Project Fact Sheets

Work Plan for the Great Salt Lake Basin Integrated Plan

The *Gap Analyses Report* (Appendix G of the draft *Work Plan for the Great Salt Lake Basin Integrated Plan*; Work Plan) identified an ambitious list of more than 130 potential opportunities to fill gaps in our collective understanding of Great Salt Lake (GSL) and its watershed. During development of the Work Plan, the GSL Steering Committee and GSL 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 for accomplishing the GSL Basin Integrated Plan (GSLBIP) goals (Table 1). These projects were identified based upon their capacity to accomplish the following:

- Inform decisions to be made by 2026
- Build a foundation for the future
- Be completed within the prescribed GSLBIP timeline and budget

These projects are only recommendations at this time; funding amounts are subject to change.

Table 1. Cost Summary for Recommended Projects

Project Title	Project Category	Estimated GSLBIP Funding Contribution[a]
GSLBIP Work Plan Development (completed)	Decision-Making Track	$700,000
GSL Stormwater Study (completed)	Decision-Making Track	$500,000
Modeling and Scenario Planning[b]	Decision-Making Track	$4,500,000
Quantification of Evaporative Losses from Great Salt Lake	Strategic Research	$400,000
Groundwater Well Monitoring*	**Strategic Research**	**$200,000**
Bioenergetics Study: Water Requirements of Great Salt Lake Shorebirds	Strategic Research	$200,000
Analysis to Identify Functional Flows for Streams	Strategic Research	$300,000
Opportunities and Costs for Agricultural Water Optimization and Leasing*	**Solutions Development**	**$400,000**
Opportunities and Costs of Municipal and Industrial Water Conservation*	**Solutions Development**	**$400,000**
Options and Costs for Great Salt Lake Dust Control	Solutions Development	$300,000
Great Salt Lake Data Hub Development	Capacity Development	$200,000
TOTAL		$8,100,000

[a] Estimated GSLBIP funding contribution does not include external funding amounts. Individual project fact sheets provide more information on matching funds from project partners.
[b] Refer to Appendix H, *Scoping Plan for the Water Resources Planning Tool*, for additional details on schedule.

***** Projects that were changed because of draft Work Plan comments.

Note:

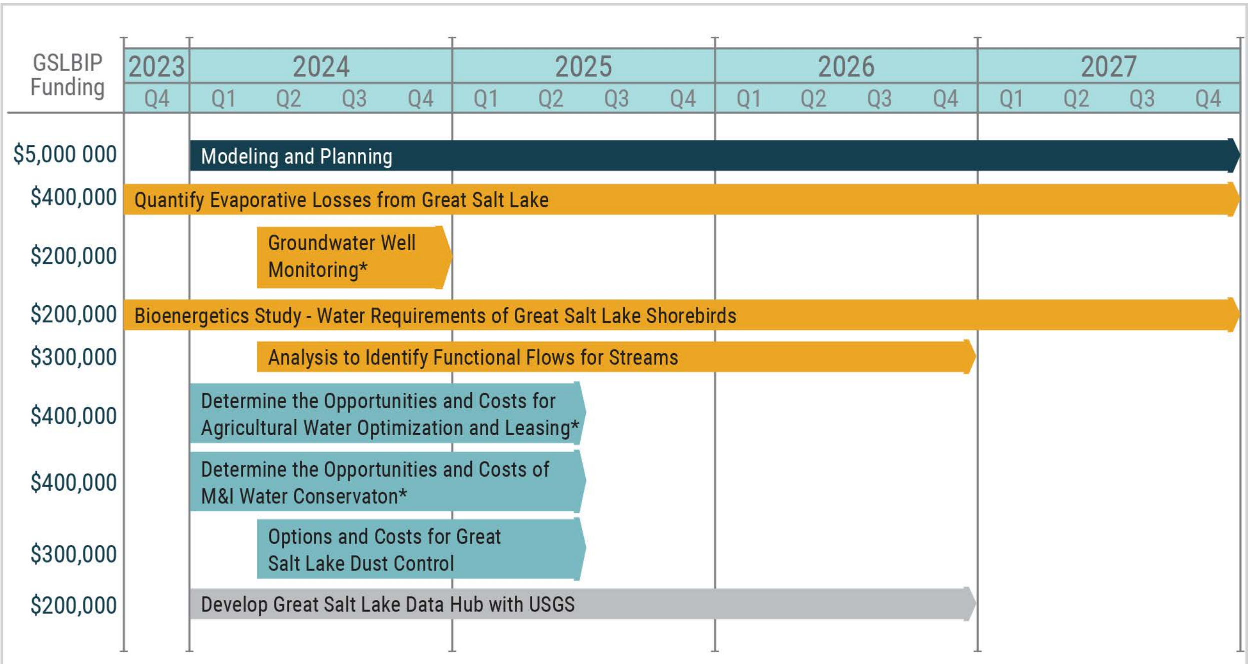
GSLBIP = Great Salt Lake Basin Integrated Plan

