Work Plan for the Great Salt Lake Basin Integrated Plan

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Utah Division of Water Resources
Great Salt Lake Basin Integrated Plan
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Acronyms and Abbreviations

$	United States 2023 dollars
CRAU	Colorado River Authority of Utah
DEQ	Utah Department of Environmental Quality
DNR	Utah Department of Natural Resources
DWR	Utah Division of Wildlife Resources
DWRe	Utah Division of Water Resources
DWRi	Utah Division of Water Rights
FFSL	Utah Division of Forestry, Fire & State Lands
GSL	Great Salt Lake
GSLAC	Great Salt Lake Advisory Council
GSLBIP	Great Salt Lake Basin Integrated Plan
GSLEP	Great Salt Lake Ecosystem Program
H.B.	House Bill
H.C.R.	House Concurrent Resolution
IWAA	Integrated Water Availability Assessment
Reclamation	United States Bureau of Reclamation
SAC	Salinity Advisory Committee
Trust	Great Salt Lake Watershed Enhancement Trust
UDAF	Utah Department of Agriculture and Food
UGRC	Utah Geospatial Resource Center
USACE	United States Army Corps of Engineers
USGS	United States Geological Survey

Section 1—Introduction

Water represents life. Its life is what likely first attracted humans to the shores and tributaries of Great Salt Lake (GSL). Harnessing its life was a priority for Euro-American pioneers when they arrived in Utah and first dammed City Creek. Its life is the legacy that subsequent generations worked and sacrificed to leave us and enable the growth and development we have enjoyed throughout the GSL watershed ever since (Hooton 1997; GSL Resolution Steering Group 2020).

What is an Integrated Water Assessment?

An integrated water assessment is a means to understanding problems and challenges and evaluating options that enable informed decisions. The assessment is a planning process that holistically looks at the planning and management of the entire water cycle and considers it as a single and connected system (GSLAC 2020). It ensures that development and management of a community's resources are coordinated to maximize social and economic benefits while minimizing impacts on the community and the environment. Per H.B. 429, the integrated water assessment is intended to provide recommendations for an action plan that will achieve the defined goal.

Recent drought and the observed decline in GSL water levels have elicited significant concern to no surprise. These concerns represent a potential risk to continued economic growth, public health, and vibrant ecosystems and communities in and throughout the GSL watershed (H.C.R. 10 2019; GSL Resolution Steering Group 2020; GSL Strike Team 2023). They also represent an urgent challenge to be faced today for generations tomorrow (GSL Resolution Steering Group 2020; GSL Strike Team 2023).

Against this backdrop, the Utah Legislature took the significant step in 2019 to recognize "the critical importance of continued water flows to GSL and its wetlands and the need for solutions to address declining water levels, while appropriately balancing economic, social, and environmental needs" (H.C.R. 10 2019). The Utah Legislature built upon resulting recommendations to commission and direct the Utah Department of Natural Resources, Division of Water Resources (DWRe), to complete a Great Salt Lake Watershed Integrated Water Assessment in 2022 (H.B. 429 2022). The integrated water assessment, within the context of the GSL watershed, must accomplish the following:

- **Assess** the current and future water supply
- **Assess** current and future water demands
- **Investigate** the potential benefits of forest management and watershed restoration
- **Assess** the quality of available water resources
- **Identify** and **evaluate** best management practices that provide adequate flow to sustain GSL, its wetlands, and other ecological functions in its watershed
- **Study** the impact of stormwater management practices on the water budget of GSL

Most importantly, the integrated water assessment must integrate ongoing efforts and systems, develop collaborative solutions, and recommend actions that shape a lasting water legacy for future generations. **The integrated water assessment is a roadmap to understanding and action**.

1.1 About This Work Plan

Soon after passage of House Bill (H.B.) 429, DWRe and its partners applied to the U.S. Bureau of Reclamation (Reclamation) for a WaterSmart grant that would provide additional funds for preparing the GSL Watershed Integrated Water Assessment. DWRe was successful and was notified in December 2022 that Reclamation would provide up to $3,174,000 in matching funds to complete a GSL Basin Study. DWRe and Reclamation combined H.B. 429's GSL Watershed Integrated Water Assessment with Reclamation's GSL Basin Study into one effort: the GSL Basin Integrated Plan (GSLBIP). This Work Plan meets the requirements for a Work Plan as outlined in both H.B. 429 and Reclamation's directives and standards for Basin Studies (WTR 13-01; refer to Table 1-1). This Work Plan represents a roadmap toward developing the GSLBIP—a roadmap to action.

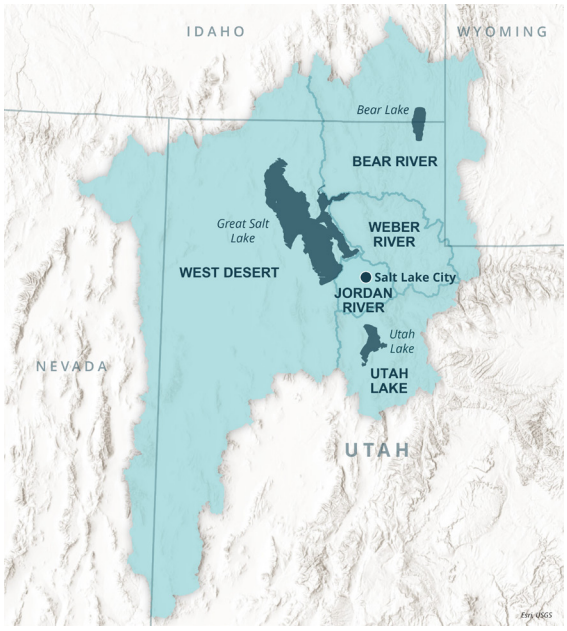
Table 1-1. Requirements for This Work Plan

House Bill 429	Basin Study Directives and Standards (WTR 13-01)
▪ Completion by November 30, 2023 ▪ Synthesis of available information, literature, and data ▪ Assessment of scientific, technical, measurement, and other information needs ▪ Implementation of the Work Plan description before November 30, 2026	▪ Basin study management structure ▪ Decision-making process ▪ Project team roles and responsibilities ▪ Study team coordination ▪ External communication and outreach processes ▪ Technical analysis methodologies ▪ Task and milestone schedules ▪ Budget and cost control ▪ Deliverables and project documentation requirements ▪ Description of study review process, including reporting requirements

1.2 Great Salt Lake Watershed Study Area

The GSL watershed is a 36,199-square-mile closed basin within the Great Basin region. GSL is the largest saline lake in the western hemisphere and receives all waters not evaporated or consumed in the watershed. Figure 1-1 illustrates the four states with territory in the watershed: Utah, Wyoming, Idaho, and Nevada. The watershed is home to 2.8 million people (83 percent of Utah's population) living in 141 municipalities. More than 1.4 million acres of farmland are irrigated (DWRe 2023) with water stored in more than 909 reservoirs (UGRC 2023). While Utah is the fourth fastest-growing state in the nation, GSL's water level has been in

Figure 1-1. Great Salt Lake Watershed Study Area



long-term decline, with serious implications to wildlife habitat, recreation, public health, industry, agriculture, ecosystem services, and the regional hydrologic cycle. GSL fell below its historical low elevation during 2022, resulting in more public attention on, and engagement with, the lake than perhaps ever before. Similarly, due to the limited water supply, many water supply systems in the GSL watershed were also severely stressed.

All five river basins contributing to GSL—Bear River, Weber River, Jordan River, Utah Lake, and West Desert—and GSL itself will be considered in the GSLBIP. Each of these river basins, along with their smaller streams, springs, imported water from the Colorado River Basin, and regional aquifers, support large agricultural areas, small towns, a growing metropolis, and unique ecosystems. All river basins contribute any water that is not utilized to GSL, the lowest point in the watershed. The GSLBIP will be the first effort to attempt to fully integrate the water cycles and management of each river basin and GSL itself within the context of the GSL watershed.

1.3 The Challenge to Overcome

The challenge to overcome by the GSLBIP initially appeared to be straightforward and clear. GSL's gradual decline, culminating in a record low water level in 2022, poses a significant risk to Utah's economy, public health, and ecosystems (H.C.R. 10 2019; GSL Strike Team 2023). Exposed lakebed, resulting dust emissions, reduced habitat, and ecosystem impacts from elevated salinity (GSL SAC 2023; Harris 2023) became most acute in 2022 and attracted widespread publicity and concern (Flavelle 2022; Krugman 2022). The GSL Strike Team, which comprises state agency professionals and researchers from Utah State University and the University of Utah, recently concluded that "the situation requires urgent action" (GSL Strike Team 2023). Upon further evaluation, however, GSL's decline appears to be a symptom of more consequential water resource challenges in the watershed.

As a terminal lake that receives inflow from its watershed but has no outlet, GSL reflects the change its watershed has experienced over time. Thus, the long-term decline of GSL, even as punctuated by the floods of the 1980s, reflects similar symptoms observed in its watershed and surrounding region. Population growth (Hollingshaus et al. 2022), recent declining trends in instream flows (Miller et al. 2019; GSL Strike Team 2023), declining groundwater levels (Zamora and Inkenbrandt 2023), increasing impacts from drought to agriculture (UDAF 2023), increasing risks from wildfire (FFSL 2023)

Challenge Statement

Ensuring a resilient water supply requires extraordinary vision and collaborative effort. Solutions remain socially and technically complex as demands on this limited resource continue to increase. Today's water management decisions shape tomorrow's possibilities.

The challenge was organized to describe the social and technical complexities as follows (see Appendix A for more details):

Social Complexity

- *Social challenges*
- *Awareness challenges*
- *Fragmentation*
- *Organizational and institutional challenges*
- *Legal challenges*

Technical Complexity

- *Water supply*
- *Water management*
- *Land management*
- *Quantification*
- *Environmental challenges*

and from reduced flows to habitat, wildlife, and water quality (RiverRestoration 2019), aging infrastructure (Prepare60 2020; State of Utah 2022), growing water challenges (U.S. Bureau of Reclamation 2005, State of Utah 2022), and increasing efforts and investments in water management to sustain the status quo in the GSL watershed (Envision Utah 2017; H.B. 41 2020; State of Utah 2022) are consistent with GSL's symptoms. The decline of reservoirs in the Colorado River system, groundwater levels in Utah's other Great Basin aquifers (Smith et al. 2019), and in terminal lakes (H.C.R. 10 2019; AECOM 2019) throughout the western United States (USGS 2023) are also consistent with GSL's symptoms. All are symptoms that point toward a long-term impact from climate change, increasing water use in the watershed (GSL Strike Team 2023) and an increasingly complex social, political, and regulatory system of systems (State of Utah 2022). Together, they point toward what is considered a wicked problem (Rittel and Webber 1973; Head and Alford 2008)—a problem or a challenge that cannot be definitively defined due its social and technical complexity (refer to the *Development of a Challenge Statement Technical Memorandum* in Appendix A).

