisco Beach (public)	Rainbow Cove (public)	Garden City Area	Southwest Shoreline	Southeast Shoreline
HIGH	5,923 (high)	0	Full allocation of 245,000 acre-feet (above 5,914.7 feet)		Maximizes access to tributaries (5,914.7 feet and higher)	100%				100%	These species generally thrive at high lake levels, which is adverse for the lake ecosystem.	0%	More data are needed to assess water quality and lake levels. There are currently no clear thresholds that relate to water quality.	Accessible for most watercraft	Accessible for most watercraft	Accessible for most watercraft	Accessible for most watercraft	Accessible for most watercraft	Accessible for most watercraft	Accessible for most watercraft	Accessible for most watercraft	Accessible for most watercraft	Accessible for most watercraft		Accessible for most watercraft	Accessible for most watercraft	Accessible for most watercraft	No parking allowed	No parking allowed	No parking allowed
HIGH	5,922	28																														
HIGH	5,921	66																														
HIGH	5,920	109		90%																												
HIGH	5,919	168																														
HIGH	5,918	269																														
MEDIUM	5,917 (75th percentile)	407		69%		99.98%				90%		10%																				
MEDIUM	5,916	549																														
MEDIUM	5,915	723																														
MEDIUM	5,914	955	Decreasing allocation to contract holders with decreasing lake levels	46%																												
MEDIUM	5,913	1,188																														
MEDIUM	5,912 (median)	1,385			Minimum lake level for tributary access (5,912.1 feet)	98.78%				67%		33%																					
LOW	5,911	1,516			Disconnection of tributaries		Disconnection from lake																										
LOW	5,910 (25th percentile)	1,924				97.23%				54%		46%																				
LOW	5,909	3,026																														
LOW	5,908	3,587																														
LOW	5,907	3,801		14%																												
LOW	5,906	3,914																														
LOW	5,905	4,007																														
LOW	5,904	4,093	Allocation of 0 acre-feet (at or below 5,904 feet)																													
LOW	5,903 (low)	4,169				90.71%				0%		100%		Difficult to access for most watercraft	Difficult to access for most watercraft	Difficult to access for most watercraft	Difficult to access for most watercraft	Difficult to access for most watercraft	Difficult to access for most watercraft	Difficult to access for most watercraft	Difficult to access for most watercraft	Difficult to access for most watercraft	Difficult to access for most watercraft	Difficult to access for most watercraft	Difficult to access for most watercraft	Difficult to access for most watercraft	Difficult to access for most watercraft	Difficult to access for most watercraft	Difficult to access for most watercraft	Lakebed parking available	Lakebed parking available	Lakebed parking available

Key:

Beneficial or Sustainable for Resource | Transition | Adverse for Resource

Notes: All Community Resources lake levels are approximate. The driver of lake level management zone determination is the notable changes that resources experience at certain elevations. The goal is to capture the largest number of resource thresholds or changes across a particular zone.

* Elevations: High, third quartile (75th percentile), second quartile (median), first quartile (25th percentile), and low lake elevations are calculated from historic lake level data collected daily from January 1, 1990, to October 12, 2020 (calculations have been rounded to whole numbers). Habitat percentages were calculated for these five lake levels only, with the exception of littoral cobble habitat.

† Data for endemic fish are derived from Glassic and Gaeta (2018) and are available only for specific lake levels. Data for Bonneville cutthroat trout are derived from Glassic and Gaeta (2020) and Tolentino (2020) and are available only for specific lake levels. Bear Lake Bonneville cutthroat trout spawn in four different streams associated with Bear Lake.

‡ Aquatic habitat (open water) consists of the planning area's lake habitat and adjacent tributaries where streamflow enters. It is comparable to the Utah Division of Wildlife Resource's (DWR's) open water and riverine key habitats. Aquatic habitat percentages are based on the cumulative acreage of the habitat type on Bear Lake sovereign lands (Utah portion of Bear Lake only).

§ Riparian habitat is comparable to DWR's aquatic-forested and aquatic scrub/shrub key habitats and is present in the planning area along streams entering Bear Lake. These data are based on Glassic and Gaeta (2020) and represent the main Bear Lake tributaries.

¶ The wetland habitat assessment is based on observation and anecdotal information, as well as local wetland data from the summer of 2014 at specific lake elevations. Open water wetlands are those that are fully inundated with water and associated with the submerged portion of the lake. Non-open water (emergent) wetlands have vegetation, soils, and hydrology typical of wetlands but are not necessarily fully inundated (e.g., emergent marsh).

The percentage of benthic macroinvertebrate habitat available is based on how much shoreline is exposed (acres of exposed shoreline) on the Utah portion of Bear Lake as the lake drops from 5,923 to 5,903 feet. Less habitat is available as more exposed shoreline appears.

**Riparian noxious weeds/invasive species: As lake levels drop, additional surface area adjacent to streams becomes available for colonization. Percentages reflect lake levels from 5,923 to 5,903 feet only, on the Utah portion of Bear Lake.

†† Lake levels where access is difficult for marinas assume that an average water depth of approximately 2 feet in the marina is required for boat access. Calculated lake levels for the Bear Lake State Park Marina were adjusted based on observational data.

‡‡ Lake levels where access is difficult for boat ramps are based on the measured or extrapolated elevation at each boat ramp's end, plus a 2-foot buffer. In some cases, calculated lake levels for Bear Lake State Park boat ramps were adjusted based on observational data.

Literature Cited:

Glassic, H.C., and J.E. Gaeta. 2018. Littoral habitat loss caused by multiyear drought and the response of an endemic fish species in a deep desert lake. *Freshwater Biology* 64(3).

———. 2020. The influence of multiyear drought and associated reduction in tributary connectivity on an adfluvial fish species. Ecology of Freshwater Fish 29(4):588–601.

Tolentino, S. 2020. Personal communication from Scott Tolentino. Received in an email dated 10/26/2020.

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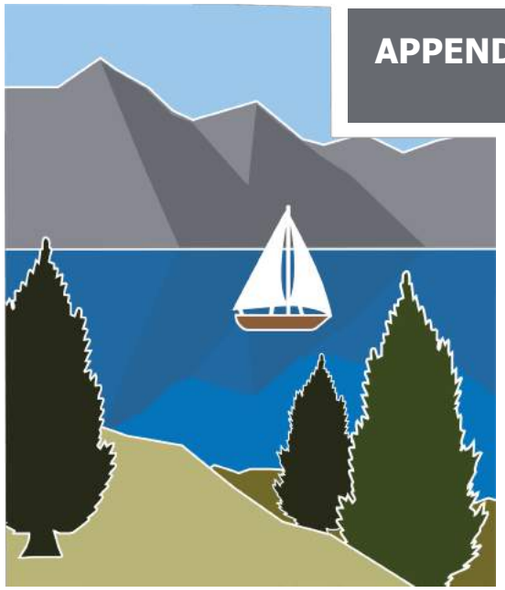

APPENDIX B – PUBLIC INVOLVEMENT AND PUBLIC COMMENTS

B.1 Public Involvement

The public outreach process for the 2022 *Bear Lake Comprehensive Management Plan* (Bear Lake CMP was structured to capture input and comments from federal agencies, state agencies, Rich County, Salt Lake County, tribes, adjacent landowners, lessees, other stakeholders, and the general public. A summary of the outreach process and comment themes and issues is presented below.

Public Outreach Process

Open House Series #1: Kickoff and Information Gathering

The first public outreach effort comprised open house meetings held during the information-gathering phase of the plan. The purposes of the open houses were to describe and explain the Bear Lake CMP process, identify local information on lake resources, and collect input on Bear Lake issues and concerns. Feedback from the open houses was used to frame the Bear Lake CMP's discussion of current conditions, identify issues requiring better management, and develop management goals and objectives. Two individual open houses were held, one in Rich County and one in Salt Lake County.

PUBLIC OPEN HOUSE: RICH COUNTY

Date and Time: Friday, September 27, 2019; 5:00 p.m. to 7:00 p.m.
Location: Garden City Town Offices (Lake View Room)
Attendance: 24 individuals signed in to this meeting.

PUBLIC OPEN HOUSE: SALT LAKE COUNTY

Date and Time: Wednesday, November 20, 2019; 5:00 p.m. to 7:00 p.m.
Location: Utah Department of Natural Resources Building
Attendance: 17 individuals signed in to this meeting.

For both counties' public open houses, participants were allowed to attend any time during the meetings. At each open house, a welcome table was set up to greet visitors, help them understand the purpose of the open house, and provide a mailing and/or email list for future notifications. During each open house, the Utah Division of Forestry, Fire & State Lands (FFSL) presented a slideshow that provided an overview of the planning process and expected outcome.

Materials at each open house included explanatory brochures, business cards with the Bear Lake CMP project website, large-format display boards on easels, and large-format aerial maps showing the planning area. The display boards provided opportunities for participants to write comments on the boards about what works well and what needs improvement for topics such as vegetation, wildlife, water quality, infrastructure, and recreation. One of the display boards also asked for specific comments on how changing lake levels affect participants and what FFSL can do to help.

Participants were asked to provide written comments and input on a comment form, by letter, or by email. In addition, participants were given the option of leaving site-specific comments on an online comment map accessed through the project website (http://bit.ly/BearLakeCMP). The comment map allowed participants to drop a colored pin (green for ecosystem resources, blue for water resources, orange for community resources, and yellow for other) at a particular lake location with an attached comment. Verbal comments from discussions at the public open houses were also noted.

COMMENT THEMES AND ISSUES

Key comment themes and issues from the first public outreach effort are summarized below.

Ecosystem resources:

- Control noxious and invasive weeds.
- Concern about invasive mussels. Continue to prevent them from reaching Bear Lake.
- Concern about deer flies. FFSL should spray for deer flies. Also, as lake levels drop, landowners should be able to mow vegetation to prevent the presence of deer flies.
- What is the carrying capacity of the lake? When is there too much visitation?

Water resources:

- Continue to keep industries out that pollute water.
- Monitor water quality in the marina and at concessionaires.
- The Idaho side of the lake needs a sewer system.
- Educate everyone on how to help keep Bear Lake water clean.

Community resources:

- Traffic should be better enforced.
- Improve and add more parking. It is unclear who manages parking.
- There are too many cars on the beach.
- Prohibit beach parking.
- Improve beach access from areas that are not private property. More beach access is needed in general.
- More boat ramps are needed.
- Need more facilities and more cleaning of bathrooms.
- Improve enforcement of rules on Rendezvous Beach.
- The Coast Guard does a good job with safety and enforcement.

Lake levels:

- Weeds become a problem when lake levels are low or high.
- Cattails invade at high lake levels.
- Low lake levels create mud/muck, weeds, and bugs.
- Allow homeowners to maintain their shoreline.
- Create lake levels that remain consistent. Maintain consistent higher lake levels.
- Inform recreation visitors about changing lake levels.
- Why do lake levels change? How does the system work?

Other:

- How much does FFSL coordinate with Idaho? Are they aligned with management?
- What is the Utah Division of State Parks jurisdiction compared to FFSL's? Who addresses issues?
- Adjacent landowners do not always understand where their property ends and the sovereign land boundary begins.
- When are permits needed, including permits from USACE?

Open House Series #2: Draft Plan Review

The second public outreach effort comprised open house meetings held after the publication of the draft Bear Lake CMP. The purposes of the open houses were to present the draft Bear Lake CMP and to provide information on how to comment. Two individual open houses were held, one in a virtual format and one in an in-person format in Rich County.

VIRTUAL OPEN HOUSE

Date and Time: Thursday, June 3, 2021; 5:30 p.m. to 6:30 p.m.
Location: Virtual meeting link
Attendance: 20 individuals logged in to this meeting.

PUBLIC OPEN HOUSE: RICH COUNTY

Date and Time: Saturday, June 5, 2021; 10:00 a.m. to 12:00 p.m.
Location: Day Use Pavilion, Bear Lake State Park Marina
Attendance: 22 individuals signed in to this meeting.

An open house format was used for both open house meetings (in virtual and in person), with participants allowed to attend any time during the meeting.

At the virtual open house, FFSL presented a slideshow that provided background on the planning process and information from the draft CMP, including lake use classifications, use determinations for common proposed actions, lake level analysis and management zones, and management goals and objectives. After the slideshow, FFSL answered questions from participants.

At the in-person open house, a welcome table was set up to greet visitors, help them understand the purpose of the open house, and provide a mailing and/or email list for future notifications. Materials at the in-person open house included explanatory brochures, business cards with the Bear Lake CMP project website, large-format display boards on easels with key information from the draft Bear Lake CMP, and large-format aerial maps showing the planning area.

Participants were asked to provide written comments and input on the draft Bear Lake CMP on a paper comment form, by letter, or by email. In addition, participants were given the option of leaving plan-specific comments in an online comment form accessed through the project website, http://bit.ly/BearLakeCMP.

COMMENT THEMES AND ISSUES

Verbal comments received during the virtual and in-person open houses are summarized below by comment themes and issues. These do not include written comments submitted during the formal public comment period, which are provided below in Table B-1.

Ecosystem resources:

- Two changes were requested to fish descriptions in the Bear Lake CMP.

Community resources:

- Private landowners want to provide input on campground development (e.g., the number of sites) and day parking.
- Can the number of visitors be limited at Bear Lake State Park?
- There are too many cars that park on the west side of the lake.

Lake levels:

- Will fish spawning streams be maintained when lake levels are low?
- Has the OHWM (5,923.65 feet) been changed?
- The lake level matrix will be useful.

Other:

- How does FFSL coordinate with other agencies for permitting, including Idaho agencies? Request more direction in the Bear Lake CMP to help permittees reach out to appropriate permitting agencies.
- What funding does FFSL have to implement its objectives?
- A request for a comment period extension was made.
- What private land has already been adjudicated?
- A request was made to change a lake use classification.

Public Comment Period

A 124-day formal public comment period for the draft Bear Lake CMP began on May 17, 2021, and ended on September 17, 2021. The comment period was extended on two separate occasions, first from an end date of June 21 to an end date of July 30, and then from an end date of July 30 to an end date of September 17. During the public comment period, comments could be submitted at open house meetings (open house series #2), online at the FFSL Bear Lake CMP website, by email, or by mail. FFSL received 21 written submissions commenting on the draft Bear Lake CMP. Verbal comments were also noted at both open house series as described previously. From the submissions, 131 individual comments were extracted for review. Individual comments are numbered per letter number (1–21). These individual comments are part of the project record and are included below in Table B-1 along with comment responses, as required by rule and statute Utah Administrative Code R652-90-600 (1)(b-d) and Utah Code 65-A-2-4. Verbal comments were generally consistent with those provided in the comment submissions.