Project Fact Sheets

A successful GSLBIP depends on translating these opportunities into actual projects and defining project scopes, schedules, and agreements needed to go from concept to operation. The project fact sheets presented in Attachment 1 are intended to facilitate developing scopes of work for the projects listed in Table 1. An overall project implementation schedule is presented in Figure 1.

Project recommendations that were changed because of draft Work Plan comments are noted by an asterisk next to the title.

Figure 1. Great Salt Lake Basin Integrated Plan Project Schedule



*Projects that were changed because of draft Work Plan comments.

Attachment 1
Project Fact Sheets

Quantification of Evaporative Losses from Great Salt Lake

Category	Strategic Research
Goal	This study aims to better quantify and reduce the uncertainty of estimates of the volume of water that evaporates from the wetlands, mudflats, and open water of Great Salt Lake (GSL).
Need	Many methods have been used to estimate evaporation from GSL, but these rates have never been directly measured or suitably modeled. Estimates of evaporation from GSL have ranged from 2,000,000 to 5,000,000 acre-feet per year. The uncertainty associated with estimating the lake's evaporative processes, evaporation rates, and the associated evaporative losses remains high due to the unique chemistry and salinity of the lake. Given the large magnitude of evaporation, even a small amount of uncertainty can translate to hundreds of thousands of acre-feet. This is a critical number in the Great Salt Lake Basin Integrated Plan (GSLBIP) water budget and its evaluation of strategies to balance available water supply.
Description	This study will implement a monitoring and modeling program planned by Utah Division of Water Resources (WRe), Utah State University (USU), University of Utah (UofU), Utah Geological Survey (UGS), United States Geological Survey (USGS), and Utah Division of Forestry, Fire & State Lands (FFSL). Tasks include the following: Establish ground-based monitoring stations (such as eddy covariance stations) to begin active measurements of evaporative processes in the open water of the South Arm and North Arm, an open water location with brackish water (salinity less than 2 grams per liter), a mudflat location with known groundwater levels, a mineral extraction evaporation pond, and in a fully vegetated shoreline wetland with surface water. These stations will need to be operated for no less than 3 years; longer-term monitoring is preferable. Ongoing funding will be required to maintain the network. Field data will be used to develop new estimates of evaporation that will be correlated with remote sensing data and other site-specific conditions. Use data to calibrate input data to models that are used to estimate GSL evaporation. Make recommendations for future monitoring and modeling of evaporation from GSL's systems.
Key Questions Pertaining to the Gap Analysis	▪ How much water does GSL and its wetlands need to support its designated uses? - How much inflow is needed to sustain a particular lake level? ▪ What is the water budget for GSL and its associated wetlands? What evaporates from the lake, mudflats, and wetlands? How do we characterize present and future climate conditions relating to evaporation, air temperature, water temperature, and water salinity?
Timeline	March to May 2024: Installation of monitoring stations as budget allows October 2024: Initial report of field measurements in 2024 December 2024: Initial recommendations for modeling of evaporation from GSL's systems July 1, 2025: Final annual report of 2024 evaporation data and recommendations for GSL (annual reports by July 1 of subsequent calendar years) Monitoring will be ongoing, dependent upon available funding
Linkages to Other Efforts	USGS Integrated Water Availability Assessments UGS FLUX network GSLBIP water budget development FFSL GSL Comprehensive Management Plan GSL Salinity Advisory Committee GSL Ecosystem Program
Cost	GSLBIP: $400,000 Total: $1,500,000 (GSLBIP contribution: $400,000; Additional funding to be determined)
Lead Entity and Key Partners	Lead: WRe Key partners: United States Bureau of Reclamation, UGS, USGS, USU, UofU, FFSL