Ensuring a resilient water supply requires extraordinary vision and collaborative effort. Solutions remain socially and technically complex as demands on this limited resource continue to increase. How can we build a resilient water supply that sustains the health and growth and enables the future we envision for GSL and all water uses in its watershed? The challenge is to make water management decisions today that determine whether adequate water is available to support the needs of all uses within the watershed for generations to come. Today's water management decisions shape tomorrow's possibilities.

1.4 The Goal to Achieve

An outcome-oriented goal statement provides clarity about the desired outcome to be accomplished over time; it also provides an opportunity for stakeholders to forge early consensus around a vision for the result of their efforts. The goal statement helps facilitate connection and create an incentive to participate in the process.

The following goal statement for the GSLBIP was developed and refined over time to reflect the intent of H.B. 429 and input received throughout Work Plan development:

Ensure a resilient water supply for GSL and all water uses, including people and the environment, throughout the watershed.

A proven means of maintaining focus during an investigation is

What is a resilient water supply?

The means are in place to provide a water supply that can meet the following criteria:

- *Anticipates the effects of short- and long-term water-related shocks and both acute and chronic stresses:*
  - *Acute— drought, spills, infrastructure failure, wildfire, earthquake*
  - *Chronic— climate change (increasing temperature and evapotranspiration), growing water demands, water storage and management to meet growing water demands, declining aquifer and lake levels, water quality and habitat degradation*
- *Is prepared and can resist disruptions*
- *Can survive through and recover from adverse impacts of those events*
- *Can adapt and transform in a way that allows us to learn and thrive*
- *Can balance both human and environmental needs/demands*

to also cast the goal as a question, as follows; all studies and projects to be completed as part of the GSLBIP should work to answer the question and achieve the goal:

How do we ensure a resilient water supply for GSL and all water uses, including people and the environment, throughout the watershed?

1.5 Objectives for the Great Salt Lake Basin Integrated Plan

Objectives are the measurable steps taken toward achieving the stated goal. The following strategic objectives will help enable successful completion and implementation of the GSLBIP:

1. **Forge connections—**Just as the water cycle connects GSL with its watershed, the GSLBIP must connect the water supply and water uses of GSL with those in its watershed. Our social, political, regulatory, organizational, and research structures must connect; that is, relationships must be established to build resilience in the watershed. Connections are typically forced upon us when crises occur to enable us to respond. Building resilience demands that we anticipate and create these connections. The GSLBIP will forge lasting connections throughout the watershed that build and sustain a resilient water supply for GSL and all water uses in its watershed. These connections will be the basis for integrated collaborative solutions.

2. **Develop shared understanding—**Building resilience requires a common understanding of the GSL watershed's complex hydrology, its built and natural environments, and the political, regulatory, and legal regimes that govern them. We must agree what the challenges are and why they must be addressed. We must have a transparent technical dataset and analyses that form the basis for decisions. We must understand our options and own our actions. Through GSLBIP development and implementation, stakeholders throughout the watershed will develop a shared understanding of the issues.

3. **Quantify water resources—**H.B. 429 rightly emphasizes the importance of developing a water budget for GSL and its watershed. We must understand the available water supply, its quality, and the demands placed upon it in the past, present, and future to build a resilient, sustaining water supply. This requires active and accurate measurement, assessment, and forecasting tools, processes, and infrastructure. The GSLBIP must develop the means to quantify the existing water supply and water demands and forecast the future water supply and water demands.

4. **Evaluate options—**The GSLBIP must consider the following: (1) GSL watershed potential points of failure and determine how these weak points can be protected or backed up, (2) the means to build flexibility into water systems to facilitate quick response and deep recovery, (3) the means of minimizing impacts and stopping cascading losses, (4) options that will enable a return to healthy systems as quickly as possible, and (5) options that promote active learning, rapid adaptation, and improved response. The GSLBIP must identify and evaluate options that will mitigate risks, adapt to and mitigate potential water shortages, embrace the uncertainties of the future, address the challenges and achieve its goal.

5. **Recommend actions—**GSLBIP development must carefully consider the values and requirements of the human and natural systems, minimize short- and long-term risks, evaluate potential conflicts and tradeoffs, and develop consensus around a suite of recommended

actions. The GSLBIP also must include a robust trade-off analysis to help decision-makers balance water supply and demand and avoid deterioration of agriculture, industry, communities, and ecosystems. The final GSLBIP will include final recommendations for actions for achieving its goal.

1.6 The Expected Outcome

This Work Plan outlines a roadmap for the GSLBIP of engagement, monitoring, study, modeling, and analyses intended to uncover and develop durable and defensible solutions. Developing the GSLBIP will require innovation, flexibility, transparency, collaboration, and compromise to achieve consensus. There will be a temptation to expand the scope, a need to delve into more detail, and a desire to extend the schedule. The challenge the GSLBIP must overcome, however, cannot wait. The GSLBIP must result in a timely action plan that the public will support and decision-makers can feasibly implement. The water legacy we will leave to future generations is on the line.

Section 2—Integrating Partners and Activities

The water resource management challenges we face today require an integrated approach that considers the entire water cycle and treats GSL watershed as a single and connected system – a system of systems. Sustainable and resilient solutions will require the GSLBIP to integrate not just surface and groundwater supplies, but also the social, legal, economic, and political structures; local and regional water infrastructure and operations; and environmental requirements of the entire watershed (refer to Figure 2-1). To do so, the GSLBIP must begin with and be founded upon trust and partnership, and it must integrate the goals, objectives, and work of partners and participants to boost connection and alignment, minimize duplication of effort, leverage available expertise and funding, and achieve the best result.

in·te·grate

/ˈin(t)əˌgrāt/

transitive verb

to combine two or more things in order to become more effective

2.1 Partners and Participants

Figure 2-1. Elements to be Integrated as Part of the Great Salt Lake Basin Integrated Plan

To participate and/or become a partner, contact Laura Vernon/DWRe at gslbasinplanning@utah.gov.

The DWRe and Reclamation have developed a growing list of partners who have already formally committed time, information, and resources to GSLBIP development (Figure 2-2). DWRe and Reclamation are committed to bolstering these existing partnerships as well as forging new ones. Each partner will become involved with and participate in tasks depending upon their unique interests, mission, expertise, and mandate. An ebb and flow of participation among partners is expected throughout the development of the GSLBIP.

Numerous entities and individuals also are already involved in some way or have or may indicate their desire to participate. These include local water management agencies, irrigation companies, tribes, municipalities, educational institutions and organizations, nongovernmental organizations, community organizations and individuals. Some participants may participate in executing tasks, while others may simply observe and be informed of study activities. All stakeholders throughout the watershed will be invited and given the opportunity to participate and share their insights related to the GSLBIP.

Table 2-1. Growing Partnership Committed to the Great Salt Lake Basin Integrated Plan

Great Salt Lake Basin Integrated Plan Partners	
Academic and Advisory	
Agricultural Water Optimization Committee	Growing Smart Initiative
Bear River Watershed Council	Jordan River Watershed Council
Great Salt Lake Advisory Council	University of Utah
Great Salt Lake Ecosystem Program	Utah Lake Watershed Council
Great Salt Lake Salinity Advisory Committee	Utah State University
Great Salt Lake Strike Team	Utah Water Ways
Great Salt Lake Technical Team	Weber River Watershed Council
Great Salt Lake Watershed Enhancement Trust	West Desert Watershed Council
Environmental	
FRIENDS of Great Salt Lake	The Nature Conservancy
National Audubon Society	
Federal Agencies	
U.S. Army Corps of Engineers	U.S. Fish and Wildlife Service
U.S. Bureau of Reclamation	U.S. Forest Service
U.S. Bureau of Land Management	U.S. Geological Survey
U.S. Environmental Protection Agency	
State Agencies	
Idaho Department of Water Resources	Utah Division of Water Rights
Utah Division of Air Quality	Utah Division of Wildlife Resources
Utah Division of Conservation	Utah Geological Survey
Utah Division of Forestry, Fire & State Lands	Utah Division of State Parks
Utah Division of Water Quality	Wyoming Office of the State Engineer
Utah Division of Water Resources	
Water Suppliers	
Bear River Canal Company	Metropolitan Water District of Salt Lake and Sandy
Bear River Water Conservancy District	Ogden River Water Users Association
Cache Water District	Provo River Water Users Association
Central Utah Water Conservancy District	Salt Lake City Department of Public Utilities
Jordan Valley Water Conservancy District	Weber Basin Water Conservancy District

2.2 Ongoing Activities to be Integrated into the Great Salt Lake Basin Integrated Plan

Water planning is not something new in Utah. The water plans of our predecessors are what enabled the growth and development of the communities and economy we enjoy today; those plans left an incredible water legacy. The partners listed on Figure 2-2—plus numerous more—continue that important planning legacy. The GSLBIP must capitalize upon this wealth of information, knowledge, and experience; integrate past and ongoing efforts; and identify opportunities to bring them into alignment.

DWRe's first task related to H.B. 429, as described in Section 1, was to partner with Reclamation to capitalize upon its expertise in water planning, development, conservation, and management and the regional water infrastructure it had a significant role in developing and operating throughout the GSL watershed. The result is the development of this Work Plan for the GSLBIP. Many previous and ongoing activities were identified as part of situational and gap assessments completed for this Work Plan. Many activities are already under way or beginning soon that will be important to integrate with the GSLBIP; some of these activities are summarized in Table 2-2.

2.3 Funding Sources

Primary funding for the Work Plan and also GSLBIP development will come from $5 million appropriated by the 2022 Utah Legislature and a $3.17 million WaterSmart grant provided by Reclamation. DWRe is actively working with the GSL Strike Team, other state agencies at the Utah Department of Natural Resources (DNR), Utah Department of Agriculture and Food (UDAF), and Utah Department of Environmental Quality (DEQ), and other federal agencies at the United States Department of Interior and United States Department of Agriculture to leverage existing and identify new sources of funding for additional work. Reclamation is also assisting with investigating potential additional funding sources.