Table B-1. Bear Lake Comprehensive Management Plan Public Comments

Submission Number	Comment Type and Location	Commenter	Topic	Comment Number	Comment	Disposition/Response to Comment
1	Email, not applicable (N/A)	Debbie Hafer	Low water levels, pests	1.1	The frustration is that when the water is out and has been the weeds grow and it becomes swampy and as the water goes out the small sand barriers keep the water from getting to the lake and then a swamp comes. We have a place (it's a long ways and many, many, many places have this same problem for miles, where the water comes out of the hills all year long and so the water bubbles up and can't get to the lake with these sand barriers. What comes are lots and lots of mosquitoes and deer flies. It is so bad, that they chase you into the house or to the boat and until you get out a ways, they keep biting. It is impossible to play on the beach or in the water as you truly get eaten. I have some allergic to these and even those that are not, still suffer from these painful deer flies and swell up from the mosquitoes. I would like to see us to be able to keep our beaches cut, or something to happen to help these people for a few miles to enjoy their homes without being eaten. Help us figure a way to prevent these swamps from returning as the water will be so low. this year, creating a perfect storm in deer flies and mosquitoes which carries problems for humans with infections, pain, discomfort, allergies, reactions to the bites.	Thank you for your comment. Table 3-2 of Chapter 3 lists vegetation management actions that can be taken to manage weeds (e.g., seasonal mowing and removal of dead biomass or accumulated material). These actions are allowable in all areas of the lake but require an authorization from FFSL. Please reach out to FFSL for help with the authorization process. As explained in Chapter 1 "A Storage Reservoir" and "Lake Level Approach," FFSL does not have the authority or jurisdiction to determine water levels in Bear Lake.
2	Email, N/A	Joey Stocking	Technical edits	2.1	Just some references errors you may want to correct. On this document: 5.2.1 (page 38) it references figures 1, 2, 3, 4, but I believe it is referring to figures 4, 5, 6, 7. However, you already had a figure 4 on page 36. I'd recommend changing those Seasonal ramp photos labels as figures 5,6,7,8 and then fixing the reference to them in the body of the text to avoid confusion.	You are referring to Appendix F Supplement – Ramp Amendment, which we are not updating or modifying but have incorporated into the CMP. No change has been made to the CMP.

Submission Number	Comment Type and Location	Commenter	Topic	Comment Number	Comment	Disposition/Response to Comment
3	Email, paragraph 1	Scott Tolentino	Measuring lake levels	3.1	Pg 14, 2nd Column, under "Measuring Lake Levels: I have a question regarding the following statement: "because the elevation can be significantly different between its North and South ends". There is no reference provided to back up this statement and only on the worst seiche events would this even be true. So, either provide a reference for this statement or I would recommend saying this instead: "There was concern that there were differences in lake levels between the North and South ends" OR "The lake level sight at the marina was selected since it was easily accessible, permanent location which was not apt to need to be relocated in the future".	Change has been made.
3	Email, paragraph 2	Scott Tolentino	Fish	3.2	Pg 75, Left Column, Under Bear Lake Whitefish Bear Lake whitefish spawn from mid-February to mid-March. Please take out January,	Change has been made.
3	Email, paragraph 3	Scott Tolentino	Fish	3.3	Pg 75, Under Bonneville cisco The second sentence should say less than 9". Please take out 7.5"	Change has been made.
3	Email, paragraph 4	Scott Tolentino	Fish	3.4	Pg 78, Under Bear Lake BCT, 1st paragraph, last sentence (just above the picture) It currently says, "Bear Lake BCT typically rear in their natal stream environment for 1-2 years and migrate to the lake during spring runoff (Nielsen & Lentsch 1988)." I will attach a reference below to a recently completed M.S. thesis that has more accurate information. The sentence above should be modified to say, "Nielson and Lentsch (1988) reported that Bear Lake BCT typically rear in their natal stream environment for 1-2 years and migrate to the lake during spring runoff the following season. However, a recent study (Heller 2021) has shown some Bear Lake BCT migrate out of tributary streams as young-of-the-year immediately after hatching, some migrate out the following year between June and August, and some migrate out as late as age 5." The reference is: Heller, M. R. 2021. Production of wild Bonneville cutthroat trout in Bear Lake: Evaluation of a harvest fishery. Master's thesis. University of Idaho. Moscow, ID. 81 pages.	Change has been made.

Submission Number	Comment Type and Location	Commenter	Topic	Comment Number	Comment	Disposition/Response to Comment
3	Email, paragraph 5	Scott Tolentino	Fish	3.5	Pg 79 - Lake trout. Right column, 2nd Sentence. It says, Stocking numbers have been constrained since 1980." This is incorrect. It should say, "Stocking numbers were reduced in 1995 as a result of bioenergetic modeling that showed it was beneficial to stock more conservative numbers of lake trout, and the stocking numbers have remained at lower levels than time".	Change has been made.
3	Email, paragraph 6	Scott Tolentino	Technical edit	3.6	Pg 81 - Figure 2-27 Move the label GCP- just south to the little "point" that is approximately 1/2 inch below the current position of the GCP label.	Change has been made.
3	Email, paragraph 7	Scott Tolentino	Technical edit	3.7	Pg 90 - Under "Ecosystem Resources", Left Column, 1st Sentence: It says, "with 0.5% of the 1.1% being exclusively cobble". I would encourage you to look over the reference to ensure that is an accurate statement. Perhaps it should be 50% of the 1.1% or perhaps 0.5% of the total cobble? It just seems that 0.5% of 1.1% is EXTREMELY small. However, this may be correct. I don't have the reference to check it right at this moment.	Text has been reviewed and modified.
4	Email, paragraph 1	James Hanzelka	Stakeholders	4.1	p.1, diagram at the bottom right of page doesn't include adjacent landowners, which are stakeholder in the management plan.	Adjacent landowners are part of "the public" and could also be considered a "special interest group." No change has been made.
4	Email, paragraph 2	James Hanzelka	Figure edit	4.2	p. 2, Figure 1-1. Do the different shades of blue in the lake diagram have any significance, if so, that should be explained in the legend.	Disparate lake colors are a result of the aerial imagery being flown at different times.
4	Email, paragraph 3	James Hanzelka	Bear River flow	4.3	p.8, para.2, under background. States, "Bear River has not naturally flowed into Bear Lake in recent history", however on p.11, under Decreed Water Rights, bullet 1, indicates that Bear Lake is to receive from Bear River 5,500 cubic feet per second (cfs) from Bear River. This seems to be inconsistent between these two statements and should be clarified as to how the two values are currently accommodated.	Both areas of text are correct. Bear River has not *naturally* flowed into Bear Lake in recent history; however, human-made diversions direct Bear River flow into Bear Lake. Text has been modified for clarification.
4	Email, paragraph 4	James Hanzelka	Dredging	4.4	p.12. Under Settlement Agreement. Paragraph 2 indicates that in order to avoid litigation UP&L entered into a settlement agreement which dictated downstream releases. It is unclear if this was in lieu of the dredging or if that dredging did in fact occur.	Connely Baldwin at PacifiCorp indicated the dredging permit was applied for in 1995 but wet conditions negated the need for dredging until 2003. Dredging was done in 2003 but not below 5,902 feet, only to 5,902 feet. Text has been added to this section.

Submission Number	Comment Type and Location	Commenter	Topic	Comment Number	Comment	Disposition/Response to Comment
4	Email, paragraph 5	James Hanzelka	Legal agreements	4.5	p.12. Under Three State Agreement. This refers to an agreement between Utah, Idaho, Wyoming and UP&L, but no specifics of the agreement ae given it would be nice to include some details on what the basics of that agreement are and how it impacts lake level.	The paragraph explains that the agreement essentially states "that ScottishPower would not significantly change historical operational practices." You can read the full agreement here: https://bearrivercommission.org/docs/Tri%20State%20Agreement-PacifiCorp%20and%20Scottish%20Power.pdf. No change has been made.
4	Email, paragraph 6	James Hanzelka	Lake levels	4.6	p.15. Lake Level Management Matrix and Management Zones. This section specifies three levels, high – 5918-5923, Medium – 5912 – 5917, Low 5905 – 5,911 feet. I see several issues with this classification. - each of these levels leaves a foot between each level which isn't in any zone. For example, medium should be 5912-5918, which leaves the number of 5918 as the demarcation point. Even better would be to state it as less that 5918 – 5912, which would clearly put 5918 in the high zone and 5917.9999 as in the medium zone. - The mismatch between these numbers and the allocation numbers of levels outlined in the settlement agreement seems problematic. - The designations seem fairly broad in relation to the impacts stated later in the plan. For example, the lateral distance in the shallower parts of the lake would be many times greater than the vertical distances. So, one foot in the high zone of elevation, may result in yards of distance the shoreline would move from previous level. Seems like this could increase the difficulties experienced within a given management zone.	Decimal points are not included in the matrix because most of our data are not that specific. The lake levels are a broad guideline for management actions. The high/medium/low ranges are not meant to match the allocation numbers; they are a guideline for management actions based on the notable changes that resources experience at certain lake level elevations. The allocation information is included in the matrix for reference only. Agreed. Where possible, the data in the lake level matrix account for these differences. No change has been made.
4	Email, paragraph 7	James Hanzelka	Stakeholders	4.7	Pp.23 -24, Section 1-9. Should include non-governmental stakeholders like Bear Lake Watch.	Bear Lake Watch is not a collaborative management group. It has no legal management authority on Bear Lake. No change has been made.
4	Email, paragraph 8	James Hanzelka	Stormwater	4.8	pp.25-26, Garden City, Lake Town and Rich County management plans. The Ogden Valley News, May 15 2021 edition, has a comprehensive study on the management of storm water and the effect on watersheds and lakes downhill from major developments. To my knowledge currently there is no requirement in those plans for retention ponds or basins to control the flow of contaminants from developed areas into the lake. This could have a major impact, particularly as more extensive development occurs in the area.	Thank you for your comment. Development of retention ponds and basins for stormwater control is not within FFSL's jurisdiction. Nonpoint source pollution such as stormwater is discussed in the Water Quality section of the CMP. The plan states: "Because these sources of pollution are not on sovereign lands but have the potential to affect sovereign lands, there may be a need for collaborative management and partnerships with local governments to ensure resources are protected."

Submission Number	Comment Type and Location	Commenter	Topic	Comment Number	Comment	Disposition/Response to Comment
4	Email, paragraph 9	James Hanzelka	Lake use classes	4.9	p.33. Figure 1-10, shows most of the land area within Garden City as Class 2, which is defined in Table 1-2, p.30, as "shoreline appropriate for future development." Since most of the shoreline within Garden City is currently developed it seems it should more likely be shown as Class 1, defined as, "Shoreline with existing authorization, existing developments and adjacent developed private land."	FFSL has decided to keep these areas as Class 2. No change has been made.
4	Email, paragraph 10	James Hanzelka	Figure edit	4.10	p.33, Figure 1-10 and related charts and graphs. The color scheme chosen, with green for the lake proper and blue for surrounding lands makes the coloring of the lake in this figure different from the lake coloring in all other figures in the document. For consistency it might be useful to change the color scheme between class 5 and 6 so that the coloring of the lake in this figure matches the other figures.	The lake use class color scheme is the same for all of FFSL's recent management plans (e.g., Colorado River CMP). No change has been made.
4	Email, paragraph 11	James Hanzelka	Socioeconomics	4.11	P.112. Section 2.5, Socioeconomic. The section names two significant user groups, full time residents and tourists. There is a third group which is significant in the area, part-time resident owners. The reason this is significant is that within Garden City specifically and the lake in general, as significant number of adjacent lands to the sovereign lands is owned by this group. While this group is not likely to provide the workforce the full-time residents do, they have a different perspective on use of sovereign lands that either the resident or tourist population. They have a significant interest in maintaining the viability of the state-owned lands and can provide a source of assistance in management.	Thank you for your comment. Section 2.5 does not define full-time residents and tourists, nor consider them as specific user groups. Available socioeconomic data currently do not distinguish between full-time and part-time resident owners. Second homes are discussed in the Recreation and Tourism section, which would account for some part-time owners. No change has been made.
4	Email, paragraph 12	James Hanzelka	Lake level effects	4.12	p.114. Lake Level Effects, para. 3. States "At a lake level of 5915 no lakebed parking can occur in Garden City…" Current lake level is approximately 5916 and there is a significant amount of parking available on the lakebed. If the point was being made that the city managed lakebed parking area for day use is not useable then that should be clarified.	The 5,915-foot lake level includes a 100-foot buffer from the water line, which is necessary because travel is not allowed within 100 feet of the water's edge. Edits have been made to clarify the 100-foot buffer.
4	Email, paragraph 13	James Hanzelka	Agriculture	4.13	pp.120-121. This section contains information about the effect of agriculture on the study area. One aspect that is not included is the relationship of agricultural runoff and wetlands. The fingers of wetlands extending into the sovereign lands is the result of runoff canals adding extra water to the ecosystem. These create additional wetlands areas, some of them quite extensive. This effect needs to be included in the study.	We did not identify any scientific studies or data indicating that some of the wetlands around Bear Lake are due to runoff canal inputs. No change has been made.

Submission Number	Comment Type and Location	Commenter	Topic	Comment Number	Comment	Disposition/Response to Comment
4	Email, paragraph 14	James Hanzelka	Canals, irrigation ditches	4.14	p.131. under the section titled "Canals and Drainage Ditches" the comment is made that "A number of canals and ditches are located near Bear Lake but outside of the planning area." Clearly as shown above those drainage ditches extend into the lakebed as the water recedes below the OHWM.	Based on GIS mapping, one of the canals in Table 2-19 extends into the planning area. Text has been updated.
4	Email, paragraph 15	James Hanzelka	Bear Lake State Park usage	4.15	p.149., figure 2-60. It is interesting to note the dip in usage at Bear Lake State Park during the low water years of 2013 and 2014. The graph shows an increasing usage at the park, except those surrounding the lowest water years starting in 2013. After 2015 the increased usage continues to ramp up.	Thank you for your comment.
4	Email, paragraph 16	James Hanzelka	Parking	4.16	pp.152-153. This section talks about parking availability around the lake. It is clear that there is a lack of facilities to support use of the lake. In talking with Sen. Lyle Hillyard he pointed to the need for a coordinated use plan that the State could use to apply funds to support. While it might be outside the purview of this plan, the conclusions could support the idea of a funded study to improve the ability to use the lake and retain the uniqueness of the ecosystem.	Thank you for your comment. Documenting the parking problems at Bear Lake in the CMP will help identify solutions and apply for funding to alleviate some of the issues.
4	Email, paragraph 17	James Hanzelka	Wetlands	4.17	p.175. Table 3-4, In the chart at the end of the table, second paragraph under the heading High (5918-5923). The statement," non-open water wetland habitats on sovereign land may be less sustainable. Is in conflict with the statement on p.111 that "As the level of lake drops from 5923 the amount of exposed sediment increases. As shown in earlier sections this sediment is comprised of higher concentrations of non-organic materials, thus as the lake recedes the wetlands areas experience decreased water availability, eventually drying out and reducing the viability of the area in favor of less favorable sediment areas with limited vegetation.	The text on page 111 is describing areas of exposed shoreline (open ground) as the lake level drops. These are two different discussions not related to each other. At high lake elevations there is a lot of open water habitat but emergent wetland habitat is diminished as emergent areas around the edge of the lake become submerged.