Groundwater Well Monitoring

Category	Strategic Research
Goal	The study goal is to update groundwater withdrawal estimates within the five river basins with the Great Salt Lake (GSL) watershed for integration into groundwater water budgets and current modeling efforts.
Need	Accurate determination of water use, particularly groundwater use, is a critical component of assessing water availability in the GSL watershed. A large component of total water use is groundwater withdrawal for irrigation. Since 1963, the U.S. Geological Survey (USGS) Utah Water Science Center, in cooperation with the Utah Department of Natural Resources Division of Water Rights (WRi), has estimated annual groundwater withdrawal from basins in Utah. This program ended after 2008 for much of the state. Several valleys have been updated as part of individual studies, but most estimates for irrigation groundwater withdrawals in the state are over 15 years old.
Description	This study will focus on establishing new power consumption coefficients (PCC) for irrigation wells located in the five river basins in the GSL watershed[1]. Historically these valleys included Bear River (Box Elder County), Cache Valley, Cedar Valley, Curlew Valley, Dugway Area, East Shore GSL, Goshen Valley, Grouse Creek Valley, Heber Area, Juab Valley, Ogden Valley, Park Valley, Rush Valley, Salt Lake Valley, Skull Valley, Tooele Valley, Utah Valley, and the Weber River and Delta Areas. Current estimates for these valleys rely on outdated PCCs and in many cases wells have not been visited in over 15 years with newer wells unrepresented in withdrawal estimates. Tasks to update PCCs include the following: 1. Field visits to each irrigation well in the identified valleys to a) develop new PCCs by use of clamp on flowmeters and power meter outputs, or b) establish new PCCs for wells that have been drilled/replaced since 2008. 2. Produce updated valley wide irrigation withdrawal estimates for WY 2024/2025 using new PCCs. Integrate new estimates into USGS Statewide Groundwater Conditions Web Application. 3. Identify 5 to 7 candidate wells within the five river basins and instrument the wells for real-time groundwater data for a 2-year data collection period.
Key Questions Pertaining to the Gap Analysis	How much water is and will be available for use in the GSL watershed? What water resources are currently available? What is the current groundwater withdrawal and how does it compare to historical estimates? Are withdrawals increasing/decreasing/stable? What is the current status of groundwater levels in the five river basins?
Timeline	June 2024–August 2025: Task 1 October 2025: Task 2 June 2024–November 2024: Task 3
Linkages to Other Efforts	USGS GSL Basin regional groundwater model with assistance from UGS Ongoing updates to USGS models (Cache Valley Groundwater Model)
Cost	GSLBIP: $200,000
Lead Entity and Key Partners	Lead: USGS (Utah Water Science Center) Key Partners: WRi, local irrigators, river commissioners, water utilities

[1] [1] Gold, B.L., Angeroth, C.E., and Marston, T.M., 2020, Development of a method to identify complex wells and assess the accuracy of basin withdrawals in Utah: U.S. Geological Survey Open-File Report 2020-1106, 23p.