Table 2-2. Critical Activities to be Integrated into the Great Salt Lake Basin Integrated Plan Development

Plan	Description	Details
USGS Saline Lakes Ecosystems IWAA[1]	Authorized by the 2022 Saline Lake Ecosystems in the Great Basin States Program Act, the Saline Lakes IWAA includes numerous studies to collect data and investigate the interplay between saline lake hydrology and ecology to inform water management in the western United States. The USGS has 11 active studies as part of this IWAA that include GSL and its watershed.	The Saline Lakes Ecosystems IWAA is currently funded through October 2024 and includes the following: ▪ Water quality and quantity monitoring ▪ Avian movement and habitat monitoring ▪ Remote sensing analyses of habitat, hydrology, and water quality ▪ Aquatic ecology monitoring ▪ Water budget development ▪ Analyses of watershed land use changes ▪ Communications ▪ Database development
GSL Watershed Enhancement Trust[2]	The Trust was established by the Utah Legislature (H.B. 410) in 2022 to enhance water quantity and water quality for GSL and its wetlands. The Trust is beginning assessments and studies to identify essential habitats and hydrology that can be protected, enhanced and restored.	This Trust was provided $40 million in 2022 and is managed by the National Audubon Society's Saline Lakes Program and the Nature Conservancy. The Trust Advisory Council advises on matters related to the Trust and project proposals.
USGS and UGS GSL Basin Groundwater Model	This effort was funded by the 2021 Utah Legislature to develop a groundwater model of the GSL Basin to better quantify the groundwater contribution to GSL and its wetlands. The goal is to help with future planning and water management decisions affecting the lake, its wetlands, and surrounding areas.	This collaborative effort is scheduled to be completed in 2025.
GSL Tech Team Hot Topics Research Grants	The FFSL has been funding novel research of GSL since 2009 via its Hot Topics research grant program. The GSL Tech Team recommends key topics of interest that will further knowledge of GSL. FFSL solicits and funds proposals annually. Results are published to the community.	FFSL has funded approximately $200,000 in grants annually through fiscal year 2023. FFSL intends to increase this amount to $500,000 with a renewed focus upon research that informs and improves management of GSL.

Plan	Description	Details
GSL Strike Team	This team was originally formed in 2022 to bring together researchers at the University of Utah, Utah State University, and state agencies to provide data and answers to key questions needed for saving the GSL. The GSL Strike Team is currently assisting the GSL Commissioner develop his strategy.	This team published its *Great Salt Lake Policy Assessment* (GSL Strike Team 2023)[3] on February 9, 2023, for the 2023 General Legislative Session.
GSLAC, GSL Technical Team, GSLEP Technical Advisory Group, and GSL SAC	These groups comprise stakeholders and scientists completing ongoing studies to identify risks and opportunities and recommend studies and management strategies. Each group has a different point of focus.	Information about these groups is available online.[4, 5, 6, 7]
Water Suppliers And Managers	Numerous irrigation companies and municipal wholesale and retail water suppliers operate in the GSL watershed. All perform water planning at some level, provide expertise and data, and are likely partners for the GSLBIP.	Example water-planning documents they maintain include 40-year water requirement plans, water conservation plans, annual water use plans and reporting, and system water master plans.
Agricultural Water Optimization Program	UDAF was appropriated $200 million in 2023 to invest in helping agriculture optimize water use while maintaining or improving agriculture production.	Applications for projects must demonstrate water savings. Also, all projects require using flowmeters and demonstrating improved and protected surface and groundwater quality by reducing overwatering of crops.
GSL Inflow Monitoring	DWRi is working with Utah State University to complete a gap analysis of flow measurement infrastructure in the GSL watershed to identify priority locations for the installation of new flow measurement infrastructure.	A total of $5 million was appropriated to the DWRi for this program, but it expires on June 30, 2024.
GSL Recovery Program	Funding was identified in the 2022 GSL Recovery Program Act for the USACE to study drought conditions and protect the long-term health of GSL. DWRe is currently coordinating with the USACE.	DWRe has signed a Memorandum of Agreement with the USACE to begin an initial assessment of project needs. This assessment will begin in 2023 and likely conclude in 2025.
GSL Comprehensive Management Plan	The FFSL intends to begin updating its 2013 GSL Comprehensive Management Plan in 2023. This plan is intended to identify potential issues and strategies to manage GSL resources at different lake levels.	This important effort, which will help determine whether developing safe operating water levels for GSL is feasible, will begin during late 2023 and likely conclude in 2025.

Plan	Description	Details
Utah Wildlife Action Plan	This plan is an Endangered Species Act listing prevention plan that provides a roadmap on what species need conservation attention in Utah, what habitats they rely upon, what stressors they face, and important conservation actions.	The Utah Wildlife Action Plan is required to be revised every 10 years, and the DWR and partners are currently revising the plan with a timeline for completion being fall 2025. For this revised plan, Utah conservation partners have placed more emphasis on the GSL ecosystem, including saline lakes habitat and expansion of the species that need conservation attention, which comprise species that rely on the GSL (for example, brine shrimp and brine flies).

[1] More information is available at https://www.usgs.gov/special-topics/saline-lakes-ecosystems-integrated-water-availability-assessment.
[2] More information is available at https://www.gslwatertrust.org/.
[3] The GSL policy assessment can be accessed at https://gardner.utah.edu/great-salt-lake-strike-team/.
[4] More information is available at https://deq.utah.gov/great-salt-lake-advisory-council/great-salt-lake-advisory-council.
[5] More information is available at https://ffsl.utah.gov/state-lands/great-salt-lake/great-salt-lake-technical-team/.
[6] More information is available at https://wildlife.utah.gov/gslep.html.
[7] More information is available at https://ffsl.utah.gov/state-lands/great-salt-lake/great-salt-lake-salinity-advisory-committee/.

Notes:

$ = United States 2023 dollars
DWR = Division of Wildlife Resources
DWRe = Utah Division of Water Resources
DWRi = Utah Division of Water Rights
FFSL = Utah Division of Forestry, Fire and State Lands
GSL = Great Salt Lake
GSLAC = Great Salt Lake Advisory Council
GSLEP = Great Salt Lake Ecosystem Program
H.B. = House Bill
IWAA = Integrated Water Availability Assessment
SAC = Salinity Advisory Committee
Trust = GSL Watershed Enhancement Trust
UDAF = Utah Department of Agriculture and Food
USACE = United States Army Corps of Engineers
USGS = United States Geological Survey

Section 3—An Integrated Collaborative Process

Most of us are familiar with and have participated in a collaborative process. We engage the right people from within the right circles to solve our problems. We collect the right information to answer the right questions to make decisions. Then, we involve the right people to make or communicate those decisions that achieve the desired outcomes. These collaborative processes happen every day – in our homes, neighborhoods, organizations, companies, and communities. They can be simple and involve quick decisions or entail extensive study and deliberation. Connection (of individuals), a shared understanding (of the issues, concerns, options, tradeoffs, and decisions), and a commitment to a shared outcome are the critical elements that create trust and enable our success.

What is a collaborative process?

A collaborative process is a structured process that brings together the right people asking the right questions and evaluating the right information to drive informed, perceptive, balanced, and durable outcomes.

The GSLBIP must implement a similar process to create trust and enable success, but at a large scale, across the GSL watershed. A successful GSLBIP will require a process that is appropriate for and rises to the challenges we face and the goals we seek to achieve.

3.1 Building an Integrated Collaborative Process

The first step of any integrated water resources management plan is to build a collaborative process. The collaborative process will be the foundation and the framework that the GSLBIP will depend upon to achieve its objectives. Not only must the GSLBIP involve watershed stakeholders to achieve Objectives 1 and 2, but it must also integrate them directly into the technical analyses completed to achieve Objectives 3, 4, and 5. Utah's 2001 State Water Plan stated it succinctly as "The responsibility for making many water-related decisions resides with local leaders (DWRe 2001)." These leaders (as stakeholders) must be integrated into developing the GSLBIP so that their decisions align with GSL watershed goals and objectives.

Why do we need a collaborative process?

Input derived from a situational assessment (The Langdon Group 2023, Appendix B) validated recommendations from previous efforts to evaluate strategies for water for Utah and GSL (Envision Utah 2017; GSL Resolution Steering Group 2020; GSLAC 2020). Stakeholders in the watershed want and simply must have a vested interest in the solutions. Not only do adjacent communities want to connect with each other as they wrestle with water concerns, but they must do so within the context of both their river basin and the GSL watershed. Stakeholders want to and must participate in the process, accept the data, actively use the models, understand the issues and solutions, and assume a stake in the solutions.

Public engagement traditionally uses a robust communications plan and a steering committee to gain input, insight, and recommendations as technical analyses are completed in parallel. The GSLBIP, however, seeks to take the traditional approach a step further by also

directly engaging key stakeholders as part of completing the technical analyses. Developing sustainable and durable solutions that stand the test of time requires participants to have a vested interest in the process and results. An integrated collaborative process achieves those kinds of solutions.

3.2 Essential Strategies

An integrated collaborative process must implement the following strategies for it to succeed:

1. **Ensure a public and transparent process—** The process must enable any interested person or organization within the GSL watershed to be able to explore, learn, and participate in the GSLBIP. Processes, work products, data, and results must be transparent to ensure ease of access and accountability and engender trust.
2. **Implement a strong communications plan—**The process must include implementation of a strong communications plan that provides all interests with an opportunity to learn about and participate in developing the GSLBIP and also engages the broader community in reviewing, accepting, and implementing the plan. The communications plan must provide an opportunity for education and participation and allow individuals to explore and develop their own paths. Appendix C includes the GSLBIP Communications and Outreach Plan.
3. **Engage diverse interests—**The process must involve and represent diverse interests that balance and integrate different backgrounds, geographies, and perspectives from throughout the GSL watershed. These diverse interests need to be balanced with those of government agencies who are mandated to manage and protect GSL watershed resources.
4. **Cross-connect at multiple levels—**The process must facilitate cross-connection among government entities, interest groups, and participants across the GSL watershed, at the river-basin level, and even at the local level (refer to Figure 3-1). These cross-connections are the means to forge the relationships, partnerships, shared understanding, and trust that will be required to formulate durable solutions and outcomes for the watershed. The more connected people feel to each other, the issues, their watershed, their GSL, and their solutions, then the more likely the outcomes will be successful, sustainable, and durable.
5. **Integrate policy with science at the local level—**The process must integrate and facilitate a discussion of policy and science that will be unique to each river basin. Watershed councils in

Utah's Statewide Water Commitments

- *Utah is committed to increasing the resiliency of its water supply and quality by maintaining and improving current water infrastructure, improving data collection, and investigating opportunities for new water supply and storage.*
- *Utah is committed to using its existing water supply as wisely as possible by reducing the amount of water consumed through implementing conservation, ensuring access to safe and reliable drinking water, and improving the quality of water as it leaves its communities.*
- *Utah is committed to optimizing the use and management of its finite water supplies to preserve the state's agricultural economy and ensure a sustainable and prosperous future.*
- *Utah is committed to maintaining and improving the health of its waters and watershed – with emphasis on our forests, GSL, Bear Lake, and Utah Lake – to support their continued multiple uses.*

Source: State of Utah (2022).

each river basin will be best positioned to forge the required connections and shared understanding unique to their backyard. The councils will best understand their systems, data, and how solutions in their river basin will affect them, their river basin, and their place in the GSL watershed. They must participate in developing the solutions they will need to implement.