Submission Number	Comment Type and Location	Commenter	Topic	Comment Number	Comment	Disposition/Response to Comment
4	Email, paragraph 18	James Hanzelka	Climate	4.18	p.179, Section 3-3. The fifth bullet under the heading Water Resources, states, "Recognition that a warming climate is resulting in a declining snowpack, reduced runoff, and increased evaporation and that the available water supply could be compromised." Is somewhat misleading. If you accept global warming theory, the reduction in polar ice would result in increased water in the overall system. This increased water availability along with the other factors mentioned indicate that overall, they water supply should be more than adequate, but year to year variation may result in larger swings in the availability in the system. We've just seen that with a well above average water year just a few years ago and a more limited water supply this year. This points to a need to better manage the resources in those high-water years than the current system provides.	Global warming is an accepted scientific fact. This bullet sentence is based on the information in Chapter 2, Climate, which is specifically for Rich County.
4	Email, paragraph 19	James Hanzelka	Stakeholders	4.19	p.197, Table 3-20. Should include private entities and stakeholders like Bear Lake Watch and adjacent landowner.	This table focuses on agencies with regulatory authority on or near the lake. Bear Lake Watch does not have any legal regulatory authority on or near Bear Lake. No change has been made.
4	Email, paragraph 20	James Hanzelka	Literature cited	4.20	Chapter 4, Literature Cited. Should include the article, "Urban and Storm Water Runoff – A Community Concern.", Ogden Valley News, May 15, 2021, p. 12.	The Literature Cited section includes only those works that have been cited in the text. This article has not been cited in the text. No change has been made.
4	Email, paragraph 21	James Hanzelka	Matrix	4.21	Appendix A, p. A-3. The chart shows no parking in the Garden City area when the lake level is above 5917 feet. This is not strictly true since at lake levels below 5918 there is sufficient exposed lakebed to park vehicles on the lakebed and maintain the 100 foot standoff from the water's edge. The problem is access. Below 5917 there are no public access points to allow the general public to park on the lakebed. There may need to be a separate category for adjacent landowners with access, who can launch and park equipment on the lakebed.	The matrix shows no parking in the Garden City area when the lake level is at 5,915 feet and above. This matrix reflects lakebed parking for the general public, not adjacent landowner access.

Submission Number	Comment Type and Location	Commenter	Topic	Comment Number	Comment	Disposition/Response to Comment
5	Email, N/A	Brian Hirschi	Motorized access	5.1	On the Bear Lake Comprehensive Plan draft, on page 171 it has a map of motorized accesses to beaches at Bear Lake, and whether its managed access or open vehicle access. I noticed at our Performance Rental location just north of the marina, its currently showing as open vehicle access. Obviously, the water has been high enough the last 10 years that nobody can drive on that beach area. But now that the water is going down and we're in a drought, possibly in the next few years the lake might be low enough again where there's enough beach exposed for vehicles. Traditionally when the water level was that low, we had our private party access to the sovereign lands where our watercraft renters would drive and park on the beach. From the Marina to the Hunt scout camp, there's no other private property along the lake side of the highway. In the past people would walk and use this beach area, but there was nowhere for them to access driving vehicles in this area. Along this stretch of highway there's natural barriers of large rocks, trees, and soft sand to prevent people from driving off the highway onto the beach. My concern is that since the popularity and demand for people trying to access the lake has more than tripled in the last 10 years, that if the water goes down far enough again, desperate people might somehow try to make an access road off the highway between the marina and our location to get their vehicles onto the beach when that's never happened before in the history of the lake. Maybe it would start with ATV's and UTV's blazing their way down, and then maybe later it turns into a regular road for all vehicles. Is there something that can be done to prevent this? Do I need to get our location and FFSL lease listed at Performance Rental as "managed motor vehicle access" on the BLCP, similar to Epic RV Park and Ideal Beach/Bluewater? Or do you think it be fine as it is, and people shouldn't be creating new roads to drive in this area when the water level goes down. I'm just trying to think ahead and be proactive about this.	FFSL shares some of your concerns. The intent is that the *Bear Lake Motorized Access Plan* can stand separately from the CMP, and the map shown is just an example of what we have currently in place. This allows for adaptive management so that we can make changes to motorized vehicle access without having to amend the CMP. There is good justification for limiting motorized access in that area if it becomes an issue. In the areas marked "managed access", we've generally limited any parallel travel through that area – which we could do for your lease area if that starts to become a problem and there are vehicles out on the shoreline north of the marina. Keeping vehicles off the shoreline entirely can be more difficult, particularly because of the public safety hazard of having them parked along the highway versus getting them off the highway and out onto the shoreline. FFSL is supportive of addressing any of these issues through a change in the motorized access plan as well as posting those restrictions if this becomes a problem. In addition, we have an objective in Table 3-17 to "Create a resource management plan specifically for motorized access at Bear Lake to replace the current *Bear Lake Motorized Access Plan* (FFSL 2015)."
6	Email, N/A	David Cottle	Comment period extension	6.1	At the draft CMP Zoom meeting we requested that the comment period be extended until Sept. Summer is so incredibly busy and to do the comments on the CMP justice the 21st of June doesn't give anyone much time to do a thorough job. Please let us know as soon as you've had a chance to discuss that request.	The comment period was extended two times, with a final end date of September 17.

Submission Number	Comment Type and Location	Commenter	Topic	Comment Number	Comment	Disposition/Response to Comment
7	Email, paragraph 1	Wes Thompson	General	7.1	I think some of the information that was emphasized (base on volume or ease of obtained) was on the wrong topics. Forestry Fire and State Lands (FFSL) has no regulatory authority related to Fish and Wildlife, Water Resources, or Socioeconomics. FFSL does have regulatory authority on the recreation resources that are part of the Community Resources. I think that is where the emphasis should have been.	Thank you for your comment. FFSL does have regulatory authority for fish, wildlife, and water resources that are below the 5,923.65-foot sovereign lands boundary. Socioeconomics was included in the CMP because it is connected to recreation and tourism, which are key activities at Bear Lake.
7	Email, paragraph 2	Wes Thompson	Irrigation withdrawals	7.2	Section 1.2 Page 14. Document states: Pumping of Bear Lake water ceases after the irrigation season is over, typically around the end of October. If Bear Lake is relatively full at the end of the irrigation season or large amounts of inflow are predicted, PacifiCorp is tasked with releasing water outside of the irrigation season, as necessary. Add: Post irrigation withdrawals can be very substantial and also produce income for PacifiCorp through the generation of electricity in downstream dams. These releases are typically initiated between or December before any substantial accumulation of snowpack has occurred. Lake levels could be maintained higher if the post irrigation releases did not occur. These releases prevent the lake from reaching or staying near its natural level, even with years with significant runoff.	FFSL prefers the existing language in the CMP. No change has been made.
7	Email, paragraph 3	Wes Thompson	Authorizations	7.3	Page 23 Section 1.8 Garden City Garden City also holds a large lease of sovereign lands with specific management requirements as part of that lease. The lease extends from the south side of the state park marina to near Ideal Beach. (I have included a digital copy of the lease for your reference – my copy may be for an older lease but I anticipate not much has changed.)	Correct. However, other than leases associated with marinas, the CMP does not identify and describe specific leases. Leases will be viewable on the GIS data viewer in the story map when the final CMP is published. This section is describing zoning only.
7	Email, paragraph 4	Wes Thompson	Authorizations	7.4	Page 29 – Section 1.12 Special Use Lease Agreements. The Garden City lease Agreement should be called out as an example of one of these, as I believe this is the largest lease on the lake.	We do not provide specific examples of leases in Section 1.12 (it reduces the need to update details of the CMP).

Submission Number	Comment Type and Location	Commenter	Topic	Comment Number	Comment	Disposition/Response to Comment
7	Email, paragraph 5	Wes Thompson	Figure edits, uniqueness of Bear Lake	7.5	Page 41 Figure 2-2 Looking northwest from near the west end of Rendezvous Beach towards Gus Rich point Page 41 Figure 2-3 Looking north from near the state line on the west side of the lake. Page 43 Uniqueness and Community Values. Bear Lake is also unique as it is one three large natural lakes in the State of Utah. Most of the other large water bodies in the state are man-made reservoirs. Bear lake offers premier recreation opportunities for boating and beaches that the other two natural lakes do not provide.	Both figures have captions that were taken from the photo source. No change has been made. A sentence has been added to the uniqueness and community values section.
7	Email, paragraph 6	Wes Thompson	Noxious weeds	7.6	Page 62 INTRODUCED, INVASIVE, AND NOXIOUS WEED SPECIES Anecdotal observations show the following noxious weeds increasing in the Garden City and Fish Haven areas in the last 10 years, indication current efforts are not sufficient to stop the spread of the following noxious weeds in upland areas adjacent to the lake: dyers woad, Scotch thistle, bull thistle, and Russian knapweed.	Thank you for your comment. FFSL will continue to monitor and treat noxious weed species in the planning area.
7	Email, paragraph 7	Wes Thompson	Hydrology	7.7	Page 94 Hydrology The document states: " The average winter/spring runoff increase in volume to Bear Lake from tributaries (based on data from 1922 to 2019) is approximately 18,321 acre-feet per year (approximately 25.3 cubic feet per second). The total average winter/spring increase in lake elevation from all sources (including the Bear River) (based on data from 2016 to 2020) was roughly 3.1 feet (Baldwin 2020). This was an unusually wet period (2016-2020). It would be better for the SWCA team to do their own 10 year and 30 year average and include those numbers too. And also include the average drop in elevation for the same years. Is there a 30- year trend that can be described? Is the lake filling or draining? A very important question for future management.	The 2016 to 2020 period of record was an error and should have been 1916 to 2019. The text has been corrected. There is not a lot of value in using a 10- or 30-year period (or another sub-time period). The lake is operated as a reservoir and on average the annual increase in elevation is roughly the same as the annual decrease in elevation. Our sources indicate that the lake elevation in any given year can't really be predicted by the previous year and that diversions in a given year are really driven by the water year in that year.

Submission Number	Comment Type and Location	Commenter	Topic	Comment Number	Comment	Disposition/Response to Comment
7	Email, paragraph 8	Wes Thompson	Water quality	7.8	Page 107 Water Quality Concerns The document states: "The primary water quality issues in the Bear River Basin are nutrient and sediment loading from agricultural activities and hydrologic modifications (Gerner and Spangler 2006)." Perhaps this statement could be better summarized or clarified. Is he talking about loads from adjacent lands or from upstream along the Bear River? I have not observed any sediment loading from agricultural activities into Bear Lake and doubt there are any significant agricultural sediment loads. The shoreline is too flat and mostly surrounded by extensive vegetation that prevents erosion from agricultural areas to occur. Most of the agricultural is grass hay, alfalfa or grazing. It is possible some nutrient loads occurs but overall, the adjacent lands do not appear to be heavily fertilized. I believe the "hydrologic modifications" (use of the lake as a reservoir) creates the bulk of the nutrient and sediment loads (See the photo on page 9, Figure 1-3) with input via the Rainbow Canal and the Causeway Inlet. Mike Allred with the DEQ has water quality data as does the USGS related to the concentrations and possibly loads from the inlet causeway. The Spangler 2006 report is dated and does not include any data from the recent high flows and large sediment and nutrient inputs in the past 10 years.	The following text has been added after the mention of Bear River Basin: "which includes northern Utah, southeastern Idaho, western Wyoming, and all of Bear Lake and the Bear River watershed)" to clarify that the statement is not specific to Bear Lake but rather the Bear River Basin and the Bear River. The remaining text on this page describes Bear Lake-specific water quality concerns.
7	Email, paragraph 9	Wes Thompson	Lake levels	7.9	Page 109 Lake Level Effects The document says: "Lake level is largely influenced by precipitation and water management (i.e., use of Bear Lake as a water storage reservoir)." I strongly disagree with this statement. The lake level is completely controlled by water management (i.e., use of Bear Lake as a water storage reservoir). Water management is largely influenced by precipitation. If the lake was not used as a reservoir, the lake levels would be very stable with minor fluctuation related to precipitation. Precipitation is a secondary variable. Second paragraph states: "Lake levels are reduced during drought conditions through diversion and net evaporation." The work diversion should be changed to withdrawals. The withdrawals impact lake levels not diversions.	Text has been edited to reflect these suggestions.

Submission Number	Comment Type and Location	Commenter	Topic	Comment Number	Comment	Disposition/Response to Comment
7	Email, paragraph 10	Wes Thompson	Sediment dynamics	7.10	Page 110 The Document says: "Although loading of total suspended solids and nutrients is greatest during high flow events in the Bear River, these are the flow regimes when Dingle Marsh is most effective at reducing loads (Allen 2011). High water levels in Dingle Marsh result in more water surface area and emergent vegetation area where water velocities are slowed, allowing for the settling and deposition of particles being transported by flow (Allen 2011). Dingle Marsh is less effective at reducing nutrient loading during periods of low flow due to the opposite scenario in which the marsh area is reduced (Allen 2011)." The Allen (2011) thesis measured only one year of discharge (2008) where discharge was only 77% of the mean historical discharge through the causeway (Basically a low runoff year). Maximum discharge (where sediment and nutrients can really mobilize) in 2008 was approximately 1000 cfs, which is less than 1/3 of the discharge measured during 2011 (3500cfs) I doubt that his conclusions on the effectiveness of the Dingle Marsh apply for higher flow regimes. His study did not measure bed load which at higher flows could be significant. The CMP document should note that the Allen 2011 study was for a low runoff year and may not reflect average or high runoff conditions. Drone flights during 2001 (contact Bear Lake Watch) appear to show the main flow taking a fairly direct path through the Dingle Marsh to the Causeway Inlet. These high flows likely remobilized sediment that was deposited during low flow years. During this below average water year, 4,600 Kg of total phosphorus was added to Bear Lake via the Causeway Inlet. Allen 2001 states "Total nitrogen loads did not decrease as water moved from the inlet (to Dingle Marsh) to the Causeway inlet." Allen also states regarding loads of total suspended sediment (TSS) "Although the composition of the TSS was not explicitly analyzed during this study, field observations showed the Causeway TSS to be made up primarily of plant material, where the Lifton TSS was primarily made up of mineral particles. " This finding documents that operation of the lake as a reservoir brings in plant material (that turns into muck- likely nutrient rich) and exports mineral (sand) material). This has a big impact on future management, water quality, and the condition of the shoreline and beaches.	Edits have been made to reflect these comments.