Bioenergetics Study: Water Requirements of Great Salt Lake Shorebirds

Category	Strategic Research
Goal	This study aims to determine the shorebird carrying capacity of Great Salt Lake (GSL) for different habitat conditions.
Need	GSL's food and habitat resources are increasingly a crucial part of sustaining waterbird populations in the Western Hemisphere. Although the Great Salt Lake Ecosystem Program (GSLEP) has developed an extensive dataset and models of bird use and the associated aquatic ecology of GSL, resource managers do not have a means to evaluate the bird carrying capacity of GSL and its wetlands. Bioenergetics models can provide that means and allow wetland managers to make informed decisions regarding water management for birds. It is a critical means to evaluate how much water GSL and its wetlands will need to support the waterbirds that rely on them.
Description	This study will provide funding to GSLEP via the Utah Division of Wildlife Resources (DWR) to augment its existing "Waterbird Bioenergetic Models for GSL" effort to include shorebirds. GSLEP is already developing a bioenergetics model for waterfowl at GSL (began January 2023); this study will add funding to include shorebirds at GSL. Work will be contracted via GSLEP to Dr. Mike Conover of Utah State University (USU). The work will include a literature review to understand bird energetic requirements, analysis of remote sensing and geographic information system (GIS) data to evaluate the various habitats of GSL, field studies to correlate bird use and food items to habitat type, and an assessment of bird carrying capacity for each habitat type. Recommendations will be provided to determine spatial and temporal correlation between available hydrology and habitat type.
Key Questions Pertaining to the Gap Analysis	How much water does GSL and its wetlands need to support its designated uses? What is the value and consequence of changing lake water level? How will the ecology change with fluctuating water levels? For open water, mudflat, unimpounded marsh complexes, impounded marsh complexes, and islands… How will the food chain change with water level? How does habitat structure change with water level? What is the available foraging and nesting habitat? How will bird use change with water level? How will food abundance change with water level?
Timeline	January 2024: Begin immediately July 15, 2024: First annual report for both waterfowl and shorebird studies (annual reports by July 15 of subsequent calendar years) October 30, 2024: Initial estimates of bird carrying capacity by habitat type July 15, 2025: Second annual report for both waterfowl and shorebird studies, updated estimates of bird carrying capacity by habitat type December 30, 2027: Final reports for both waterfowl and shorebird bioenergetic models for GSL
Linkages to Other Efforts	Direct linkage to GSLEP "Waterbird Bioenergetic Models for GSL" effort. Quarterly coordination with GSLEP Technical Advisory Group (TAG), USGS Integrated Water Availability Assessments, GSL Basin Integrated Plan (GSLBIP) water budget development, Utah Division of Forestry, Fire & State Lands GSL Comprehensive Management Plan, and GSL Salinity Advisory Committee
Cost	GSLBIP: $200,000 Total for shorebird bioenergetics study: $375,000 (GSLBIP contribution: $200,000; Additional funding to be determined) DWR and its partners for parallel waterfowl study: $460,000; Combined total: $835,000
Lead Entity and Key Partners	Lead: DWR, GSLEP TAG Key Partners: USU, WRe

Analysis to Identify Functional Flows for Streams

Category	Strategic Research
Goal	This study aims to identify and quantify flow targets in streams and wetlands that are most ecologically critical to the support and maintenance of local and downstream water quality and aquatic life uses. Expected output is a GIS-based data interface (RiverWare) that can be used to quantify the nature and extent of ecological modifications resulting from hydrologic alterations and make recommendations about what changes in flow management would most benefit Great Salt Lake (GSL), GSL wetlands and upstream tributaries in the basin.
Need	There are many competing interests for water in the streams of GSL's watershed. Ideally, the timing and rate of water deliveries to GSL would also maximize water quality and aquatic life benefits in upstream tributaries. The appropriate rate, volume and timing that can holistically protect these ecosystems, however, is rarely understood. Functional flows represent distinct aspects of a natural flow regime that sustain ecological, geomorphic, or biogeochemical functions, and that support the life history and habitat needs of native aquatic species. Functional flows are characterized using a suite of flow metrics calculated at reference stream flow gages. These metrics are evaluated to establish flow-based conservation objectives. Strategies to deliver water to GSL can then also maximize water quality and support of aquatic life uses in upstream waterbodies. The functional flows approach also maps reach-scale estimated natural functional flows for all streams in the watershed so that the extent of existing hydrologic modifications can be evaluated, which is needed to develop more efficient and effective restoration strategies in degraded waterbodies. A conceptually similar approach will be used to define important hydrologic objectives for Great Salt Lake and its surrounding wetlands so longitudinal relationships can be evaluated and mapped using the same framework. This approach will help identify upstream reaches where altering the timing or quantity of water delivery can improve ecological conditions throughout the watershed. Finally, functional flows will be evaluated for wet-, moderate- and dry-year conditions so that water and other natural resource managers can better take advantage of wet years or mitigate adverse effects in dry years. Functional flow metrics will provide the GSLBIP with critical input about how water supply can be more effectively managed to be ecologically protective.
Description	This study will provide funding to the Utah Division of Water Quality (DWQ) to augment its existing "Establishing a Functional Flow Framework (FFF) for the Great Salt Lake Basin" effort. Development of a FFF will include the following: Determination of which hydrologic attributes are most important to GSL, GSL wetlands and upstream waters Reach-scale maps of natural functional flow metric ranges for all streams in the GSL watershed and for wet, moderate, and dry water year types Measures or estimates of existing hydrologic conditions and functional flows alteration assessment An evaluation of linkages among functional flow metrics and conservation targets (e.g., fishery health, biological integrity, water quality) Recommendations for using the framework to inform best management practices in the GSL watershed Project results will be made available online via a user-friendly, map-based interface.