Figure 3-1. Connecting Communities within their River Basins and with their Watershed and Great Salt Lake

6. **Foster learning by taking no regrets actions—**Decisions are already being made, and actions are already being taken to address the risks we face and make use of the opportunities we have. Near-term no regret actions are, and will continue to be, essential to the process. These no regret actions enable connection, encourage innovation as a means of learning, refine our understanding of the issues, "move the needle," and engender trust among participants. These actions maintain forward momentum, demonstrate progress, and naturally facilitate an active, adaptive management process. Collaborative problem-solving is a critical element in taming a wicked problem. Appendices D and E provide a list of "no regrets" opportunities identified as part of developing this Work Plan.

7. **Develop a vested interest in results—**Stakeholders with diverse values and views should be engaged and invested in from the beginning of the process. These stakeholders must gain a shared understanding of the issues, help shape the work to be done, oversee the work's completion, interpret results, evaluate tradeoffs, and participate in crafting solutions – all to ensure that the stakeholders have a vested interest in the GSLBIP's results and recommendations. A vested interest is essential for durable outcomes.

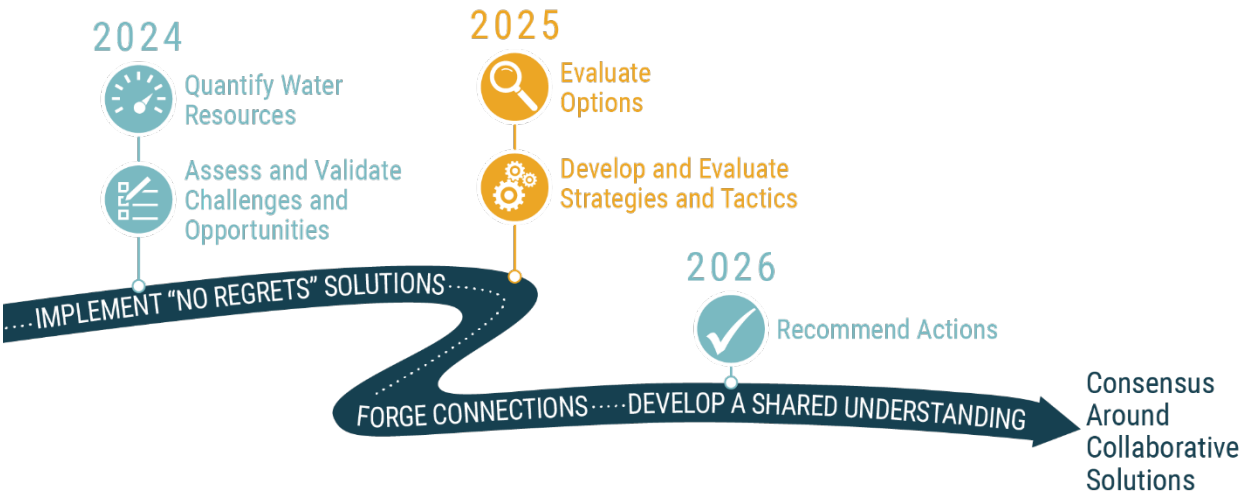
8. **Facilitate inclusive and balanced deliberations—**The process should be inclusive and balanced. Deliberations cannot be approached as a zero-sum game; we must reject an either/or approach in favor of identifying strategies that seek to balance needs and support multiple uses.

9. **Forge consensus-driven decisions—**Decisions by consensus means that stakeholders will strive to find common ground and unanimous approval but that, in the end, a minority may disagree while the rest can agree or reach acceptance. Even then, the views of the minority are respected and advanced to decision-makers for consideration along with the consensus recommendation. Consensus will provide a solid foundation for the GSLBIP; it will indicate long-term support and commitment from a diverse group of partners and participants.

3.3 The Integrated Collaborative Process

Figure 3-2 illustrates the GSLBIP's integrated collaborative process. Stakeholders will be engaged throughout and as part of the technical analyses to develop a vested interest in results, drive consensus, and result in sustainable and durable outcomes. No regrets actions will drive momentum, demonstrate progress, and facilitate collaboration via active adaptive management throughout the effort. Technical analyses allow stakeholders to be engaged throughout the process. The GSLBIP will not be solely a DWRe and Reclamation plan; it must be the entire GSL watershed's plan. To that end, the integrated collaborative process will be driven by a cross-connected structure of watershed stakeholders who participate in developing tools, interpreting results, evaluating options, and recommending solutions at the river basin and watershed scale. Stakeholders are not only advising, but they are truly participating.

Figure 3-2. The Integrated Collaborative Process: Framework to Drive Consensus and Durable Outcomes



The GSLBIP will leverage several existing collaborative efforts, such as the GSLBIP Advisory Group, GSLBIP Steering Committee, GSL Advisory Council (GSLAC), and various watershed councils to capitalize upon their momentum and effectiveness while minimizing additional burdens on organizations and individuals. DWRe and Reclamation will be responsible for engaging, facilitating, and coordinating the efforts of these groups within the framework of the GSLBIP.

At the watershed scale, DWRe formed a GSLBIP Advisory Group comprising representatives from participating state and federal agencies in June 2022 to advise its efforts to implement H.B. 429. The GSLBIP Advisory Group has continued advising DWRe and Reclamation in developing this Work Plan. A GSLBIP Steering Committee comprising diverse interests (non-state and federal agencies) from across the entire GSL watershed was formed in July 2023 to also advise in Work Plan development. Both groups will continue to work closely with each other and with DWRe and Reclamation throughout GSLBIP development. The role of the two groups will continue to be advisory; they will represent watershed interests, guide GSLBIP development, and provide final recommendations to DWRe.

This Work Plan proposes to use the newly formed watershed councils within each river basin to engage participants at a more local level and integrate them into the technical analyses (refer to Figure 3-3). The GSLBIP will leverage the expertise of these watershed councils to understand their challenges and water systems and support them in developing their own river basin water budgets. The river basin water budgets will then be used to help inform and validate and the overall watershed water budget and solutions. The watershed councils will be asked to help consider challenges, identify options, and evaluate water management strategies within the context of both their river basin and watershed. These connections, if in alignment with GSL watershed goals, are what will sustain actions into the future. Direction from the top alone will not create durable outcomes; they must be owned at the

GSLBIP Advisory Group and GSLBIP Steering Committee

The GSLBIP Advisory Group will engage and represent state and federal agencies with a stake in managing water in the GSL watershed. The GSLBIP Steering Committee will represent diverse interests from across the GSL watershed with a stake in how water is used and managed. Both will also contribute to the following:

- *Guiding the GSLBIP development process and achieving the GSLBIP goal and objectives*
- *Recruiting the involvement of governmental and nongovernmental entities, the private sector, and citizens working to develop the GSLBIP and encouraging ongoing collaboration and communication among them*
- *Reviewing and advising DWRe and Reclamation on activities, progress, technical products, and significant findings from GSLBIP development*
- *Reviewing and providing GSLBIP recommendations to DWRe*

The GSLBIP Advisory Group will additionally assess and advise DWRe and Reclamation on alignment with existing law, policy, and efforts.

River Basin Watershed Councils

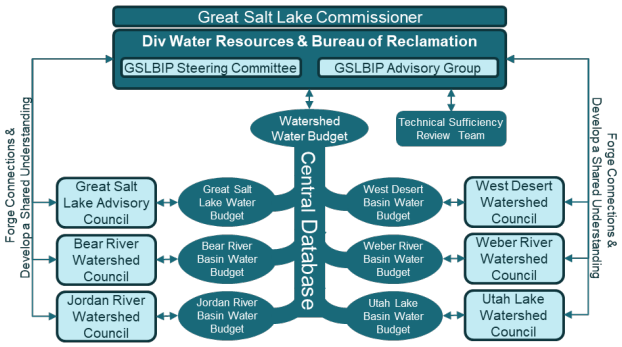
The watershed councils will contribute the following:

- *Represent diverse interests at GSL or within their respective river basin that have a stake in their water supply.*
- *Define, assess, and advise DWRe and Reclamation regarding challenges they face in water management.*
- *Define and assess their respective water budgets and evaluate potential solutions within the framework of the GSLBIP.*
- *Review and advise the GSLBIP Advisory Group and GSLBIP Steering Committee pertaining to activities, progress, concerns, technical products, and significant findings of the GSLBIP.*
- *Review the GSLBIP and provide recommendations to the GSLBIP Advisory Group and SGLBIP Steering Committee.*

local level for water users to choose and enable successful long-term implementation.

Work performed as part of this GSLBIP must be science based, technically correct, and defensible. Reclamation will form an independent Technical Sufficiency Review Team of experts who will provide an independent review of GSLBIP deliverables. Appendix F provides details on the composition and responsibilities of the Technical Sufficiency Review Team.

Figure 3-3. Integrating Stakeholders into Great Salt Lake Basin Integrated Plan Development



3.4 Decision-Making Process

GSLBIP's integrated collaborative process implements a model that engages and cross-connects diverse interests at multiple levels to drive toward consensus-driven decisions. Stakeholders throughout the GSL watershed will have multiple venues to participate in the process's analyses and discussions. In the end, the GSLBIP Advisory Group, GSLBIP Steering Committee, river basin watershed councils, and GSLAC must consider input from the diverse interests they represent to make recommendations to the groups and decision-makers above them. All groups must strive to make decisions by consensus; all must strive to find common ground and unanimous approval. Views of the minority will be respected and advanced to decision-makers for consideration, along with the group's consensus recommendation.