Submission Number	Comment Type and Location	Commenter	Topic	Comment Number	Comment	Disposition/Response to Comment
7	Email, paragraph 11	Wes Thompson	Sediment dynamics, wetlands, riparian corridors	7.11	Page 110 Sediment Dynamics The document States: "More frequent and longer-term monitoring of suspended sediment is needed to improve understanding of the system's sediment storage and release processes (Belmont et al. 2018). Can funding for these studies be part of the goals, recommendations, implementations of the new CMP? The Document States: Healthy riparian corridors and wetland areas also play a critical role in regulating sediment inputs into aquatic ecosystems such as Bear Lake. Why use "such as Bear Lake?" Does it happen at Bear Lake or not? This needs to be clarified more. The sediment input to Bear Lake is primarily from divisions of the Bear River and the input is via the Causeway Inlet. Very little sediment comes from the other creeks that discharge into the lake as they are pretty low gradient streams and drop most of their sediment before they reach the lake, and their total flow volume is pretty minor compared to the input from the Bear River.. The riparian are area that impacts sediment to the lake is on the Bear River upstream of Stuart Dam. The Rainbow inlet canal generally has no riparian area. Modify the first paragraph on Page 111 to read Protection of healthy wetlands and riparian corridors in the Bear River upstream of the lake may help reduce sedimentation in Bear Lake.	The CMP has two objectives that address sediments: Support studies to better understand lake circulation and sediment processes and how they are impacted by fluctuating lake levels. Support research of sediment dynamics at Bear Lake, including the influence of lake levels on sediment movement. FFSL will support this research by collaborating with other interested agencies and seeking funding where needed. Minor edits were made for clarification.

Submission Number	Comment Type and Location	Commenter	Topic	Comment Number	Comment	Disposition/Response to Comment
7	Email, paragraph 12	Wes Thompson	Sediment dynamics	7.12	Page 111 The document states: "During high lake elevations and particularly while sediment-rich flows are entering the lake from Bear River via Mud Lake, sediments are deposited and re-distributed along the lake shoreline. These sediments create and sustain sandy shoreline areas that are coveted for recreation on the lake. This is not accurate. Your are mixing two different things. The document be revised to and substitute the following paragraphs. "During high lake elevations, shoreline sediments are eroded from some shorelines and deposited and re-distributed along the lake shoreline. These sediments create and sustain sandy shoreline areas that are coveted for recreation on the lake." "While sediment-rich flows are entering the lake from Bear River via Mud Lake, vegetation pieces and particles and find grained suspended sediments are deposited along the lake shoreline. These sediments create a fine grained, nutrient rich organic muck the covers and degrades the sandy shoreline areas that are coveted for recreation on the lake – particularly in area with gently sloping shorelines.	Edits have been made to reflect these comments.
7	Email, paragraph 13	Wes Thompson	Marinas	7.13	Page 122 Marinas. You may want to put a sentence in here about the CMP can accommodate new marinas, however the best size and location for constructing a new marina or expanding existing marinas would likely require an Environmental Impact Statement under US Army Corps of Engineers regulations.	Table 3-2 in Chapter 3 of the CMP indicates that marinas are potentially allowable at the lake, and that USACE and DEQ regulatory approval would likely be required. No change has been made.

Submission Number	Comment Type and Location	Commenter	Topic	Comment Number	Comment	Disposition/Response to Comment
7	Email, paragraph 14	Wes Thompson	Canals, irrigation ditches	7.14	Page 131 Canal and Irrigation Ditches The Document States :"There are no known canals or irrigation ditches in the planning area (DWRi 2014). There are ditches within on the lake bed. Some of these likely predate the clean water act. I have attached the BIO-WEST report that mapped the ditches within the Garden City lease area as a digital file for your reference. These ditches were installed (typically by adjacent landowners) to assist in moving: storm water, irrigation return flows, water from springs and seeps, and water discharging from wetlands both above and below the ordinary high water mark to the lake. These ditches also help reduce deer fly and mosquito habitat by eliminating or reducing shallow pools of standing water and lakebed vegetation. Garden city has obtained a Corps permit to maintain a number of these ditches.	We received and reviewed your earlier comments on these ditches. FFSL is aware of them but has chosen not to discuss them in the CMP. This text has been modified for clarity.
7	Email, paragraph 15	Wes Thompson	Shoreline	7.15	Page 143 Bear Lake Shoreline The shoreline only got less than one page of existing conditions documentation? This is really the only area where FFSL has any regulatory authority. This is where a large majority of the recreation happens. This is where the CMP can make a positive impact. There should be a big list of bullet point on how the shoreline has been impacted and is currently impacted by fluctuating water levels from use of the lake as a reservoir. I am disappointed my scoping comment was not given more weight.	This section is focused on visual resources and the Bear Lake shoreline. The shoreline of Bear Lake is discussed *throughout* the CMP because it is so interconnected with other Bear Lake resources (e.g., recreation, wetlands, visual resources, water quality). This was a conscious choice. In addition, there is not a lengthy section on shoreline sediment dynamics (see Water Quality) because of the lack of scientific data on sediment movement with lake level changes at Bear Lake.

Submission Number	Comment Type and Location	Commenter	Topic	Comment Number	Comment	Disposition/Response to Comment
7	Email, paragraph 16	Wes Thompson	Water quality, visual resources	7.16	Page 144 The document states: "However, the clarity of the northern portion of the lake could temporarily be affected if increased sediment or turbidity is introduced into the lake from spring flows via Mud Lake." This needs to be corrected to state: "However, the clarity of the northern portion of the lake has been affected by increased sediment or turbidity that was introduced into the lake from spring flows via Mud Lake." If you want to interview me or Bear Lake Watch and add a personal communication citation, you know how to contact each of us. The water was very turbid and green and full of algae rather than blue in the north half of the lake until August after the 2011 high runoff event. I am not sure if Idaho or Utah's water quality measurements captured with turbidity or Secchi disk measurements. Bear Lake Watch might know who has this data if it was collected. This was before the USGS platforms were in place.	Edits have been made to reflect these comments.

Submission Number	Comment Type and Location	Commenter	Topic	Comment Number	Comment	Disposition/Response to Comment
7	Email, paragraph 7.17	Wes Thompson	Carrying capacity, lakebed parking	7.17	Page 146 Recreation and Access Document states: "Access must be balanced to protect the lake. Too many access points can damage the lake ecosystem and recreational experience; too few access points can limit opportunities to experience the lake, create crowding at particular areas, and reduce the public support for and use of the lake. For these reasons, spacing of access points is important." I agree with the above paragraph. In the goals and the objectives there needs to be studies carried out to determine the carrying capacity of the lake and the shoreline. How many boats can be on the lake before the users experience is degraded. How many people or vehicles can the beach handle at the state parks or the southwest area or the Garden City lease before the crowding reduces the user experience and causes both conflict with people because they are crowded together and degradation of the shoreline or water in the lake. Since the Garden City lease is where I have the most experience, I would suggest the lakebed parking be limited so that each vehicle has 30 feet of beachfront (might could be less in a state park area where there is more intensive management). That gives 10 feet for a canopy and 10 feet on each side for your other stuff without encroaching into the next group's "personal space". The Garden City lease is not like a State park. There are no signs to educate the public on the rules, no full time employees, no infrastructure, no one to pick up trash, maintain order, sell permits, enforce the rules, etc. Also, the adjacent property owners also need their 30 feet to access the water and set up their spot on the beach. The conditions of the Garden City lease are very loosely enforced by FFSL. The leasing process is not transparent and there is no opportunity for public input on the terms of the lease or competitive bids on the lease area. The lease process needs to be changed.	Table 3-17 in Chapter 3 contains an objective for carrying capacity: "Work to understand the lake's ecological health in the context of increasing visitation; consider assessing the lake's carrying capacity for recreation users at various water level elevations or in the three lake level management zones." Modifications to the Garden City lease stipulations are outside the scope of the CMP.

Submission Number	Comment Type and Location	Commenter	Topic	Comment Number	Comment	Disposition/Response to Comment
7	Email, paragraph 18	Wes Thompson	Motorized access	7.18	Page 157 Motorized Access I personally would like to see the limit for parallel travel outside of the State Parks reduced from 500 yards to 175 yards or 0.1 miles. This is a distance that someone can read on an odometer. Also where there is public vehicle access, there need to be signs or other designations (rope or tape) to show where the limit is located. Otherwise vehicles will travel as far as they want to find the "best" spot or the most uncrowded spot. The parallel travel brings a host of user conflict issues, safety concerns, and resource impacts and should be limited. The state parks can allow parallel travel to whatever they feel is needed within the Fee area of the park – they have the proper management tools. Outside the State Parks, the management tools are not in place.	The CMP has an objective in Table 3-17 to "Create a resource management plan specifically for motorized access at Bear Lake to replace the current *Bear Lake Motorized Access Plan* (FFSL 2015)." We will consider your parallel travel comments as part of this resource management planning process. We also have an objective in the same table that addresses signage: "Work to reduce user conflicts through education, signage, designated uses for specific locations, and enforcement of regulations."
7	Email, paragraph 19	Wes Thompson	Signage	7.19	Page 167 Educational Materials It is critical that large signs be posted with the rules for beach use where ever vehicle access is permitted. Signs are currently severely lacking.	A signage objective has been added to Table 3-19 under Education Goal 3.

Submission Number	Comment Type and Location	Commenter	Topic	Comment Number	Comment	Disposition/Response to Comment
7	Email, paragraph 20	Wes Thompson	Shoreline restoration, desired future conditions	7.20	Page 169 Introduction I really do not see anything here that pushes restoration of the lake and shoreline (as far as possible given its current use as a reservoir and the degradation related to that use) to the conditions it was when it was obtained by the state to be managed for the public trust. The document should talk about restoring the beaches, not the anthropomorphic lakebed wetlands. The sand that has migrated into deeper water should be dredged back out and put at and above the median lake level. The anthropomorphic wetlands should be managed by disking, mowing or other means to promote recreation and pre-reservoir conditions. FFSL should acquire the necessary permits and funding to take these actions. FFSL should take actions to acquire permits and funding to remove the vegetation debris and muck that have accumulated on the lake bed from using this unique and formerly pristine lake as a reservoir. FFLS should purse mitigation funding from PacifiCorp to carry out these actions as they are directly or indirectly responsible for the impacts caused by using the lake as a reservoir and they generate substantial profits from using Bear Lake as a reservoir, with little or costs to them. FFSL should also have as a long term goal to obtain water rights (similar to instream flows), legislation, etc., to restore water levels to a more natural condition. This is really my biggest point that I think is lacking from the DRAFT CMP. Related to this: What are the desired future conditions? (Page 172). I really do not see them succinctly spelled out.	Section 3.2 includes the following desired future condition: "Restoration or enhancement of degraded areas to improve overall ecological function and condition." This would include beaches. FFSL does not have any mandate to restore the lake to specific conditions or to a specific point in time. Our mandate is to manage to the Public Trust. FFSL is working to balance the beneficial use of the resource with the long-term protection of Public Trust values. It is outside FFSL's capacity to obtain permits, go in and remove material, disc the beaches, etc. FFSL will, however, seek to facilitate said actions with others where most beneficial. Desired future conditions are specifically listed on page 174, 179, 184, and 186 of the CMP.

Submission Number	Comment Type and Location	Commenter	Topic	Comment Number	Comment	Disposition/Response to Comment
7	Email, paragraph 21	Wes Thompson	Public Trust responsibilities	7.21	What are the Public Trust responsibilities of FFSL? The public trusts you to manage the lake to preserve it as close to reasonably possible to conditions when you became responsible for the lake. Are you desiring to manage the lands for those future conditions? There needs to be more emphasis in going that direction in this CMP. The lake and shorelines have been degraded over the last 100 years and need some serious actions to restore them.	The Public Trust over sovereign lands is described in detail on page 6 of the CMP. FFSL's management responsibilities are described in detail on pages 6 and 7. As stated on page 7, the State of Utah recognizes that protection of navigation, fish and wildlife habitat, aquatic beauty, public recreation, and water quality (Public Trust values) must be balanced with any proposed use (Utah Administrative Code R652-2-200). Implementation of multiple-use policies must avoid substantial impairment of Public Trust values. FFSL strives for an appropriate balance among compatible and competing uses on Bear Lake. Therefore, the overarching management objectives of FFSL are to balance the use of and sustain the Public Trust resources and to provide for reasonable beneficial use of those resources consistent with their long-term protection and conservation. As stated in Chapter 3, the desired future conditions provide a resource benchmark that FFSL seeks to accomplish through the implementation of the CMP and its associated goals and objectives.
7	Email, paragraph 22	Wes Thompson	Mowing	7.22	Page 171 Use Classes Footnote on Table 3-2 related to mowing. There is no critical nesting after August 31.	Edits have been made to the footnote.
7	Email, paragraph 23	Wes Thompson	Dredging	7.23	Question : Would maintaining the previously mentioned ditches be considered dredging? Private parties are the ones who have maintained this ditches in the past. It is hard to get cities, the county, FFSL, State Parks, etc. to be committed to maintain these ditches so unless private parties can do it, it does not get done and the beaches turn into mosquito habitat.	Yes, this would be dredging. Dredging is potentially allowable in all lake use classes but requires an authorization from FFSL. See Table 3-2 in Chapter 3.

Submission Number	Comment Type and Location	Commenter	Topic	Comment Number	Comment	Disposition/Response to Comment
7	Email, paragraph 24	Wes Thompson	Objectives	7.24	Page 174 and 175 Table 3-4 Should include another objective: Protect and if possible and restore and enhance littoral sand habitats on sovereign lands. Fish and wildlife habitat goal 4. This should include invasive fish like the carp in the State Park Marina. I have witnessed the carp feeding on the eggs of spawning native Utah suckers. These carp in the marina are huge and well fed (is the marina still selling carp food which is technically illegal – feeding wildlife requires a permit) and can produce millions of eggs. The carp compete with the native fish for nutrients and food in a lake that is already low in productivity. The State is spending millions of dollars to remove carp in Utah lake but in Bear Lake they are feed an almost protected in the Marina (no fishing allowed in the marina). Objective related to noxious weeds: Russian knapweed is also found around the uplands at the lake. Populations are present on the Epic harbor dikes. FFSL need to obtain more funding to treat the invasive weed for more manpower or to hire contractors to assist them.	Thank you for your comments. We haven't discussed or defined "littoral sand habitats" in the CMP and do not agree that it is a defined or typical habitat type. Therefore, we haven't added the suggested objective. The Fish and Wildlife Species Goal 4 in Table 3-5 discusses aquatic invasive species, which could include carp. Goal 4 in Table 3-4 and the associated objectives are broad so that they allow for the treatment of any invasive and noxious weed species, including Russian knapweed. No change has been made.
7	Email, paragraph 25	Wes Thompson	Parking	7.25	Page 175 Management Considerations Establish Lakebed parking capacities. See previous comment recommending capacity of no more than 30 feet of beach front per vehicle outside of the State Park fee areas. No double or triple rows of vehicles .	Please see the management considerations under Table 3-17. The CMP has an objective in Table 3-17 to "Create a resource management plan specifically for motorized access at Bear Lake to replace the current *Bear Lake Motorized Access Plan* (FFSL 2015)." We will consider your lakebed parking comments as part of this resource management planning process.