Key Questions Pertaining to the Gap Analysis	How can watershed management benefit water quantity and quality in the watershed? What is the condition of GSL's watershed? What have been and will be the long-term trends in watershed condition? What is level of and current risk our watershed face that could impact water quantity and quality? What are the options for and potential benefits of sustaining river flows in the low flow season? How can river flows in the low flow season be increased in the GSL watershed? How should objectives be defined? What metrics should be used? What are the options for and potential benefits of improving water quality? How can water quality be improved in the GSL watershed? What much water is required to sustain high priority ecological sites? How can managing water quality benefit a resilient water supply? What water quantity and quality is needed to sustain high priority ecological sites? How much water is required to sustain high priority ecological sites? What is the minimum flow to sustain water quality and function?
Timeline	October 2023: Work began January 2024 – Hold expert workshops to establish conservation targets October 2024: Initial estimates for FFF December 2024: Initial recommendations for incorporating FFF into water budget models July 1, 2025: Updated recommendations for incorporating FFF into water budget models October 2026: Final recommendations for incorporating FFF into water budget models
Linkages to Other Efforts	DWQ development of FFF for all of Utah DWQ water quality assessments GSLBIP water budget development Utah Department of Wildlife Resources' (DWR's) Utah Wildlife Action Plan Trout Unlimited High-Frequency Data Logger Program Weber Basin Water Conservancy District Utah Lake and Jordan River Hydrological Simulation Program - FORTRAN (HSPF) modeling
Cost	GSLBIP: $300,000 Total: $677,000 (USU/USGS: $317,000, GSLBIP: $300,000, Additional funding to be determined)
Lead Entity and Key Partners	Lead: DWQ Key Partners: Utah State University, DWR, Utah Division of Water Resources

Opportunities and Costs for Agricultural Water Optimization and Leasing

Category	Solutions Development
Goal	This study aims to quantify the potential depletion and diversion savings and costs of agricultural water optimization and conservation including split-season leases, seasonal leases and coordinated reductions in diversions in the Great Salt Lake (GSL) watershed. Secondary goals include an improved understanding of the results and benefits of current agricultural optimization programs and how these programs may be enhanced in the future and to spatially characterize the agricultural depletions in the GSL watershed.
Need	Utah's Legislature has invested $276 million into agricultural water optimization programs since the program started, and the Governor's Office supports investments in agricultural infrastructure,[2] However, diversion and depletion savings of agricultural optimization programs have not been quantified. An improved understanding of the results and benefits of past optimization projects combined with an understanding of the opportunities to reduce agricultural depletions and the associated costs will enable the state of Utah to maximize the impact of its current and future agricultural optimization projects.
Description	This study is envisioned to include the following four work tracks: *Literature review* - Conduct a literature review combined with a survey and interviews to identify lessons learned from other states on optimization, split season and seasonal lease programs. *Understanding current conditions* —Quantify the current estimated amount of agricultural depletion for current irrigated fields in each watershed within the Great Salt Lake basin using down-scaled openET and other methods, while acknowledging method limitations. Estimate the changes in depletion of implemented and planned water optimization projects. This will set the stage for the next objective to quantify what still might be possible with optimization and other supporting programs such as split-season or full-season leases. *Quantify the opportunity for agricultural depletion reduction and associated costs*—The opportunity for agricultural depletion and coordinated diversion reduction from agricultural optimization, split-season leases, and seasonal leases will be assessed across each watershed in the basin at the field scale using the latest information and methods from ongoing work by state agencies and institutions including the Colorado River Authority of Utah (CRAU) and Utah State University (USU) Extension and supporting literature sources. Practical considerations of optimization methods should be integrated into the analysis based on the results of the Optimization Program Review, known industry trends, and land capability information. Once the opportunities are identified and characterized, a review of current cost data will be conducted to quantify the costs of the various optimization and conservation methods. *Cost/benefit analysis and goal development*—Once the opportunity for depletion and coordinated diversion reduction and associated costs are quantified, a cost benefit analysis will be conducted to identify the optimization measures with the greatest impact. Deployment scenarios will be considered, and goals developed considering Conservation Target Scenarios in the GSL Policy Assessment (GSL Strike Team 2023).[3]
Key Questions Pertaining to the Gap Analysis	▪ How much water is needed for our communities, businesses, agriculture, environment, and GSL to achieve and sustain a healthy range? - What are the current demands and depletions? ▪ What are our current agricultural water demands? - How can we adapt water demands?