Figure 3-4. Great Salt Lake Basin Integrated Plan Decision Hierarchy

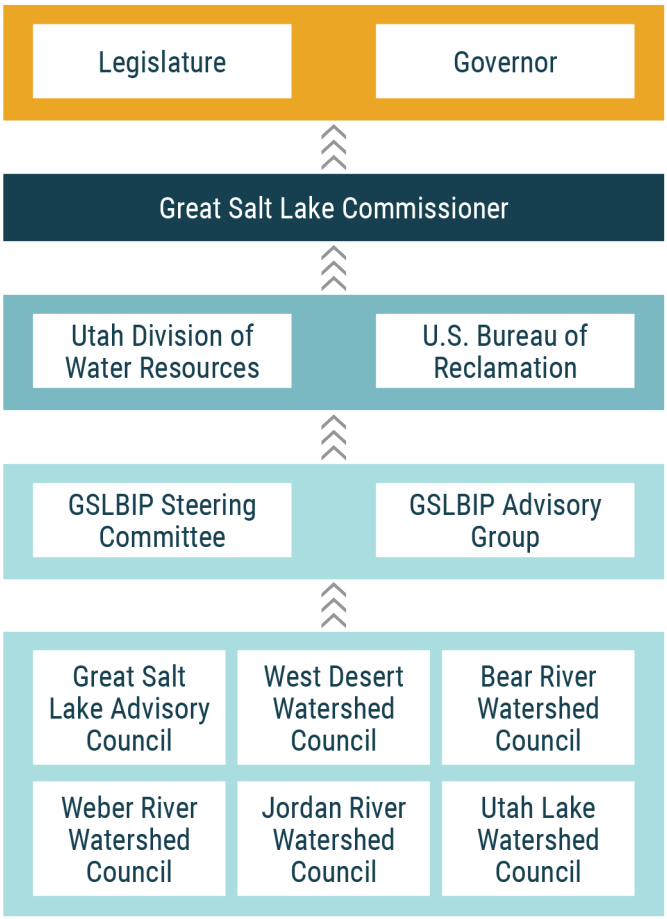


Figure 3-4 illustrates the decision-making process. Communication will flow in both directions, but recommendations and requests for decisions will be forwarded following the illustrated hierarchy. Reclamation will not have the authority, nor the ability, to enact changes to current state water operations or policy through the GSLBIP. Reclamation will codirect GSLBIP development with

DWRe through the trade-off analysis step (Task 6, see Section 4) whereupon DWRe will direct the final decision analyses for recommendations to be included in the draft and final GSLBIP. The GSL Commissioner will have the ultimate authority to direct policy that seeks to protect GSL and will coordinate directly with the Utah Legislature and Office of the Governor.

3.5 Success Metrics

An often-cited means to measure the success of GSL policy is for GSL water levels to reach a specific or range of elevations. While such a metric would indicate an increase of inflows to and a reduction of risks within GSL, this metric alone will not accurately measure the success of the GSLBIP for "Great Salt Lake and all uses, including people and the environment, throughout its watershed." One task during GSLBIP development (Task 2, see Section 4) will be to establish and refine specific metrics that can be used for to implement and actively manage identified solutions.

Success must be evident in the short term and measured in the long term.

Following are short-term success indicators:

- On-time and on-budget delivery of studies, plans, tools, and recommendations
- Significant participation in communication efforts, project meetings, and development of data, tools, and solutions
- Positive feedback from participants that they feel listened to and represented in the process and results
- Improved connection and shared understanding of the challenges, options, and solutions for managing the future water supply
- Continued changes in water use observed to be demonstrated by increasing participation in water conservation and optimization efforts
- Consensus on an action plan for balancing needs and supporting multiple uses throughout the watershed

Following are indicators of long-term success:

- **GSL water levels—**The ongoing decline of lake water levels is arrested and water levels are stabilized within a defined range.
- **Information—**Systems are in place to create, collect, store, make available, and process data for water management.
- **Policy framework—**Policy is thoughtfully refined to provide the economic, legal, and institutional mechanisms needed to incentivize a reduction in consumptive water use, share available water, and benefit all water uses, including people and the environment, throughout the GSL watershed.
- **Investments—**A source of sustainable funding is in place to facilitate,

Success as a Metric

Success is not either/or; for example, success cannot be either watershed needs, including people and the environment, or GSL water levels. Success must balance needs and support multiple uses.

incentivize, and compensate water users to reduce consumptive use, implement changes in organizational infrastructure, and build, maintain, and operate required water infrastructure.

- **Water supply status—**Although the water supply may be limited, water needs are balanced through a proactive, collaborative process without a need for legal action.

In summary, and most importantly, success will be measured by the long-term outcomes. Actions taken due to the GSLBIP will ensure a resilient water supply that sustains the health and growth of GSL and enables the future we envision for GSL and all water uses in its watershed. The GSLBIP will foster a lasting water legacy for future generations.

Section 4—A Roadmap to Action

Leveraging the integrated collaborative process, the GSLBIP must incorporate a robust technical approach to achieve its goal and objectives. It must optimize available resources while embracing the challenges we face and the inherent uncertainty of the future. It must drive collaborative decisions that create durable outcomes and shape a future that achieves our goal. This section of the Work Plan provides an overview of the origin and a roadmap toward achieving the ultimate goal of the GSLBIP—action that ensures a resilient water supply for GSL and all water uses, including people and the environment, throughout the watershed.

Key Findings from the Gap Analysis

- *We have a solid foundation to build upon. A significant body of work has been completed, is in process, or will be developed soon that will be useful for the GSLBIP. Coordination will be vital to success.*
- *Opportunities abound to improve our data, tools, processes, and decisions. The challenge is in where to start.*
- *Decisions can be made today. Completing targeted studies now will enable better decisions tomorrow.*
- *Studies and solutions have typically been discussed in terms of different timelines. The GSLBIP will consider those to be completed today (in 2023), tomorrow (2024 through 2026 as part of the GSLBIP), and beyond (2027+). The primary purpose of the GSLBIP is to enable informed long-term decisions in 2026.*

4.1 Gap Analysis

H.B. 429 required the DWRe to complete "a synthesis of available information literature, and data, and an assessment of scientific, technical, measurement, and other informational needs…" to inform the development of the Work Plan for the GSLBIP. Knowledge gained from interviews, workshops, and a review of available literature was organized in a database and used to identify strengths, gaps in available resources and opportunities for capacity development and further study. Methods and results from the gap analysis were shared with various participating experts to help validate results and are summarized in a report found in Appendix G (Jacobs and HAL 2023). The gap analysis does not in and of itself prioritize new technical analyses; it provides an invaluable synthesis of information pertinent to the goal and objectives of the GSLBIP. It was the point of origin for a roadmap for the GSLBIP Work Plan.

4.2 A Roadmap for the Work Plan for the Great Salt Lake Basin Integrated Plan

H.B. 429 required the DWRe to provide "a description of how the Work Plan will be implemented to address the needs [that is, opportunities] …" identified as part of the gap analysis. The opportunities identified by the gap analyses were prioritized with input

At a minimum, the GSLBIP must meet the following criteria:

- *Make projections of future water supply and demand*
- *Analyze how water infrastructure and operations will perform*
- *Develop appropriate adaptation and mitigation strategies*
- *Complete a trade-off analysis (BOR WTR 13-01).*

from the GSLBIP Advisory Group and GSLBIP Steering Committee based upon the capacity of the opportunities to 1) inform decisions to be made by 2026, 2) build a foundation for the future, and 3) be completed within the prescribed timeline and budget for the GS LBIP. The opportunities were then organized into five tracks that, along with the GSLBIP integrated collaborative framework, form the roadmap of the GSLBIP Work Plan (see Figures 4-1 and 3-3):

Figure 4-1. The Five Tracks and Integrated Collaborative Framework of the Roadmap for the Great Salt Lake Basin Integrated Plan Work Plan

- **Decision-making—**Proposed work will integrate people and tools within a structured process designed to identify and solve problems and make decisions. This is the central effort of the GSLBIP that achieves the requirements of H.B. 429 and Reclamation's WTR 13-01. All GSLBIP activities will serve to inform this core effort.
- **Strategic research—**Proposed work is intended to investigate and provide essential information that will improve confidence in long-term decisions to be made.
- **Solutions development—**Numerous solutions have been previously recommended. Proposed work will advance selected options and strategies to better characterize these options and inform GSLBIP decision-making.
- **Capacity development—**Proposed work will improve the ability of individuals, organizations, and communities to consider, anticipate, monitor, and make decisions as part of the GSLBIP and beyond. Maximum value from many of these projects may not be realized during development of the GSLBIP but beyond 2027. They help set both a foundation and trajectory for the future.
- **Policy opportunities—**Opportunities were identified to enhance existing policy to improve process, inform better decisions and enable better outcomes from implementation of the GSLBIP.

The Scenario Planning Process

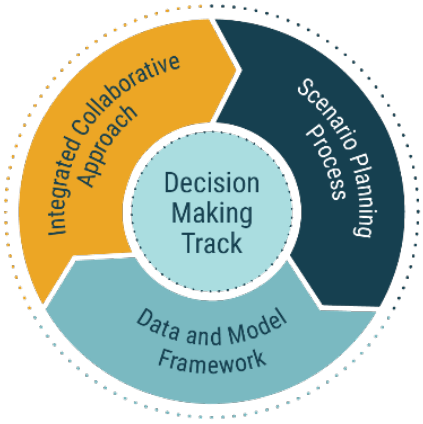
The process involves identifying the key forces or drivers that will likely influence future water supply and water demand, ranking of the driving forces as to their relative influence and uncertainty, and using the most influential and uncertain driving forces to identify various themes and storylines (narrative descriptions of scenarios) that describe how water conditions (water supply and water demand) may evolve in the future. The water conditions of the various scenarios are then quantified and used to assess future system reliability and risks and then assess the performance of options and strategies.

The following sections summarize the recommended approach to develop each track in support of the GSLBIP.

4.2.1 Making Decisions

Tasks in this track serve as the core of the technical approach and will inform the decisions that must be made today (2023), tomorrow (2024-2026) and beyond (2027+). As such, development of these tasks is the top priority for the GSLBIP. Tasks will be facilitated by the integrated collaborative approach and incorporate a scenario planning process and a new model framework and database (refer to Figure 4-2).