Submission Number	Comment Type and Location	Commenter	Topic	Comment Number	Comment	Disposition/Response to Comment
7	Email, paragraph 26	Wes Thompson	Aquatic invasive species	7.26	Page 177 Table 3-5 Fish and wildlife species goals and objectives. Goal 4. Aquatic invasive species If FFSL really wants to take a visionary step in protecting the aquatic resources in Bear Lake as well as the shoreline recreation and resources, it should prohibit all boats with ballast tanks or ballast sacks from launching at Bear Lake. Or at a minimum require professional decontamination before launching, no matter where that boat has been previously or how long it has been out of the water. I am extremely concerned that that lake will someday get infested with invasive mussels and never be the same again. The checking stations close at 10:00 and do not inspect a large number of boats. It is very difficult to completely dry out a ballast tank or ballast bag in a wakeboard or surf boats. Some of these boats are coming from Lake Powell or out of state. Sooner or later an infested boat will launch at Bear Lake and crash the eco system and spread invasive mussels downstream all the way to the Great Salt Lake marshes. Banning ballast boats or requiring professional treatment will cause a huge public uproar but is not without precedent. Twin Lakes and Glendale reservoir in Cache Valley (Idaho side) took this step several years ago. Businesses will spring up in Garden City, Laketown and St. Charles to meet the need. If visitors want to come boating at Bear Lake, they can chose to downsize to a less expensive type/size of boat (who can argue against saving money?) or go through the decontamination process. Bear Lake is not just some reservoir, it is the premier natural lake recreation area in the state of Utah and deserves premier protection measures. Also, these large ballast filled boats have proven to be less seaworthy than traditional boats. Two of the highly publicized boating accidents (one with deaths) at Bear Lake where these types of boats. These large boats create huge wakes for surfing than can be a hazard to smaller craft and they also greatly add to the rough water on crowded weekends – adversely impacting the user experience for other boaters.	FFSL supports the control and eradication of aquatic and invasive species. We will continue to coordinate closely with DWR's efforts to control and eradicate these species and with DSP on their efforts to maintain and carry out boating laws and restrictions.

Submission Number	Comment Type and Location	Commenter	Topic	Comment Number	Comment	Disposition/Response to Comment
7	Email, paragraph 27	Wes Thompson	Goals	7.27	Page 182 Water Quality Goal #3 Regarding restoring wetlands. Are there any wetlands below the full pool levels that need restoration? All of them that I have observed seem to be thriving. Other than a few scattered bulrush patches, most of these wetlands are anthropomorphic wetlands created by use of the lake as a reservoir. Most of these wetlands would be underwater (open water classification rather than wetlands) and the lake bottom would mostly be devoid of vegetation under natural conditions. The wetlands need to be managed not restored. While wetlands can provide great benefits in natural locations, the anthropomorphic wetlands that have formed on the lake bed at Bear Lake impede movement of the sediment required for maintaining the sandy beaches that Bear Lake is famous for. These wetlands create deer fly and mosquito habitat that can be vectors for disease transmission and also degrade the recreational experience. The can be a detriment to visual resources by blocking the view of the water. They also can impede walking access as they are difficult to walk through when thick and tall. The wetlands also trap the muck and vegetative debris transported into the lake via the Inlet Causeway during high flows. These wetlands also contribute to the muck and vegetative debris deposited on the shoreline when they are killed by high water levels following a period of low water levels. As noted previously, the goal should be for FFLS to maintain these shoreline areas by mowing, disking, etc. to restore the lake and shoreline to a condition more similar to its condition at Statehood as required by the public trust doctrine. FFSL should obtain/provide the appropriate permits, funding, manpower, equipment, contracts, etc., to make this happen.	The Public Trust Doctrine does not require restoration to conditions as they were at statehood. FFSL will only support wetland restoration where needed and most effective per Water Quality Goal 3, Objective 4.
7	Email, paragraph 28	Wes Thompson	BMPs	7.28	Page 189 Figure 3-7. Below Grade Utilities section. There are no floodplains on sovereign lands at Bear Lake. Does scour occur anywhere at Bear Lake?	This BMP has been edited to reflect your comment.

Submission Number	Comment Type and Location	Commenter	Topic	Comment Number	Comment	Disposition/Response to Comment
7	Email, paragraph 29	Wes Thompson	Lake levels	7.29	Page 190 Visual Resources Table 3.16 Low water levels Management considerations. Document states: Vegetation on the lakebed may dry out and die if water sources are lacking. Has this been documented anywhere? I have not witnessed any vegetation on the lakebed dying because of lake of water. I have observed vegetation dying because it was inundated numerous times.	If water levels stay consistently low over several years, some vegetation below the OHWM but not near the water line could dry out and die. An edit has been made for clarification.
7	Email, paragraph 30	Wes Thompson	Carrying capacity	7.30	Page 191 Recreation and Access Table 3-17 Last objective in table related to overcrowding. Please see previous comments on carrying capacity related to Garden City lease area. Also, Garden City has three access streets that can support lakebottom vehicle access near down town: 150 south, 75 north, and 200 north. In the past number of years, only 150 south has been used with all traffic directed to the south. It would decrease impacts if the other accesses where also used (perhaps on a daily rotating basis). This would decrease the overcrowding impacts and resource impacts. Right now the adjacent shore owners south of 150 south bear the brunt of the impacts of vehicle access on the shoreline while other Garden City areas have no impacts from the lease. As noted previously, the carrying capacity need to be evaluated. The lease currently does not have a limit. There could be 500 or 5000 vehicles there under the current lease	All three of these streets are included in Table 2-21 as public recreation access areas in Garden City. Modifications to the Garden City lease stipulations are outside the scope of the CMP. Table 3-17 in Chapter 3 contains an objective for carrying capacity: "Work to understand the lake's ecological health in the context of increasing visitation; consider assessing the lake's carrying capacity for recreation users at various water level elevations or in the three lake level management zones."

Submission Number	Comment Type and Location	Commenter	Topic	Comment Number	Comment	Disposition/Response to Comment
7	Email, paragraph 31	Wes Thompson	Etiquette, education	7.31	Page 196 Education Figure 3-13 Suggested Lake Etiquette I would suggest that FFLS take steps to educate the public on a boating best management practice. This would be to discourage "power turns." Power turns are when a skier, boarder, surfer, tuber or whatever being pulled behind the boat crashes and the boat make a turn under full or moderate throttle to return to puck them up. This creates a large wake that moves out in a 360 degree pattern, sending these large waves to all portions of the lake. The better practice is for the boat to return to an idle or wakeless speed and then make a 180 degree turn and idle back to the fallen skier. This only takes about 10 seconds longer and gives the skier time to pull up or down (as needed) their swimming suit, catch their breath, put the ski or board back on, etc. In emergencies a power turn can be merited. Grandpa or Dad taught the power turn back in the 1960s and 70s and it is an outdated procedure with today's busy lakes. It creates unnecessary waves. You may find some documentation related to power turns in older editions of Waterski Magazine. Here are a couple of You Tube videos on the subject. https://www.youtube.com/watch?v=UX622fVXLdY https://www.youtube.com/watch?v=QYahRgfmXkM (take a look at the comments). Also boater should be encourages to two skiers, boarders etc. in a north south direction. This way the waves only have to travel 5-8 miles to the nearest show before they dissipate rather than 20 miles. This will reduce the overall roughness of the water. Hyrum Reservoir requires driving in a counter clockwise direction (for safety on a small reservoir) so this is not something unprecedented. It may take a while and a lot of education. Some signs at the boat ramps would be the place to start with educating on both Power turns and driving direction. In 5 years or so, everyone would get the word and see the benefit.	Thank you for your comment. See Education Goal 3 in Table 3-19: "Develop and provide information to lake users on stewardship and proper lake etiquette." DOR enforces boating laws and regulations.

Submission Number	Comment Type and Location	Commenter	Topic	Comment Number	Comment	Disposition/Response to Comment
8	Project website submission, paragraph 1	Bruce Chapman	Access	8.1	On page 146 it reads "Too many access points can damage the lake ecosystem and recreational experience." Since the multitude of access points is detrimental to both, I would like to see access limited. My cabin is close to the Blue Water Beach commercial operation, overcrowding greatly diminishes the lake experience for all of us close to BWB along with eco systems that are damaged by overuse. Not too far to the west of BWB, I observed a Sandhill Crane trying to incubate her eggs in the bull rushes. She wouldn't have stood a chance to hatch her eggs if the nest was nay closer to BWB.	Thank you for your comment. FFSL understands your concerns. The CMP has several goals and objectives related to access, including "Balance recreational access with the need to protect sensitive areas or wildlife" and "Consider limiting or prohibiting new recreation authorizations in areas of high recreation conflict." Please see Table 3-17.
8	Project website submission, paragraph 2	Bruce Chapman	Motorized access	8.2	Motorized vehicle use on the beaches is out of control. Years ago the use of motorized vehicles was limited to watercraft launching by permit. That seems to have gone by the wayside with vehicles crowding the beach areas, parking wherever and racing back and forth on the dry lakebed. This not only is environmentally destructive, but also a safety hazard. It would be best to eliminate any motor vehicles on the beaches except for launching. Even though the racing of ATV's IS illegal, there is not enforcement in place to regulate this activity. I also worry about the toxic fluids and oils that may be leaking from these parked vehicles.	The CMP has several goals and objectives related to motorized access in Table 3-17, including the following: Work to reduce user conflicts through education, signage, designated uses for specific locations (e.g., scuba diving), and enforcement of regulations. Work to better educate recreation users about motorized vehicle rules, beach launching rules, the current Bear Lake Motorized Acces Plan (FFSL 2015), and any other plan for motorized access that may be developed in the future. Create a resource management plan specifically for motorized acces at Bear Lake to replace the current *Bear Lake Motorized Access Plan* (FFSL 2015).
9	Project website submission, paragraph 1	Zac Covington	Connected land management plans	9.1	Connected Land Management Plans - add the Rich County Trails Plan, 2018 as well as General Plans for the county, Garden City, and Laketown. These are being updated as we speak. Also, I don't see Bear Lake Watch anywhere (in the TOC anyway) - might be good to add them. I noticed the trails guide is mentioned on page 154, but not the plan.	The Rich County trails plan is discussed under the section for the Rich County Resource Management Plan. The general plans for Garden City and Laketown are discussed in Section 1.10. We included the Rich County Resource Management Plan in the CMP (rather than the general plan) because it seemed most applicable. FFSL has typically not listed non-profits in its CMPs.

Submission Number	Comment Type and Location	Commenter	Topic	Comment Number	Comment	Disposition/Response to Comment
9	Project website submission, paragraph 2	Zac Covington	Surrounding land uses	9.2	Also, I think it is critical to have a discussion on surrounding land uses, particularly residential and commercial. One map with the Utah Water Related Land Use classifications showing all uses including urban areas, roads and streets, stream corridors/riparian areas, wetlands, various types of farmland, etc. would really paint a picture of how those uphill uses can impact the lake. There is currently a conceptual diagram showing non-point source types, but I think you also need a map and some text explaining how specific land uses uphill and upstream can and will impact the water quality in the lake at some point and at some threshold. This includes impervious surfaces, disturbed soils, and other growing non-point source surfaces. I realize this goes beyond the immediate shoreline area, but land use all around the valley impacts water quality and quantity of the lake.	The water quality concerns section of the CMP adequately addresses potential water quality concerns from upstream uses, especially since FFSL does not have jurisdiction above the OHWM. FFSL is supportive of upstream land use decisions that may improve water quality at Bear Lake and will coordinate with upstream users and other state agencies on BMPs to promote the health of Bear Lake, as applicable.
9	Project website submission, paragraph 3	Zac Covington	Technical edit	9.3	On page 198, BRAG is listed on the table to the right. We don't do anything with lake or surrounding use management, so please remove that marker. We do planning and research to a certain extent for local governments and the BL Regional Commission.	The suggested change has been made.
9	Project website submission, paragraph 4	Zac Covington	Literature cited	9.4	I did my master's thesis years ago on land use planning processes for the Bear Lake Region. You are welcome to add that to your literature cited list if you like - here is the link: https://laep.usu.edu/files/BearLakeProject_Final.pdf. Also, I would add the Rich County trails plan.	Thank you for the information. The Literature Cited list only includes those documents that we have referenced in the CMP text. The Rich County trails plan is discussed under the section for the Rich County Resource Management Plan.
10	Project website submission, N/A	Christopher Chesnut	Transportation, parking	10.1	With all of the visitors to Bear Lake, transportation and transportation supporting uses need to be taken into account for their impact on the area. For example, parking is becoming an issue. There are safety and natural environment impacts from the visitation. We should evaluate opportunities for accommodating visitors and protecting the natural environment.	Thank you for your comment. The CMP includes information on current transportation and parking issues in the Community Resources section, as well as goals and objectives for addressing these issues in Chapter 3. As described in Section 1.2 of the CMP, the overarching management objectives of FFSL are to balance the use of and sustain the Public Trust resources (navigation, fish and wildlife habitat, aquatic beauty, recreation, and water quality) and to provide for reasonable beneficial use of those resources consistent with their long-term protection and conservation.

Submission Number	Comment Type and Location	Commenter	Topic	Comment Number	Comment	Disposition/Response to Comment
11	Project website submission, N/A	Gary Larsen	Lake protection	11.1	Bear Lake is one of the few real "jewels" of the intermountain West. Everything possible should be done to keep it as pristine as possible. It is difficult to understand How a private for profit corporation such as Rocky Mountain Power has the sole authority to determine how much water to pump out of the Lake. They have little incentive to preserve as much water as possible in the lake. It seems like this authority should be in the hands of the people and of the government that have the incentive to preserve and maintain the beauty and recreational properties of the lake rather than pump it out for power and farming.	Thank you for your comment. Section 1.2 of the CMP provides an explanation of the historical context and current role of PacifiCorp and Bear Lake. FFSL has no legal authority to adjudicate water rights (or control lake levels) in Bear Lake.
12	Email, N/A	Barbara Sabo	Shoreline	12.1	For the record, on behalf of those of us who value the shoreline resources, I would like to note that Bear Lake is a recreational lake. We would appreciate the cooperation of both Utah and Idaho in tending the shoreline where public beach is available. The current state of most of the sandy areas open to the public is quite hazardous. Broken reeds, clay muck, and an ever-growing assortment of dangerous rocks make the beaches undesirable. We pay taxes to both states to maintain our state parks and natural resources. It is time to focus time and money on optimizing the Bear Lake environment for the enjoyment of all.	Thank you for your comment. Please see Chapter 2, Community Resources, Recreation and Access for our understanding of recreation at Bear Lake. Please see Chapter 3, Tables 3-16 and 3-17 of the CMP for visual resources and recreation and access goals and objectives, some of which address shoreline improvements. Many of the goals and objectives in Chapter 3 offer opportunities for collaboration in the management of the lake.