[2] Utah Governor's Office of Planning & Budget, Utah Governor's Office of Economic Opportunity, Utah Department of Agriculture and Food, Utah Department of Environmental Quality, Utah Department of Natural Resources, and Colorado River Authority of Utah. 2022. *Utah's Coordinated Action Plan for Water*. November. https://gopb.utah.gov/wp-content/uploads/2022/11/2022_11-Plan-for-Coordinated-Water-Action-FINAL.pdf.

[3] Great Salt Lake Strike Team. 2023. *Great Salt Lake Policy Assessment*. https://gardner.utah.edu/wp-content/uploads/GSL-Assessment-Feb2023.pdf.

	▪ What immediate enablers are needed to support water demand quantification activities? ▪ What best management practices could be implemented to reduce human water demands? ▪ What data and management resources are needed to evaluate actions? ▪ What are the costs of changes? - What are our future demands? ▪ What are our future agricultural water demands? - How much have and will demands change over time? ▪ What have been and will be the long-term trends in population and land use? o How has and will climate change influence water demands? o What are the critical elements that would enable more accurate predictions?
Timeline	- May 2024: Literature Review and Lessons Learned, Understanding Current Conditions - Sept 2024: Characterization of Existing Crops, Irrigation Methods, and Associated Depletions - November 2024: Quantify Opportunity for Agricultural Depletion Reduction and Associated Costs Initial Report - April 2025: Cost/Benefit Analysis and Goal Development and Final Report
Linkages to Other Efforts	▪ GSL Basin Integrated Plan water budget (used to characterize depletion and return flows) ▪ Agricultural Water Optimization Program: Utah Department of Agriculture and Food (UDAF) ▪ Water Depletion Accounting: USU, Utah Division of Water Rights (WRi) ▪ Agriculture Water Demonstration, Research, and Implementation Pilot Program: USU, CRAU, Central Utah Water Conservancy District ▪ Water Optimization Research: USU ▪ Drought Mitigation Programs: CRAU ▪ Water Related Land Use Program: Utah Division of Water Resources (WRe) ▪ Agricultural Water Resiliency Plan: Central Utah Water Conservancy District
Cost	▪ GSLBIP: $400,000 ▪ Total: $1,500,000 (GSLBIP contribution: $400,000, Additional funding to be determined)
Lead Entity and Key Partners	▪ Lead Entity: WRe ▪ Key partners: UDAF, WRi, DEQ, USU, CRAU