Figure 4-2. Three Components of the Making Decisions Track of the Work Plan



4.2.2 Integrated Collaborative Approach

The integrated collaborative approach described in Section 3 will be central to developing the GSLBIP.

4.2.3 A Scenario Planning Process—A Strategy for Coping with Uncertainty

The water resource management decisions we must make must consider the future amount of water that is available and required in Great Salt Lake's watershed over the next 50 years. The future of water is highly uncertain, dependent upon a complex interplay between natural and human systems, and driven by climatic, demographic, economic, social, institutional, political, and technological factors. The precise trajectory of this interplay over time, and the resulting state of the physical system over time, are uncertain and cannot be adequately represented by a single view of the future or even consideration of anticipated "good", "satisfactory", and "poor" conditions. The range of uncertainty in the factors that influence future water supply and water demand is simply too broad.

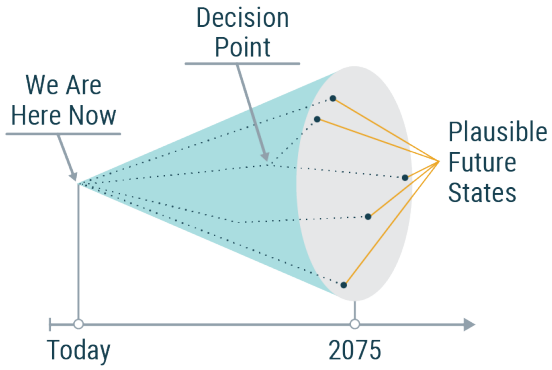
A scenario planning process (refer to Figure 4-3) will be implemented to consider the broad uncertainty and vast range of future possibilities and portray the broad range of plausible futures in a manageable number of scenarios. Scenario approaches have been widely applied in water planning and management, from global to regional scales, although specific methodologies have varied considerably (Alcamo and Gallopin, 2003; Mara and Thomure, 2009; Water Utility Climate Alliance, 2010; U.S. Bureau of Reclamation, 2012; Colorado Water Conservation Board,

Figure 4-3. General Steps Involved in the Scenario Planning Process

2019; GSLAC, 2019). A scenario planning approach allows for the identification and consideration of risks and uncertainties and also how different combinations of strategies may mitigate those risks and uncertainties.

Scenarios are alternative views of how the future might unfold; they are not predictions or forecasts of the future. A set of well-constructed scenarios represents a range of plausible futures that assists in the assessment of future risks and the development of mitigation and adaptation options and strategies. Figure 4-4 illustrates this concept. We have a present understanding of the current state of the GSL watershed, represented as "today". Future uncertainty increases with time; represented by the funnel. The integrated collaborative approach will be used to identify and define a range of plausible future states or scenarios at a future time; represented by 2075. The suite of scenarios used in the planning effort should be sufficiently broad to span the plausible range. This approach will facilitate the identification of critical signposts (decision points) when a water supply shortage might be expected within the study planning horizon and the potential magnitude of the shortage. This will help the State of Utah respond to the key planning question of when and how much of a potential water shortage the watershed might experience and evaluate and select the best combination of actions to implement to ensure a resilient water supply.

Figure 4-4. Conceptual Representation of the Uncertain Future of a System, also known as the "Cone of Uncertainty"



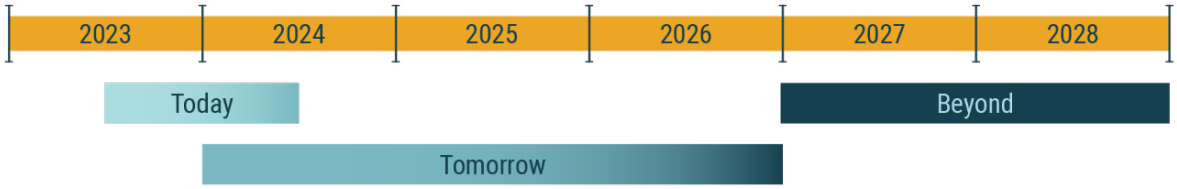
Source: Adapted from Timpe and Scheepers, 2003.

An integrated collaborative framework using a scenario planning process will best position Utah to develop an actionable GSLBIP for the future.

4.2.4 Data and Model Framework

Central to the GSLBIP technical approach will be development of a framework of data and models and data that will enable the scenario planning process and accomplish the GSLBIP's objectives (DWRe 2023). The model framework must inform our decisions today, tomorrow, and beyond (see Figure 4-5). Planning is not a finite event; it is and will be a continual process we must be prepared for. **The GSLBIP must enable an adaptive approach toward stakeholders making better and better decisions into the future**.

Figure 4-5. Decision Horizons for the Great Salt Lake Basin Integrated Plan



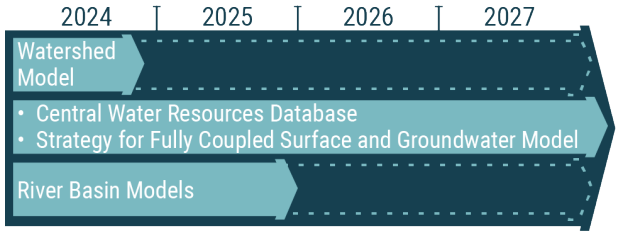
4.2.5 Decision Horizons for the Great Salt Lake Basin Integrated Plan

4.2.5.1 Today (2023)

Informed decisions can be made with the models and data we have today. The State of Utah has invested significantly in studying how to manage water resources in GSL (Clyde Snow & Sessions 2023, Jacobs and HAL, 2023) and throughout its watershed (DWRe 2001, 2004, 2009, 2010, 2014, 2021), how changes in climate and throughout the watershed can influence GSL (GSLAC 2019), and developed recommendations to preserve flows for GSL (HCR10 2020, GSLAC 2020). Data, tools, and recommendations are available for decisions today. In most cases, however, existing analyses do not consider the watershed as a whole nor adequately capture or enable an evaluation of the possibilities of the future.

4.2.5.2 Tomorrow (2026)

Figure 4-6. Model Development Schedule

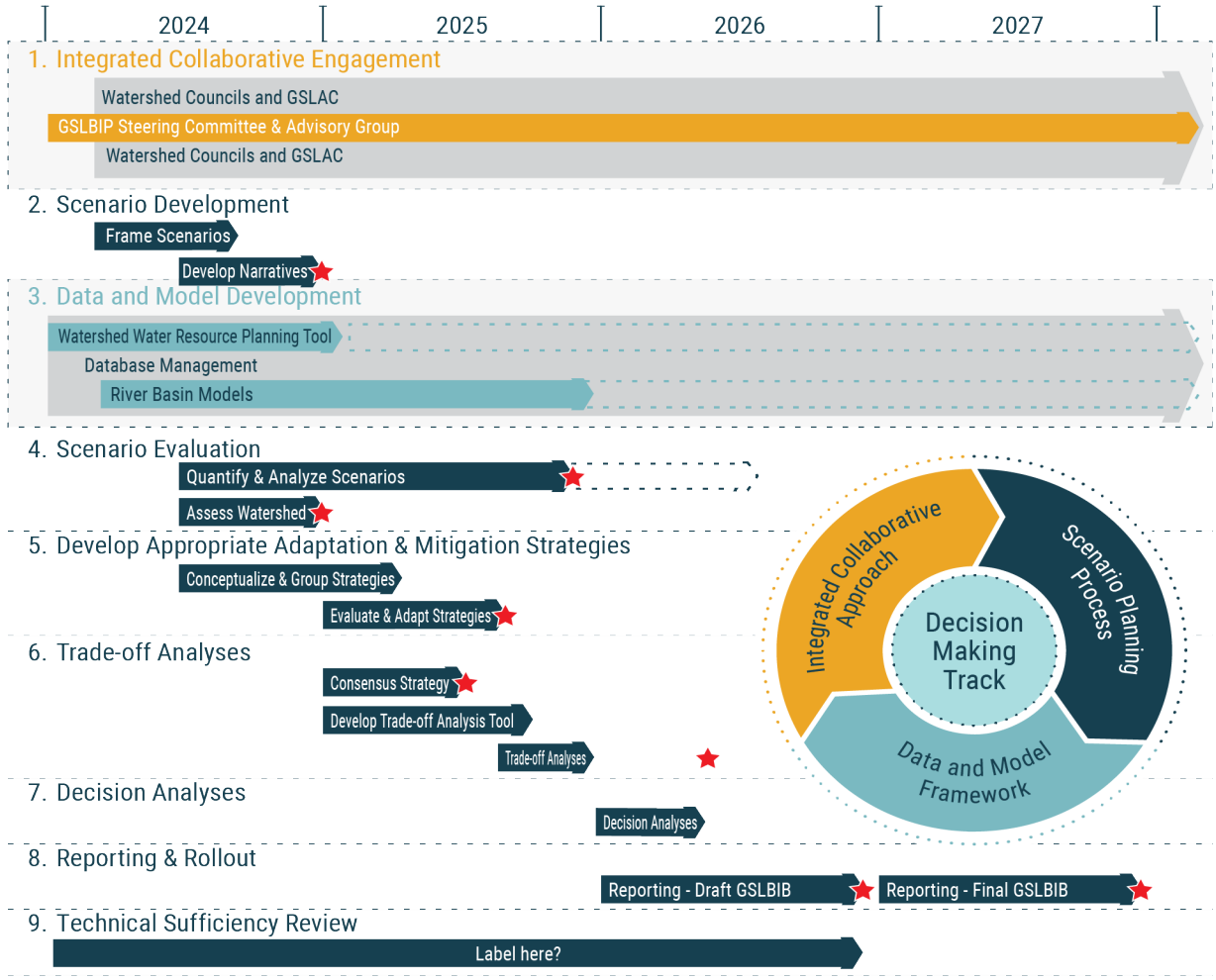


H.B. 429 prescribes that the GSLBIP must be completed by November 30, 2026. As illustrated in Figures 4-6 and 4-7, data and tools must be available in December 2024 to understand what and where the water gaps are in the GSL watershed and to begin to assess and validate challenges and opportunities. Additional data and tools must be available in 2025 to enable stakeholders from throughout the watershed to evaluate options and develop and evaluate strategies and tactics to adapt to and mitigate potential water shortages. Trade-off analyses must begin by August 2025 to enable final recommendations for action s in August 2026. The GSLBIP Model Scoping Plan (see Appendix H) describes the recommended modeling and database approach for the GSLBIP.