Submission Number	Comment Type and Location	Commenter	Topic	Comment Number	Comment	Disposition/Response to Comment
13	Email, N/A	Bruce and Sue Sakashita	Uniqueness, biodiversity, current conditions, lake level effects, shoreline owners	13.1	As members of Bear Lake Watch, we wholeheartedly support the issues raised by Bear Lake Watch concerning the proposed CMP, summarized as follows. 1. Does not acknowledge and address the uniqueness of the Lake and desire to preserve such qualities 2. Prioritizes biodiversity over biosecurity regarding the Lake's unique indigenous species and environment 3. Accepts the current condition of the unnatural waterfront, even though it has declined dramatically over the years and continues to deteriorate 4. Does not address the deleterious effects resulting from use of the Lake as a reservoir with artificial water-level fluctuations (including irreversible adverse effects on the health of humans and wildlife) 5. Does not reflect some important issues addressed in the 2009 CMP and commitment to work with the shoreline owners.	Thank you for your comment. 1. The uniqueness of Bear Lake is discussed in Section 2.2 of the CMP. Many of the desired future conditions and goals and objectives in Chapter 3 will help protect the unique qualities of Bear Lake. 2. *Biosecurity* is defined by the Food and Agriculture Organization of the United Nations as an integrated approach for analyzing and managing relevant risks to human, animal, and plant life and health, and associated risks to the environment. Biosecurity covers food safety, zoonoses, the introduction of animal and plant diseases and pests, the introduction of living modified organisms, and the introduction and management of invasive alien species. The CMP is designed to be a broad management plan (see Utah Code 65A-2-1) that can be implemented within FFSL's current executive authority, not an assessment of biosecurity hazards and their associated risks. Bear Lake's unique indigenous species (e.g., fish) and environment are described in detail in Chapter 2, and Chapter 3's goals and objectives offer ways to protect these important resources at Bear Lake. 3. The CMP describes the current conditions of the lake and outlines desired future conditions as resource benchmarks to work toward using Chapter 3's goals and objectives. For example, one of the desired future conditions is "Restoration or enhancement of degraded areas to improve overall ecological function and condition." Please note that Bear Like is a highly managed, constrained system and as such, restoration to an earlier condition may be unrealistic. 4. The CMP recognizes that changing lake levels caused by use of the lake as a storage reservoir affect the lake's resources. These impacts are discussed in multiple Lake Level Effects sections throughout the CMP, including one for wildlife. The goals, objectives, and management considerations in Chapter 3 seek to address some of the negative impacts of these fluctuating lake levels. 5. Table 3-17 of the CMP has the following objective: Seek opportunities to collaborate with adjacent landowners and user groups on shoreline improvements. Additional outreach goals and objectives have been added to the Education and Outreach Table 3-19.

Submission Number	Comment Type and Location	Commenter	Topic	Comment Number	Comment	Disposition/Response to Comment
14	Email, N/A	Dave Tyszko	General	14.1	we support the comments put forth by Bear Lake Watch. Thank you for all your great efforts to keep Bear Lake the unique and regal body that it is.	Thank you for your comment.
15	Email, N/A	Janette Sonnenberg	Uniqueness, biodiversity, current conditions, habitat, lake level effects, sediment and nutrient loading, shoreline owners	15.1	I agree with Bear Lake Watch's observation of the 'Bear Lake Comprehensive Planning' in that this plat: •Does not seem to recognize or revere the uniqueness of Bear Lake •Seeks Biodiversity rather than Biosecurity of our specialized species and systems •Institutionalizes the damage & degradation – accepts boggy shoreline is original or desired condition. •Sees degraded, buried and transformed sand and cobble shores as "habitat" and "wetlands" •Does not focus on the critical effects to the lakebed systems caused by using the lake as storage facility. •Recognizes Lake Level fluctuation but not problems of sediment and nutrient loading •Does not bring forward the issues of the 2009 CMP and commitment to work with the people	Thank you for your comment. The uniqueness of Bear Lake is discussed in Section 2.2 of the CMP. Many of the desired future conditions and goals and objectives in Chapter 3 will help protect the unique qualities of Bear Lake. *Biosecurity* is defined by the Food and Agriculture Organization of the United Nations as an integrated approach for analyzing and managing relevant risks to human, animal, and plant life and health, and associated risks to the environment. Biosecurity covers food safety, zoonoses, the introduction of animal and plant diseases and pests, the introduction of living modified organisms, and the introduction and management of invasive alien species. The CMP is designed to be a broad management plan (see Utah Code 65A-2-1) that can be implemented within FFSL's current executive authority, not an assessment of biosecurity hazards and their associated risks. This is not correct. The CMP describes the current conditions of the lake and outlines desired future conditions as resource benchmarks to work toward using Chapter 3's goals and objectives. For example, one of the desired future conditions is "Restoration or enhancement of degraded areas to improve overall ecological function and condition." We disagree with this assessment. Habitat types, including wetlands, are specifically described in Section 2.3, which includes a discussion of lake level effects on these habitats. See Table 3-2 for actions that can be taken with proper FFSL authorization to manage shoreline vegetation. The CMP recognizes that changing lake levels caused by use of the lake as a storage reservoir affect the lake's resources. These impacts are discussed in multiple Lake Level Effects sections throughout the CMP. The goals, objectives, and management considerations in Chapter 3 seek to address some of the negative impacts of these fluctuating lake levels. See Lake Level Effects sections, especially in Section 2.4. Sediment and nutrient loading are discussed in Section 2.4 under Water Quality. Table 3-17 of the CMP has the following objective: Seek opportunities to collaborate with adjacent landowners and user groups on shoreline improvements. In addition, Chapter 1 states the following: "Community involvement in ongoing sovereign lands management (e.g., projects involving restoration or education) is encouraged, assuming efforts are coordinated with and approved by FFSL." Additional outreach goals and objectives have been added to the Education and Outreach Table 3-19.

Submission Number	Comment Type and Location	Commenter	Topic	Comment Number	Comment	Disposition/Response to Comment
16	Email, N/A	Doug and Lorna Koci		16.1	We agree with Bear Lake Watch's summary of concerns after reviewing the CMP Update draft: In summary, our comments highlight these major points of concern with the draft: •Does not seem to recognize or revere the uniqueness of Bear Lake •Seeks Biodiversity rather than Biosecurity of our specialized species and systems •Institutionalizes the damage & degradation – accepts boggy shoreline is original or desired condition. •Sees degraded, buried and transformed sand and cobble shores as "habitat" and "wetlands" •Does not focus on the critical effects to the lakebed systems caused by using the lake as storage facility. •Recognizes Lake Level fluctuation but not problems of sediment and nutrient loading •Does not bring forward the issues of the 2009 CMP and commitment to work with the people	Thank you for your comment. The uniqueness of Bear Lake is discussed in Section 2.2 of the CMP. Many of the desired future conditions and goals and objectives in Chapter 3 will help protect the unique qualities of Bear Lake. *Biosecurity* is defined by the Food and Agriculture Organization of the United Nations as an integrated approach for analyzing and managing relevant risks to human, animal, and plant life and health, and associated risks to the environment. Biosecurity covers food safety, zoonoses, the introduction of animal and plant diseases and pests, the introduction of living modified organisms, and the introduction and management of invasive alien species. The CMP is designed to be a broad management plan (see Utah Code 65A-2-1) that can be implemented within FFSL's current executive authority, not an assessment of biosecurity hazards and their associated risks. This is not correct. The CMP describes the current conditions of the lake and outlines desired future conditions as resource benchmarks to work toward using Chapter 3's goals and objectives. For example, one of the desired future conditions is "Restoration or enhancement of degraded areas to improve overall ecological function and condition." We disagree with this assessment. Habitat types, including wetlands, are specifically described in Section 2.3, which includes a discussion of lake level effects on these habitats. See Table 3-2 for actions that can be taken with proper FFSL authorization to manage shoreline vegetation. The CMP recognizes that changing lake levels caused by use of the lake as a storage reservoir affect the lake's resources. These impacts are discussed in multiple Lake Level Effects sections throughout the CMP. The goals, objectives, and management considerations in Chapter 3 seek to address some of the negative impacts of these fluctuating lake levels. See Lake Level Effects sections, especially in Section 2.4. Sediment and nutrient loading are discussed in Section 2.4 under Water Quality. Table 3-17 of the CMP has the following objective: Seek opportunities to collaborate with adjacent landowners and user groups on shoreline improvements. In addition, Chapter 1 states the following: "Community involvement in ongoing sovereign lands management (e.g., projects involving restoration or education) is encouraged, assuming efforts are coordinated with and approved by FFSL." Additional outreach goals and objectives have been added to the Education and Outreach Table 3-19.

Submission Number	Comment Type and Location	Commenter	Topic	Comment Number	Comment	Disposition/Response to Comment
17	Email, N/A	Peter Morris, Lori Morris, Mariah Morris	Uniqueness, biodiversity, current conditions, habitat, lake level effects, sediment and nutrient loading, shoreline owners	17.1	In summary, our comments highlight these major points of concern with the draft: •Does not seem to recognize or revere the uniqueness of Bear Lake •Seeks Biodiversity rather than Biosecurity of our specialized species and systems •Institutionalizes the damage & degradation – accepts boggy shoreline is original or desired condition. •Sees degraded, buried and transformed sand and cobble shores as "habitat" and "wetlands" •Does not focus on the critical effects to the lakebed systems caused by using the lake as storage facility. •Recognizes Lake Level fluctuation but not problems of sediment and nutrient loading •Does not bring forward the issues of the 2009 CMP and commitment to work with the people	Thank you for your comment. The uniqueness of Bear Lake is discussed in Section 2.2 of the CMP. Many of the desired future conditions and goals and objectives in Chapter 3 will help protect the unique qualities of Bear Lake. *Biosecurity* is defined by the Food and Agriculture Organization of the United Nations as an integrated approach for analyzing and managing relevant risks to human, animal, and plant life and health, and associated risks to the environment. Biosecurity covers food safety, zoonoses, the introduction of animal and plant diseases and pests, the introduction of living modified organisms, and the introduction and management of invasive alien species. The CMP is designed to be a broad management plan (see Utah Code 65A-2-1) that can be implemented within FFSL's current executive authority, not an assessment of biosecurity hazards and their associated risks. This is not correct. The CMP describes the current conditions of the lake and outlines desired future conditions as resource benchmarks to work toward using Chapter 3's goals and objectives. For example, one of the desired future conditions is "Restoration or enhancement of degraded areas to improve overall ecological function and condition." We disagree with this assessment. Habitat types, including wetlands, are specifically described in Section 2.3, which includes a discussion of lake level effects on these habitats. See Table 3-2 for actions that can be taken with proper FFSL authorization to manage shoreline vegetation. The CMP recognizes that changing lake levels caused by use of the lake as a storage reservoir affect the lake's resources. These impacts are discussed in multiple Lake Level Effects sections throughout the CMP. The goals, objectives, and management considerations in Chapter 3 seek to address some of the negative impacts of these fluctuating lake levels. See Lake Level Effects sections, especially in Section 2.4. Sediment and nutrient loading are discussed in Section 2.4 under Water Quality. Table 3-17 of the CMP has the following objective: Seek opportunities to collaborate with adjacent landowners and user groups on shoreline improvements. In addition, Chapter 1 states the following: "Community involvement in ongoing sovereign lands management (e.g., projects involving restoration or education) is encouraged, assuming efforts are coordinated with and approved by FFSL." Additional outreach goals and objectives have been added to the Education and Outreach Table 3-19.

Submission Number	Comment Type and Location	Commenter	Topic	Comment Number	Comment	Disposition/Response to Comment
18	Email, N/A	Steve Cox	Previous CMP, public involvement, biodiversity, sediment and nutrient loading, lake level effects, shoreline degradation	18.1	Please accept my comments on the Bear Lake Comprehensive Management Plan Update: •While the 2021 Bear Lake Comprehensive Management Plan purports to be an update of the 2009 Bear Lake Comprehensive Management Plan it does not appear to bring forward the issues that were identified in the 2009 document. •The 2021 Bear Lake Comprehensive Management Plan update may have been limited to selected stakeholders but does not appear to include a formal transparent process for engaging the wider public at-large and rigorously seeking their input and comments. •The 2021 Bear Lake Comprehensive Management Plan does not identify ways to protect and ensure the biosecurity of Bear Lake's unique and specialized species and systems and instead mistakenly seeks biodiversity which could threaten the historic and specialized species and systems, some of which are found nowhere else in the world. •The 2021 Bear Lake Comprehensive Management Plan does not address the problems of un-natural sediment loading and nutrient loading caused by using the lake as an irrigation/ power company storage facility. •The 2021 Bear Lake Comprehensive Management Plan does not address the problems caused in the lakebed systems caused by using the lake as an irrigation/ power company storage facility. •The 2021 Bear Lake Comprehensive Management Plan does not address ways to mitigate or correct damage and shoreline degradation caused by past irrigation/ power company operations.	Thank you for your comment. We are unclear what issues you are referring to. The public outreach process for the CMP process was open to everyone, including the general public, and was not limited to select stakeholders. Please see Appendix B for a full description of this process. *Biosecurity* is defined by the Food and Agriculture Organization of the United Nations as an integrated approach for analyzing and managing relevant risks to human, animal, and plant life and health, and associated risks to the environment. Biosecurity covers food safety, zoonoses, the introduction of animal and plant diseases and pests, the introduction of living modified organisms, and the introduction and management of invasive alien species. The CMP is designed to be a broad management plan (see Utah Code 65A-2-1) that can be implemented within FFSL's current executive authority, not an assessment of biosecurity hazards and their associated risks. Bear Lake's unique indigenous species (e.g., fish) and environment are described in detail in Chapter 2, and Chapter 3's goals and objectives offer ways to protect these important resources at Bear Lake. Sediment and nutrient loading are discussed in Section 2.4 under Water Quality, along with lake level effects. Use of the lake as a water storage reservoir is explained in detail in Chapter 1. The CMP recognizes that changing lake levels caused by use of the lake as a storage reservoir affect the lake's resources. These impacts are discussed in multiple Lake Level Effects sections throughout the CMP. The goals, objectives, and management considerations in Chapter 3 seek to address some of the negative impacts of these fluctuating lake levels. See Lake Level Effects sections, especially in Section 2.4. One of the desired future conditions for ecosystem resources in the CMP is "Restoration or enhancement of degraded areas to improve overall ecological function and condition." Also, please review the management considerations in Table 3-16, which address the shoreline. Table 3-17 also has the following objective: Seek opportunities to collaborate with adjacent landowners and user groups on shoreline improvements.

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19	Email, N/A	PacifiCorp	Technical edit	19.1	p. viii Suggest adding (now Rocky Mountain Power/PacifiCorp) after "Utah Power and Light Company"	Edit has been made.
19	Email, N/A	PacifiCorp	Technical edit	19.2	p. 6, last paragraph, last sentence should read "the lake BED up to..." for precision	Text has been edited for clarity.
19	Email, N/A	PacifiCorp	Technical edit	19.3	p. 8, paragraph 3 This application was not for water rights (which are a state matter), it was for a RIGHT-OF-WAY for canals and reservoirs on federal lands.	Text has been edited for clarity.
19	Email, N/A	PacifiCorp	Technical edit	19.4	p. 8, paragraph 5 the dike was already there and was not "created" by UP&L, it just "reinforced" the existing dike.	The first sentence in this paragraph discusses the original presence of a natural causeway or sand bar. The sentence that you are referring to also explains that UP&L strengthened the natural causeway by creating a dike. The word *create* has been changed to *form*.
19	Email, N/A	PacifiCorp	Technical edit	19.5	p. 14, paragraph 4, first sentence This is not strictly true. While PacifiCorp was historically the ONLY source of ANY lake levels, it was the one used. PacifiCorp HAS historically published the elevations and volumes with the USGS, but has not done so recently. The information IS provided to the Bear River Compact Commission which typically includes it in their biennial report. So, I suppose it WAS official, from that standpoint, if the biennial report is considered to bestow the term "official" on the lake elevations. However, in future versions of the report, the commission may choose to use the newer USGS elevations. See the suggested revised language in the next comment.	Edits have been made to reflect the revised language.

Submission Number	Comment Type and Location	Commenter	Topic	Comment Number	Comment	Disposition/Response to Comment
19	Email, N/A	PacifiCorp	Technical edit	19.6	p. 14, paragraph 4, first sentence The lake elevations published do NOT account for Mud Lake volume, just Bear Lake volume. The equivalent elevation, calculated per the approved Bear River Commission Procedure, is not published officially as a daily record anywhere (only provisional daily values are available publicly on the Bear River Commission's real-time data website BearRiverBasin.org), it is only referred to when the equivalent elevation is close to 5911.0 and is needed to determine precisely when the additional storage rights in the upper division provided in the revised compact storage are allowed. Suggested revised language: "PacifiCorp historically recorded daily lake elevations for Bear Lake which were published in the Biennial Reports of the Bear River Compact Commission. The equivalent elevation of Bear Lake accounting for Mud Lake storage, calculated according to the Commission-approved procedure, is used to determine when additional storage upstream of Bear Lake provided for in the revised compact is allowed."	Edits have been made to reflect the suggested revision.
19	Email, N/A	PacifiCorp	Technical edit	19.7	p. 94, last paragraph, last sentence PacifiCorp personnel: Connely Baldwin worked with Dave Epstein of SWCA to revise this sentence to reflect that 3.1 feet is the median annual increase in Bear Lake elevation from the fall minimum to the spring maximum.	As noted in your comment, this text has been revised.

Submission Number	Comment Type and Location	Commenter	Topic	Comment Number	Comment	Disposition/Response to Comment
20	Email, N/A	Brian Hirschi	Uniqueness, lake level effects, vegetation, use of Bear Lake as a reservoir	20.1	As a reminder, Bear Lake was a natural lake isolated from the Bear River system for thousands of years, but for the approximate last 100 years it's now being used as a man-made reservoir which causes unique man-made problems. The unnaturally exposed lakebed from pumping the lake water out has created a breeding ground for invasive and unnatural vegetation along the exposed shorelines of Bear Lake. A high priority of the Army Corp of Engineers is to keep navigable waters open, and the vegetation and old tree stumps that have grown on the unnaturally exposed lakebed over the last 100 years blocking navigation should be very concerning to all. Who assumes the responsibility for mitigating the many negative impacts caused by using Bear Lake as a reservoir? This is an issue that needs to be looked at and has been basically ignored up until now. The downstream beneficiaries such as Utah Power should be paying to restore all the shorelines of Bear Lake along with an annual fine/fee for causing "fill" in Bear Lake with all the unnatural tons of dirt sediment they allow to flow into Bear Lake from the Bear River via Mud Lake each year. If downstream beneficiaries refuse to start addressing these big issues, then it's time to look at not using the beautiful natural Bear Lake as their man-made reservoir. It needs to be stated in the comprehensive plan that an alternative viable option is to take a look at stop using the natural Bear Lake as a man-made reservoir to mitigate the unnatural impacts.	FFSL does not have any mandate to restore the lake to specific conditions or to a specific point in time. Our mandate is to manage to the Public Trust. FFSL is working to balance the beneficial use of the resource with the long-term protection of Public Trust values. We address issues such as navigational hazards (e.g., Public Safety and Enforcement Goal 1) and invasive species (Fish and Wildlife Species Goal 4) in the CMP. We also discuss use of the lake as a reservoir and the impacts of fluctuating lake levels throughout the plan. It is outside the scope of the CMP and FFSL's authority to evaluate changing the use of the lake as a storage reservoir.
21	Letter, page 1	Bear Lake Watch	General concepts	21.1	Needs an over-arching goal	Our mandate is to manage to the Public Trust. FFSL is working to balance the beneficial use of the resource with the long-term protection of Public Trust values through the creation and use of Comprehensive Management Plans. Chapter 1 discusses the vision and goals of the CMP, and identifies the management strategies that will be used to meet these.
21	Letter, page 1	Bear Lake Watch	General concepts	21.2	Have clear and specific laws for each lake	We agree that the sovereign land bodies in Utah have unique challenges, requiring different goals and management. We accomplish this through individual management plans for each body. A change in specific laws would require legislative action and is beyond the purview of a CMP.
21	Letter, page 1	Bear Lake Watch	General concepts	21.3	Define how the state will manage the whole lake	FFSL coordinates closely with the state, federal, and local agencies identified in the CMP to ensure a holistic management approach. It is beyond the jurisdiction of FFSL to manage parts of the lake that are within Idaho.

Submission Number	Comment Type and Location	Commenter	Topic	Comment Number	Comment	Disposition/Response to Comment
21	Letter, page 1	Bear Lake Watch	General concepts	21.4	Define scope of the CMP	Nothing within the CMP is beyond the scope of management or jurisdiction of FFSL, which is outlined in Chapter 1. Should issues arise that are, they will be addressed on an individual basis.
21	Letter, page 1	Bear Lake Watch	General concepts	21.5	Public discourse is needed for public trust	The public outreach process for the CMP process was open to everyone, including the general public, and was not limited to select stakeholders. Please see Appendix B for a full description of this process. Public outreach and input on future actions will be followed, as required by state law.
21	Letter, page 1	Bear Lake Watch	General concepts	21.6	Have an accurate picture	FFSL is working to balance the beneficial use of the resource with the long-term protection of Public Trust values. We also discuss use of the lake as a reservoir and the impacts of fluctuating lake levels throughout the plan. It is outside the scope of the CMP and FFSL's authority to evaluate changing the use of the lake as a storage reservoir.
21	Letter, page 1	Bear Lake Watch	General concepts	21.7	Solutions and paths to action	The aim of the CMP is to provide FFSL with management strategies. It is a broad document that does not address specific projects. Nor does it preclude an entity from embarking on a project, so long as the guidance in the CMP is adhered to. Future planning, funding, and mitigation for specific projects will be identified outside the CMP.
21	Letter, page 2	Bear Lake Watch	Ecosystem resources	21.8	Add a lakebed section	"Lakebed" is somewhat interchangeable with the word "shoreline" at Bear Lake because the lakebed becomes shoreline as lake levels drop. A separate lakebed section has not been added to the CMP because there is little available data on the deeper lakebed. However, the shoreline is discussed throughout the CMP. For example, Section 1.14 discusses the shoreline and bed and includes a figure with shoreline classifications. Most of FFSL's management actions and decisions occur along the shoreline where the water meets land (e.g., vegetation management, boat ramp permitting, motorized access); very few are in deep, open water. This explains why the CMP focuses on the shoreline rather than the lakebed.

Submission Number	Comment Type and Location	Commenter	Topic	Comment Number	Comment	Disposition/Response to Comment
21	Letter, page 2	Bear Lake Watch	Ecosystem resources	21.9	Biosecurity/biodiversity	*Biosecurity* is defined by the Food and Agriculture Organization of the United Nations as an integrated approach for analyzing and managing relevant risks to human, animal, and plant life and health, and associated risks to the environment. Biosecurity covers food safety, zoonoses, the introduction of animal and plant diseases and pests, the introduction of living modified organisms, and the introduction and management of invasive alien species. The CMP is designed to be a broad management plan (see Utah Code 65A-2-1) that can be implemented within FFSL's current executive authority, not an assessment of biosecurity hazards and their associated risks. Bear Lake's unique indigenous species (e.g., fish) and environment are described in detail in Chapter 2, and Chapter 3's goals and objectives offer ways to protect these important resources at Bear Lake.
21	Letter, page 2	Bear Lake Watch	Fish and wildlife habitat and species goals	21.10	Fish and Wildlife: All of this section's goals should be rejected as being contrary to preserving the public trust resource and values- as they would completely transform Bear Lake and destroy its character and value.	The CMP's fish and wildlife goals such as protecting and sustaining habitat values, supporting habitat restoration, managing invasive and noxious weed species, and supporting the sustainability of viable populations of native and desirable nonnative fishes and bird species would help preserve Public Trust resources and would not destroy Bear Lake's character and value. These goals and objectives were developed through a review of current Bear Lake data and studies and other similar planning documents.
21	Letter, page 2	Bear Lake Watch	Fish and wildlife habitat and species goals	21.11	Suggested Fish and Wildlife goals: - Prevention of non-native plant species. Develop strategies for monitoring for threats to BL from invading species • Developing monitoring for both emergent and submergent invasions • Emergency funds should be established for instant actions against invading plant or animal…or unlikely event of HABS (We can't wait for the next funding cycle!) • With objectives of Reducing productivity factors that are conducive to invasion. - Protect the Public Trust resource value by harvesting nutrient and mining sediment that are cumulative effects of man's uses. - Add an objective to establish MOUs, or something similar, with upland adjacent landowners along Shared Stewardship lines.	Fish and Wildlife Habitat Goal 4 addresses the management of invasive and noxious weed species. Objectives include continuing the ongoing inventory and mapping of invasive and noxious weed occurrences (i.e., monitoring), identifying dispersal vectors (i.e., productivity factors), targeting and treating invasive and noxious weeds, and coordinating with adjacent landowners. FFSL also sets asides funds for invasive and noxious weed management. It is unclear exactly what is being requested in this statement. The CMP objective "Identify, coordinate with, and provide outreach and technical support to adjacent landowners who are interested in treating invasive and noxious weed species on their property that may impact sovereign land resources" would allow for MOUs if needed but more importantly allows for cooperative management and communication about invasive and noxious weed species.

Submission Number	Comment Type and Location	Commenter	Topic	Comment Number	Comment	Disposition/Response to Comment
21	Letter, page 3	Bear Lake Watch	Water resources desired future conditions	21.12	Water Resources: desired future conditions	It is outside the scope of the CMP and FFSL's authority to evaluate changing the use of the lake as a storage reservoir. The desired future conditions in Section 3.3 address your suggested desired future conditions: A sustainable lake system with preservation of vertical and horizont thermal layer stratification; protection of the pelagic food web; maintenance of seasonal variation in instream flows; and maintenance of groundwater inputs via tributary base flows, springs and seeps, and direct groundwater discharge. Improved naturalized flows, where possible, while acknowledging th constraints of using Bear Lake as a water storage reservoir and using its tributaries for irrigation. Preservation of Bear Lake's unique water chemistry and oligotrophic nature. Improved water quality and reduction of nonpoint source pollution loads.
21	Letter, page 3	Bear Lake Watch	Hydrology desired future conditions	21.13	Hydrology Goals: Help maintain the storage capacity and supply by managing the lakebed to help diminish the depletions via evaporation and transpiration.	It is outside the scope of the CMP and FFSL's authority to control the storage capacity and supply of Bear Lake. In addition, FFSL has very little control of evaporation on Bear Lake. Transpiration is the process of water movement through plants; it is unclear what is meant here.
21	Letter, page 3	Bear Lake Watch	Limnology goals	21.14	Limnology goal 1: Add an Objective to support research to identify the possible state if anthropogenic eutrophication along the shoreline. Support funding for broader and detailed understanding of BL minerology and its importance to Public Trust Resource management	The CMP's support of research on Bear Lake's water chemistry and oligotrophic nature, lake circulation and sediment processes, benthic invertebrates and pelagic food web, and threats to the lake's natural limnological conditions (see Table 3-8) would provide information on potential eutrophication that may be occurring. The support of research on Bear Lake's unique water chemistry and oligotrophic nature is included as an objective.
21	Letter, page 3	Bear Lake Watch	Water quality goals	21.15	WQ Goal: Coordinate with DEQ for near shore monitoring esp. in areas with non-sewered sanitation systems. Include both private and public. E.g. Parks and Scout Camp	The CMP's Water Quality Goal 2 addresses this issue: "Work with agencies and partners to minimize pollutant loads to Bear Lake." The objectives for this goal include identifying and addressing nonpoint source pollution loads and supporting efforts to identify the potential impact of septic systems to water quality.

Submission Number	Comment Type and Location	Commenter	Topic	Comment Number	Comment	Disposition/Response to Comment
21	Letter, page 4	Bear Lake Watch	Socioeconomic goals	21.16	Even this statement shows the vagary of Multiple Use / Sustained Yield. This is a pair of principles that needs to be defined specifically for its meaning at Bear Lake or be replaced with more appropriate guidance principles for lakes. In Utah code, this is a general principle for all State Land. All Sovereign lands have a very specific use an role, as the container of the waters, it has special functions within the "ecosystem" and total lake system. It is stated that there is no hierarchy of uses. Maintaining this base form and functions should be the basis for the evaluation of all other uses. Multiple Use is easy to find at Bear Lake but is there a limit? Must every "use" be considered or should there be standards and guard rails? (Here is where a good overarching goal and direction comes in.) Use implies depleting a resource. Resource is defined as a source or supply to be used. What does Sustained Yield mean for the bed of Bear Lake which is the planning area. Is there an expectation of actual dollar-yield? Is it to be divided up in pieces or components for profit?	The CMP facilitates FFSL's management of Bear Lake sovereign lands in accordance with the Public Trust Doctrine and multiple-use, sustained-yield principles as provided in Utah Administrative Code R652-2-200 and Utah Code 65A-2-1. It is outside the scope of this CMP to modify the definitions of multiple-use, sustained-yield principles provided in Utah code. The Utah code definitions of these terms are outlined in Chapter 1 under the Bear Lake Management and Multiple-Use section.
21	Letter, page 4	Bear Lake Watch	Socioeconomics goals	21.17	Social Economic: Better goal could be a commitment to preserve Bear Lake and its unique qualities and characteristics to support the social and economic dependency of the local community.	FFSL does not have any mandate to restore the lake to specific conditions or to a specific point in time or to support local communities. Our mandate is to manage to the Public Trust. FFSL is working to balance the beneficial use of the resource with the long-term protection of Public Trust values.
21	Letter, page 4	Bear Lake Watch	Socioeconomic goals	21.18	Social Economic: New goal: Support *tax-based yield* by maintaining the native condition of the lakebed and supporting compatible navigation and waterside recreation, making adjacent and associated upland properties more desirable, useable and valuable.	The CMP seeks to maintain a sustainable lake ecosystem supporting multiple uses that provide access, experiences, and opportunities for a diverse general public (see Section 3.5, desired future conditions for Community Resources).
21	Letter, page 5	Bear Lake Watch	Agricultural goals	21.19	Agricultural goals: This is an upland land planning issue and should not be included in this document. - Why should we have agricultural goals? …. - Why should we recognize agricultural importance when we haven't even recognized the importance of Bear Lake and the lakebed.	While agricultural land covers less than 1% of the planning area at a lake level of 5,923 feet, it does need to be included as part of the planning effort because agricultural uses have the potential to impact Bear Lake sovereign lands. Because of the potential impact of upland uses on sovereign lands, it is important to have goals that help us work with partner agencies and landowners and coordinate on issues on and around sovereign lands.