4.2.5.3 And Beyond (2027+)

The central water resources database and model data and algorithms developed as part of the GSLBIP will eventually be integrated into a coupled surface and groundwater model that can be used to inform future river basin implementation plans, water right distribution models, and local water-planning decisions. A strategy to guide development of this model should be prepared as part of the GSLBIP.

Figure 4-7. Tasks and Schedule for the Making Decisions Track of the Great Salt Lake Basin Integrated Plan Work Plan



4.2.6 Technical Sufficiency Review

An important objective of the GSLBIP will be to ensure that technical information, data, models, analyses, and conclusions resulting from development of the GSLBIP are technically supported and defensible. A Technical Sufficiency Review Plan has been prepared to outline the approach and methods to be used for reviewing this information (see Appendix F).

4.2.7 Key Tasks for Making Decisions

The core effort of leading and delivering the required tasks for Making Decisions will be completed by DWRe and Reclamation. The GSLBIP budget for this track is $5,000,000. A detailed description of task goals, activities, deliverables, and assumptions is in Appendix I.

4.3 Strategic Research

There are numerous gaps that could be and should be investigated. The proposed projects in the Strategic Studies track focus upon informing the decisions to be made by 2026. They will fill an important role of investigating essential questions and providing information that can make a significant improvement in confidence in the long-term decisions to be made as part of the GSLBIP. However, they cannot be completed alone. They must be integrated with results from numerous efforts already being implemented by others (refer to Figure 4-8). A detailed fact sheet for each of the four GSLBIP funded Strategic Research Studies is found in Appendix I.

Available Data and Tools

- ***For decisions today***
  - *Great Salt Lake Strike Team Policy Assessment (2023) based upon DWRe's Great Salt Lake Water Budget (2023)*
  - *Great Salt Lake Integrated Model (Jacobs 2019) based upon DWRe's Water Budget Model (2017 data)*
- ***For decision tomorrow***
  - *DWRe's Water Budget Model (2023)*
  - *DWRe's climate and natural flow projections for the GSL watershed through the year 2100 (2023)*
  - *A rebuilt Great Salt Lake Integrated Model based upon updated information that enables planning efforts by December 2024*
  - *New River Basin Models developed with stakeholders to represent the same water resources data as GSLIM but also incorporate detailed local operations, enable connection, and develop a shared understanding and validation of strategies. Completed by December 2025.*
  - *A new centralized water resources database with climate, water supply, water demand, and land use data developed during the GSLBIP.*
  - *A new long-term strategy to develop a coupled surface and groundwater model*

4.4 Solutions Development

Numerous options and strategies have been recommended in past studies, however, very few have been advanced to evaluate their feasibility, costs, and how they might be implemented. The proposed studies in the Solutions Development track focus on the most likely solutions, investigate their feasibility and potential costs, and provide input into the evaluation to be completed in 2024-2025 and long-term decisions to be made in 2026 (refer to Figure 4-9). However, they cannot be completed alone. They must be integrated with results from numerous efforts already being implemented by others. A detailed fact sheet for each of the three GSLBIP funded Solutions Development Studies is found in Appendix I.

4.5 Capacity Development

A number of programs and studies were identified in the gap analyses that work to improve the ability of individuals, organizations, and communities to consider, anticipate, monitor, and make decisions as part of the GSLBIP and beyond. Planning and implementation of these efforts and the maximum value from their investments may not be realized until after 2027 (refer to Figure 4-10). However, the proposed study in the capacity development track will work in concert with and will help inform the GSLBIP even as it builds a strong foundation and steers the trajectory for implementation beyond 2027. However, it cannot be completed alone. It must be integrated with results from numerous efforts already being implemented by others. A detailed fact sheet for the one GSLBIP funded capacity development study is found in Appendix I.

Figure 4-8. Targeted Strategic Research Studies

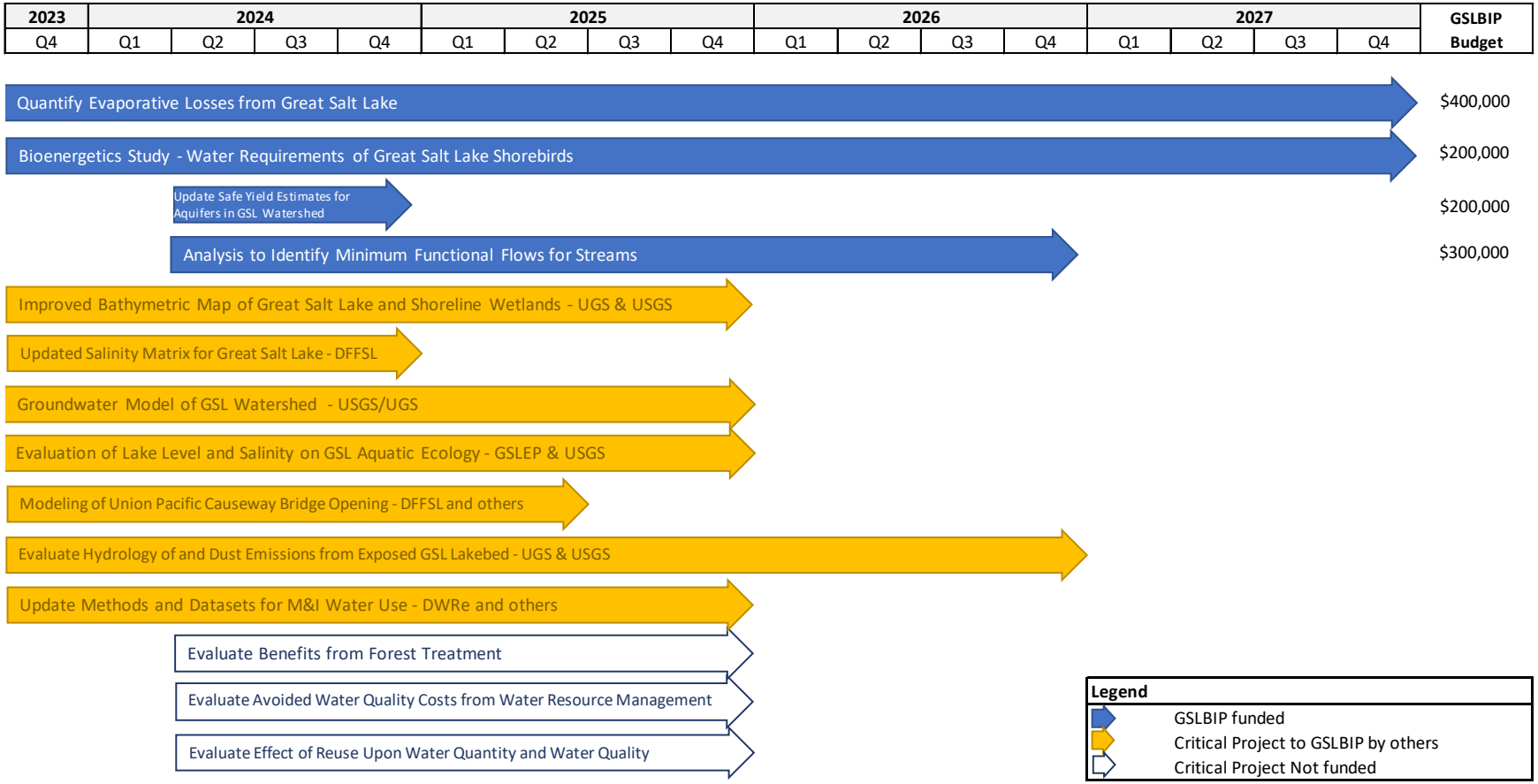


Figure 4-9. Targeted Studies for Solutions Development

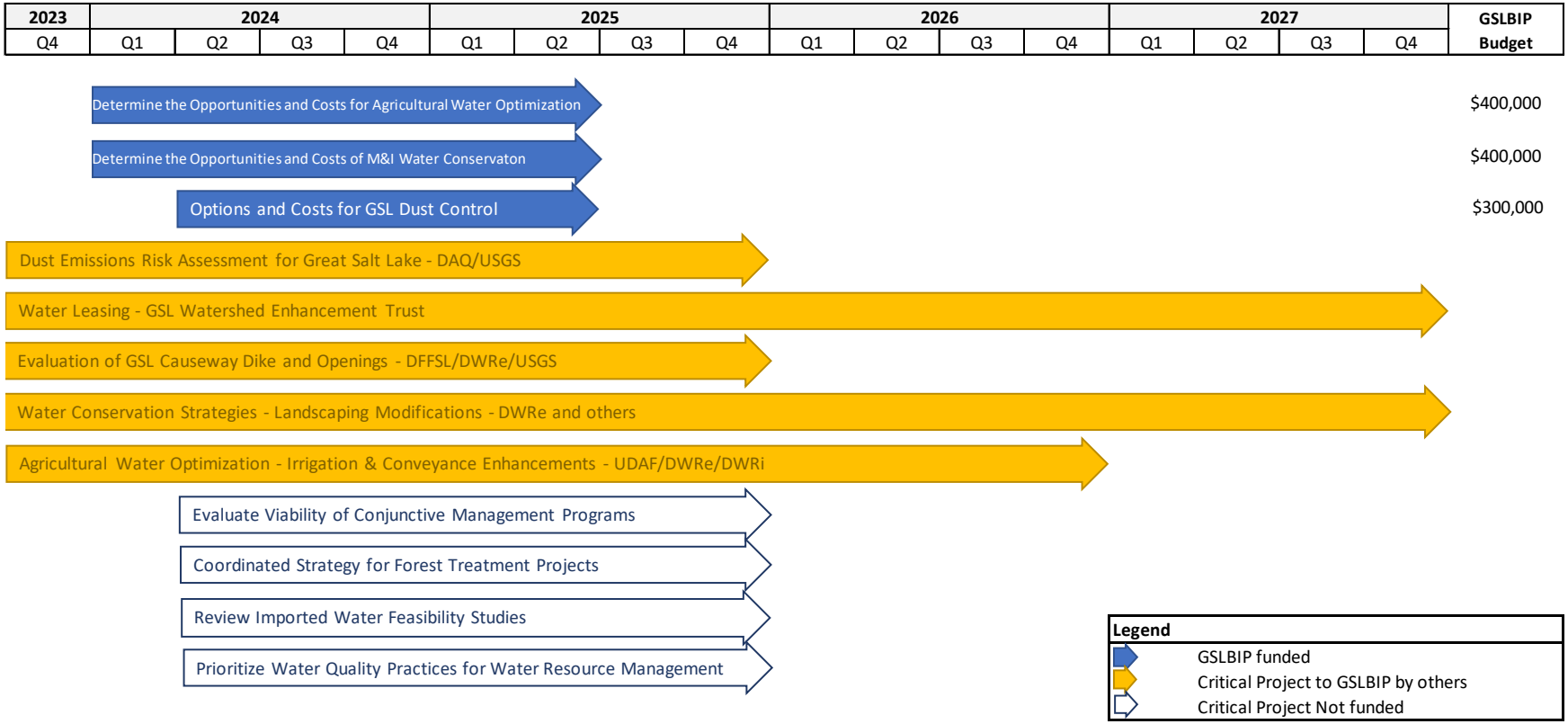
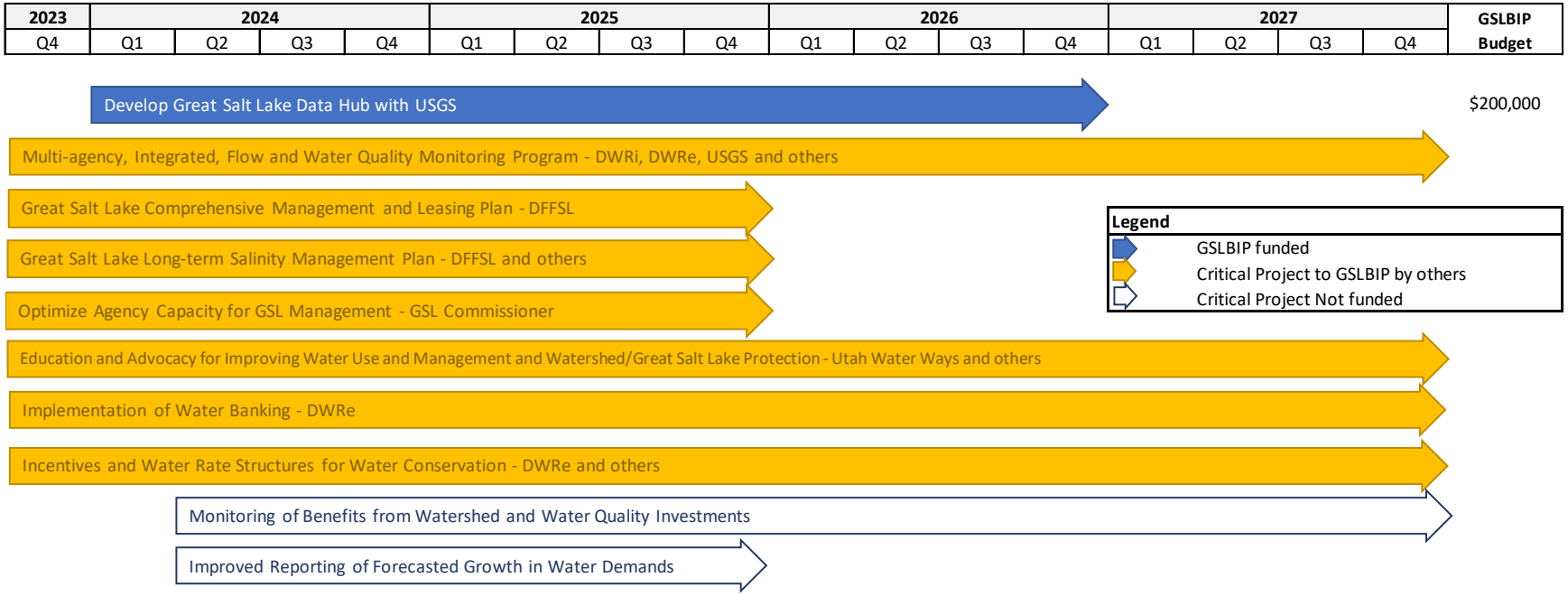


Figure 4-10. Prioritized Studies for Capacity Development



4.6 Policy Opportunities

A number of opportunities were identified to enhance existing policy to improve process, inform better decisions and enable better outcomes. These opportunities are summarized in Appendix E and may be considered during and after development of the GSLBIP.

4.7 Summary

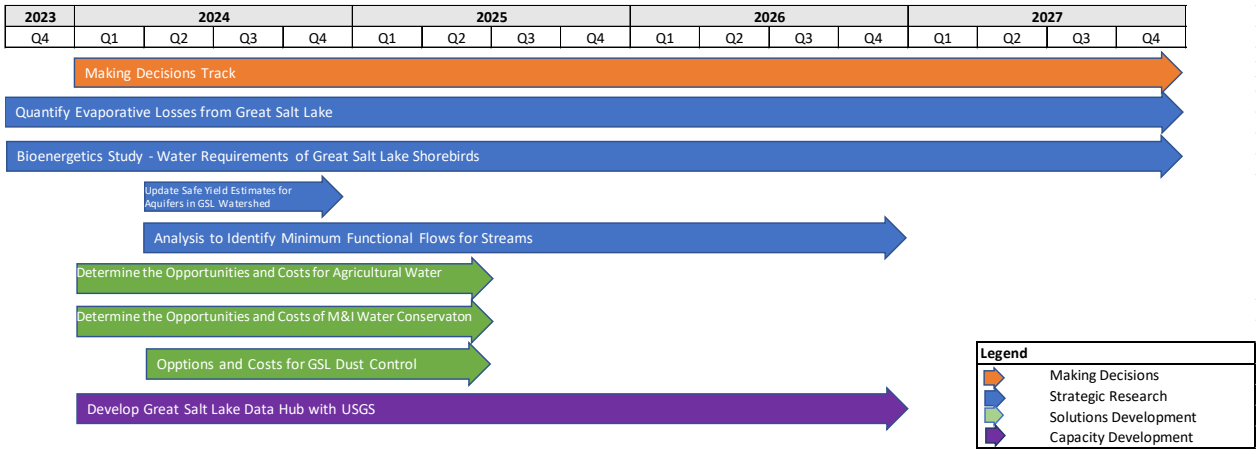
The GSLBIP Gap Analysis (Appendix G) identified an ambitious list of over 130 potential opportunities to fill gaps in our collective understanding of GSL and its watershed. During development of the GSLBIP Work Plan, the Project Team, Steering Committee and Advisory Group discussed the feasibility, impact, and potential value of the complete project list and ultimately identified which projects were the most urgent and important to accomplishing the goals of the GSLBIP (Table 4-1 and Figure 4-11). These studies were targeted based upon their capacity to 1) inform decisions to be made by 2026, 2) build a foundation for the future, and 3) be completed within the prescribed timeline and budget for the GSLBIP. Further investment in additional efforts would add additional value and accelerate implementation of solutions.

Table 4-1. Cost Summary for Great Salt Lake Basin Integrated Plan Projects

Project Title	Estimated GSLBIP Funding Contribution[a]
Work Plan for the Great Salt Lake Basin Integrated Plan Development (completed)	$700,000
Modeling and Scenario Planning[b]	$700,000
Evaporative Losses from Great Salt Lake Quantification	$5,000,000
Safety Yield Estimates from Aquifers Update	$200,000
Bioenergetics Study: Water Requirements of Great Salt Lake Shorebirds	$200,000
Functional Flow Analysis	$300,000
Opportunities and Costs for Agricultural Water Optimization	$400,000
Opportunities and Costs of Municipal and Industrial Water Conservation	$400,000
Options and Costs for Great Salt Lake Dust Control	$300,000
Great Salt Lake Data Hub Development	$200,000
TOTAL	**$8,100,000**

[a] Estimated Great Salt Lake Basin Integrated Plan funding contribution does not include external funding amount.
[b] Refer to Mode scoping Plan (Appendix H) for additional details on schedule.

Figure 4-11. Roadmap of Studies for the Great Salt Lake Basin Integrated Plan Work Plan



Section 5—Next Steps

Implementing the GSLBIP will be a daunting task; an integrated water assessment has never been completed at this scale in Utah. Water supply challenges faced throughout the watershed, and especially at GSL, could not be more urgent. Developing and implementing the GSLBIP could not be more important. The GSLBIP will need to overcome significant social, political, and technical challenges that will require an unprecedented level of trust, cooperation, and spirit throughout the watershed. Therein is the key for success. This Work Plan provides a roadmap to action; a path to a GSLBIP that will provide Utah with every opportunity to succeed. However, durable outcomes and long-term success will largely depend upon one thing—the GSL watershed moving forward with a new view of water and community. It can be done.

5.1 A Story of One Lake, One Community

The GSL community was not always able to tackle and overcome extremely challenging issues. As recently as 15 years ago, lake stakeholders often thought and acted independently. Conflict was common, resolution was infrequent. Increasing challenges, passionate leadership, and a common desire to protect the lake, however, brought lake stakeholders together as One Community. One Community that revolved around the idea of One Lake. They had different interests, opinions, and agendas, but they agreed that they only had One Lake. A view of One Lake forged One Community. That One Community is what in turn is preserving One Lake.

5.2 A View for One Water, One Community

The GSL watershed is a closed basin. Everyone who lives, works, and plays within this watershed relies upon the same, precious One Water. We must begin to think about our watershed as a community, considering where our water comes from and where it goes. The water we use was once used or passed through someone's system upstream. The water we drain, flush, or return is inevitably used by someone or something downstream. We all use and rely upon One Water. That One Water is what makes us One Community. It will take One Community to preserve One Water for future generations.

The intent of this Work Plan is to create that opportunity.

5.3 Moving Forward

Over 150 individuals contributed to this Work Plan and it has resulted in significant interest and momentum throughout the GSL watershed to implement it. This momentum must be maintained through implementation even as the draft Work Plan is reviewed by the public. Active planning must be balanced with no regrets actions. Monies are available, there is a social and political will to act, and time is of the essence. No regrets actions can be considered and taken (see Appendices D and E). Outreach and engagement efforts with the community have already begun as this Work Plan is rolled out to the public and work begins (see Appendix B). DWRe and Reclamation are already mobilizing staff, leveraging partnerships, and contemplating contracts to begin work in January 2024 (Appendix H, I and J). This Work Plan provides a roadmap for the GSLBIP; the State of Utah is already moving forward to a resilient water supply.

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