Submission Number	Comment Type and Location	Commenter	Topic	Comment Number	Comment	Disposition/Response to Comment
21	Letter, page 5	Bear Lake Watch	Infrastructure goals	21.20	Infrastructure: Add: - Work to develop mitigation plans for new and existing encroachments that interfere with water movement and dynamic actions (e.g. sand and sediment dynamics) - Recognize the value of adjacent resources for the value of the infrastructure they provide to the lakeside system, thereby reducing the amount of infrastructure needed on sovereign lands	Chapter 3 identifies goals and objectives for infrastructure as well as BMPs such as, "New infrastructure should be located in areas to minimize impacts to lake processes and resources." In addition, there is a limnology goal that states, "Consider any potential impacts to the lake's limnological processes when evaluating authorizations on sovereign lands. As new infrastructure is proposed, we will coordinate closely with all stakeholders. Infrastructure objectives in the CMP include the following: "Understand the purpose and use of existing recreation infrastructure in an area before approving new infrastructure in that area as part of the authorization process. Development should not negatively impact existing recreation infrastructure or prevent future recreational access" and "Carefully consider placement and spacing of new infrastructure to protect both the recreation experience and lake resources."
21	Letter, page 5	Bear Lake Watch	Visual resources goals	21.21	Visual Resources: identify the connection between the lakebed *condition* and the Public Trust visual resource values Detail all the factors that make up the *Visual Resource* and develop metrics and standards by which they could be measured and monitored.	This is discussed in Chapter 2, Visual Resources: "Lake color and transparency may also be affected by decaying plant matter, submerged vegetative growth, and nonpoint source pollution." "No data are currently available regarding the potential effects of changing lake levels on the clarity or turquoise-blue color of the lake. In general, changing lake levels are not expected to significantly affect the chemical composition of the lake because chemicals are transported with the water flowing into and out of the lake. However, the clarity of the northern portion of the lake can temporarily be affected by increased sediment or turbidity introduced into the lake from elevated spring flows via Mud Lake during high runoff years. In addition, although nutrient input is generally reduced by the physical and chemical properties of Bear Lake, the assimilative capacity for nutrients has not been quantified, and it is possible that primary productivity could increase in the warm and shallow areas of the lake at low lake levels (see Water Quality section)." In addition, Chapter 3 contains a goal to "Minimize impacts to the scenic values of Bear Lake", with supporting objectives.
21	Letter, page 6	Bear Lake Watch	General concepts	21.22	Lakebed Section that should be created	See response to comment 21.8.

Submission Number	Comment Type and Location	Commenter	Topic	Comment Number	Comment	Disposition/Response to Comment
21	Letter, page 6	Bear Lake Watch	Communication and relations	21.23	Communication and Relations section that should be brought forward from CMP 2009	The CMP contains updated references to communication, cooperation, and coordination in the goals and objectives throughout Chapter 3. This is consistent with recent CMPs that have been developed for other waterbodies managed by FFSL. In addition, a new education and outreach goal has been added with supporting objectives: "Continue to improve cooperation, coordination, and communication and information dissemination between resource agencies and stakeholders."
21	Letter, page 6	Bear Lake Watch	Navigation	21.24	MISSING NAVAGATION SECTION AND GOALS	Navigation is discussed in several places in Chapter 2. It is also included in the desired future conditions for Section 3.5. Infrastructure goals in Tables 3-14, 3-17, and 3-18 also address navigation.
21	Letter, page 6	Bear Lake Watch	Communication and relations	21.25	A new section of COMMUNICATIONS, PARTNERSHIP, RELATIONS	Communications, partnership, and relations are discussed in Chapter 1, Chapter 2, and especially in Chapter 3 throughout the goals and objectives. See response to comment 21.23.
21	Letter, page 6	Bear Lake Watch	Education goals	21.26	P. 194, Education Goal 1: The word "conserve" implies use until it's gone. Substitute "Preserve".	The word conserve is defined by Merriam-Webster as "to keep in a safe or sound state" and especially "to avoid wasteful or destructive use of." Use of the word conserve is appropriate here.
21	Letter, page 6	Bear Lake Watch	Lake level changes	21.27	Education and Outreach Goal 3: Since PacifiCorp will not allow the lake to fill above 5922.5 (allowing room for a record local runoff) a DMZ is created where, technically, FFSL will manage a strip of sovereign land that is 1.15 feet vertically. Consider agreements for the adjacent upland owners to help.	Collaboration with upland owners will be evaluated on a case-by-case basis and will be coordinated through the Bear River office.
21	Letter, page 9	Bear Lake Watch	Research, funding, issues	21.28	Research funding. Support research and works projects. Identify issues, set priorities and establish funding sources.	Issues at Bear Lake are discussed throughout the CMP. Priorities are outlined in the goals and objectives of Chapter 3. The support of research and projects is woven throughout the goals and objectives. Identifying funding sources is outside the scope of this CMP.
21	Letter, page 9	Bear Lake Watch	Shared stewardship	21.29	Shared Stewardship Partnership Opportunities/Necessity. FFSL should develop "Shared Stewardship" principles and programs.	Partnership opportunities will be evaluated on a case-by-case basis and will be coordinated through the Bear River office.
21	Letter, page 9	Bear Lake Watch	Technical edits	21.30	The CMP should evaluate the use of the terms e.g. shoreline, beach and inundated for clarity and to guard against false expectations from the public.	In response to planning team comments, the CMP was reviewed for the terms "beach" and "shoreline" and edits were made. The use of the word "beach" was reduced.

Submission Number	Comment Type and Location	Commenter	Topic	Comment Number	Comment	Disposition/Response to Comment
21	Letter, page 10	Bear Lake Watch	Technical edits	21.31	Pg. 8, para. Beginning "A natural causeway". What is the information source that UP&L "added fill material to create a dike"? They improved a road but we've never seen any source that said they created a dike!	The source is Iorns 1959. The text states that UP&L strengthened a natural causeway by adding fill material to form a dike. One edit has been made for clarity.
21	Letter, page 10	Bear Lake Watch	Technical edits	21.32	Pg. 11, 2nd para beginning "In the early 1900s". Delete "late-season" and replace with "supplemental" as this is the correct term used by UWRe and UWRt.	PacifiCorp has reviewed this section and did not note any inaccuracies.
21	Letter, page 10	Bear Lake Watch	Technical edits	21.33	Pg. 14, 3rd para beginning with "Typically". Add "for flood control" after "as necessary" as that is the only time PacifiCorp will release water other than for Irrigation.	PacifiCorp has reviewed this section and did not note any inaccuracies.
21	Letter, page 10	Bear Lake Watch	Technical edits	21.34	Pg. 22, Section 1.8 Does Fish haven fit under the definition of municipality? It is not incorporated and falls under the County P&Z.	The text has been edited for clarity.
21	Letter, page 10	Bear Lake Watch	Technical edits	21.35	Pg. 41, Photos. The dates shown on these photos conflict with dates on the same photos in the USU Special Collections and a recount of the history depicted in Great Surveys of the American West by R. Bartlett. In the summer of 1871, the vf Hayden survey took painter Thomas Moran and photographer Wm Henry Jackson to document Yellowstone. Jackson stopped by Bear Lake in the fall of 1871 and took 3 pictures (that we know of) of Bear Lake. We submitted proof of this earlier. This photo should be used to point out the condition of the shoreline in 1871	We received your earlier comment. The source of the photos is the BYU Harold B. Library and the dates in the CMP match the dates the library shows for the photos. It is outside the scope of work for the CMP to track down BYU/USU discrepancies.
21	Letter, page 10	Bear Lake Watch	Technical edits	21.36	Pg. 58, Para on Habitat Location and Condition. "Such impacts . . ." are also caused by man's use of the lake as a reservoir. What is the source for the statement that it "was altered from its pre-settlement condition by the draining and filling of wetlands . . ."? In the lake's pre-settlement state, there were no wetlands along the majority of the shoreline.	This text has been removed.
21	Letter, page 10	Bear Lake Watch	Technical edits	21.37	Pg 74, Description of Bear Lake Whitefish, sentence beginning " It is almost". Delete "small" and "less than 10 inches". The Bonneville Whitefish grows to 16+ inches.	Scott Tolentino at the Utah Division of Wildlife Resources was consulted and the text was modified based on his recommendations.
21	Letter, page 10	Bear Lake Watch	Technical edits	21.38	Pg 108, Figure 2-37. Where does stormwater runoff fit in this picture?	The entire picture shows stormwater runoff. As explained in the preceding paragraph: "Nonpoint source pollution is caused by runoff from snowmelt or rainfall that moves across the ground, picking up natural and anthropogenic pollutants, and finally depositing them into a waterbody."

Submission Number	Comment Type and Location	Commenter	Topic	Comment Number	Comment	Disposition/Response to Comment
21	Letter, page 10	Bear Lake Watch	Technical edits	21.39	Pg 155, Para beginning with "DWR regulates fishing". It is imperative that "adipose" is added before each use of fins. A BCT with a clipped adipose fin is a hatcher raise fish and can be kept by the angler. A BCT with an intact adipose fin is "native" and must be returned to the lake.	Scott Tolentino at the Utah Division of Wildlife Resources was consulted and the wording in the draft CMP was correct. However, the fin clip regulation has been retired as of January 1, 2022, and the text has been revised.
21	Letter, page 10	Bear Lake Watch	Technical edits	21.40	Pg.170, Table 3-2. Consider adding shoreline restoration to the table of proposed actions.	Shoreline restoration would be considered part of shoreline stabilization, vegetation planting, and vegetation removal in this table. "Restoration" is a broad term, and the table breaks down actions that could be a part of "restoration."
21	Letter, page 10	Bear Lake Watch	Technical edits	21.41	Pg. 196, under General Protocol. Replace "should be avoided" with "it is trespass".	The text has been edited for clarity.
21	Letter, page 11	Bear Lake Watch	Law, state responsibilities	21.42	There is no overarching goal within Utah that directs how the multiple agencies should jointly manage the public resource called Bear Lake, or Utah Lake or the GSL. While each agency has its own goals and priorities for Bear Lake's management, most are regulatory and not pro-active, not "fixers". Clarity of the "balancing rule". FFSL only claims responsible for balancing the uses when new use is proposed. Division seems to only focus on the "due consideration" as the only or most important. Who is responsible for preserving the Resource?	It is outside the scope of the CMP to change state law or code and the responsibilities outlined therein. FFSL's responsibilities as defined by current state code are outlined in Chapter 1 of the CMP.
21	Letter, page 11	Bear Lake Watch	Law, state responsibilities	21.43	Utah needs to declare its intention for the preserving Bear Lake - even as we use it to support power and agriculture. Most people assume it but nowhere is it stated. This also leads to One Goal for the Two States of Utah and Idaho that spells out their collective/ joint expectations. Bear Lake is a natural resource utilized by the public and held in the public trust by both Utah and Idaho. Formalize the Resolutions passed by both States in 2018.	The desired future conditions in Chapter 3 outline FFSL's intentions for the lake, which include a sustainable lake ecosystem supporting diverse, healthy populations of native and desirable plant, animal, and fish species; preservation of areas providing important ecosystem services (e.g., wetlands, riparian communities, native vegetation, and littoral cobble habitat); preservation of Bear Lake's unique water chemistry and oligotrophic nature; preservation and enhancement of the aquatic beauty of Bear Lake without impairment of multiple uses; and protection and enhancement of the recreation experience through creative, proactive management of recreational use.

Submission Number	Comment Type and Location	Commenter	Topic	Comment Number	Comment	Disposition/Response to Comment
21	Letter, page 11	Bear Lake Watch	Law, state responsibilities	21.44	No mitigation for its uses. When PacifiCorp relicensed the hydropower plants in Idaho in the late 1990s, neither State went to bat for Bear Lake by insisting that the Lake was part of the Bear River hydro system and should be included in the EIS, but tacitly agreed that the Lake was not part. Who assumes the responsibility for mitigating the many impacts caused by using Bear Lake as a reservoir?	It is outside the scope of the CMP and FFSL's authority to require mitigation for the use of the lake as a storage reservoir.
22	Letter, page 12	Bear Lake Watch	Technical edits	21.45	Replace *the story* and put a simple statement	It is not clear which text you are indicating should be replaced so we cannot evaluate your suggestions.

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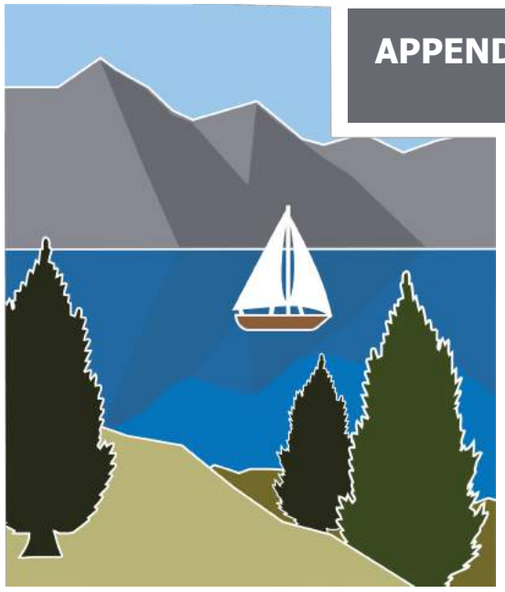

APPENDIX C – LIST OF PREPARERS

Table C-1. List of Preparers for the Bear Lake Comprehensive Management Plan

First Name	Last Name	Title/Role
Utah Division of Forestry, Fire & State Lands		
Brianne	Emery	Division planner
Matt	Coombs	Sovereign lands coordinator, Bear River area
Rowdy	Jensen	Sovereign lands coordinator, Bear River area
Ben	Stireman	Sovereign lands program administrator
Laura	Vernon	Sovereign lands coordinator
Emma	Whitaker	Law and policy analyst
SWCA Environmental Consultants		
Gretchen	Semerad	Project manager
Linda	Burfitt	Lead editor
Diane	Bush	Technical editor
Tiffany	Collins	Cultural resources specialist
Dave	Epstein	Assistant project manager, water resources lead
Suzanne	Eskenazi	Cultural resources lead
Jeremy	Eyre	Socioeconomics lead, visual resources specialist
Rhiannon	Held	Graphic designer
Rachel	Johnson	Geographic information system specialist
Kerri	Linehan	Technical editor
Audrey	McCulley	Ecosystems lead
Frank	Shrier	Fisheries specialist
Debbi	Smith	Formatter
Kristina	Stelter	Formatter and graphic designer
Allen	Stutz	Lake level analysis geographic information system lead
Calah	Worthen	Water quality specialist

List of Preparers

First Name	Last Name	Title/Role
Independent Consultant		
Claudia	Conder	Water rights specialist
CRSA		
Melissa	Fryer	Design renderings lead
J. Kelly	Gillman	Planning lead
Tina	Gillman	Public involvement specialist
Paul	Stead	Public involvement specialist
River Science Institute, Inc.		
John	Gangemi	Water-based recreation advisor