Opportunities and Costs of Municipal and Industrial Water Conservation

Category	**Solutions Development**
Goal	This study aims to refine future municipal and industrial (M&I) water use projections and the impact of conservation on projections, identify viable M&I water conservation strategies to conserve target volumes, and estimate, rank, and compare the costs of M&I water conservation opportunities.
Need	In 2020, the Great Salt Lake Advisory Council (GSLAC) and Weber Basin Water Conservancy District (WCD) studied the impact of water conservation on water resource planning (that is, the timing of large water development projects).[1] Of four WCDs within the study scope, three need conservation beyond the regional conservation goals before approximately 2055 to avoid large future water development projects. Currently, M&I water conservation implementation is inconsistent because incentives for M&I water conservation vary and depend on local water values.
Description	The study will build upon findings in the 2020 Conservation Impacts Study. Specifically, the project will examine the way population growth interacts with land use changes, refine water supply, and water demand data and estimate and rank the costs of M&I water conservation opportunities. Finally, these M&I conservation costs will be compared with future large water development projects, costs of Great Salt Lake (GSL) dust control, and costs of agricultural conservation. Study tasks are as follows: 1. Quantify the amount of conservation that has been achieved through M&I conservation including secondary metering and landscape conversion incentives programs 2. Quantify a potential range of M&I conservation possible within each GSL sub-basin. 3. Study how land and water use changes over the past decade correlated with population increases and water use to identify patterns or trends. 4. Work with the Division to update the Divisions Water Demand Model with information from Tasks 3 and 6. 5. Identify potential M&I water conservation opportunities and estimate costs. Normalize costs by the amount of water conserved. 6. Compare M&I water conservation opportunity costs with costs of future large water development projects, costs of GSL dust control, and costs of agricultural optimization. 7. Develop a proposed conservation standard for the amount of water needed for each equivalent residential connection for future growth in coordination with the Division, Division of Drinking Water, Division of Water Rights, WCDs, and municipalities
Key Questions Pertaining to the Gap Analysis	How much water is needed for our communities, businesses, agriculture, environment, and GSL? How can we adapt water demands? What best management practices could be implemented to reduce human water demands? What are the top three actions the average water user can implement to conserve water? How can we evaluate, incentivize, implement further reductions in water use? What are the costs of changes and what are the opportunity costs?
Timeline	April to July 2024: Tasks 1 -3 June to November 2024: Tasks 4 - 7 and Initial results for Tasks 1-7 December 2024 to April 2025: Finalize results
Linkages to Other Efforts	▪ Local Water Conservancy Districts master planning Local County and City general planning and zoning

Cost	GSLBIP: $400,000
Lead Entity and Key Partners	Lead: WRe Key partners: GSLAC, Utah Divisions of Water Rights and Drinking Water, GSL Strike Team, WCDs, Counties, Cities

[1] Bowen Collins & Associates. 2020. Conservation Impacts Study: Final Draft. Accessed October 27, 2023. https://documents.deq.utah.gov/water-quality/standards-technical-services/gsl-website-docs/other-studies/DWQ-2020-021042.pdf.

Options and Costs for Great Salt Lake Dust Control

Category	Solutions Development
Goal	This study aims to characterize the options to control dust emissions from the exposed lakebed of Great Salt Lake (GSL), including order of magnitude costs and water demands.
Need	Although dust emissions from GSL are increasingly considered a significant risk when lake water levels are low, sources, composition, loading, risks, and mitigation options are only recently beginning to be understood. We have only begun to consider potential strategies to reduce dust emission loads from GSL. We have not completed an engineering assessment of the potential costs or how much water might be required solely for dust mitigation. Lessons from Owens Lake and Salton Sea in California indicate proactive planning and implementation of dust control measures could significantly reduce long-term dust mitigation costs and water demands. We must identify critical steps to reduce risks in the short-term and be prepared for potential mitigation in the long-term. Improving our assessment of options and potential costs for dust control and mitigation will be critical for the decisions that will need to be made as part of the Great Salt Lake Basin Integrated Plan (GSLBIP).
Description	The following major tasks will be completed as part of this project: Synthesize work to characterize GSL dust emissions. Develop an initial methodology to estimate how dust emissions could vary with lake level. Identify options for monitoring dust emissions and impacts from dust emissions with associated costs. Identify options for controlling dust emissions on exposed portions of GSL lakebed with associated costs. Identify potential water requirements for these options, as this may impact the GSL water budget. Summarize how dust control and mitigation costs could change with lake level. Provide recommendations for next steps.
Key Questions Pertaining to the Gap Analysis	How much water does GSL and its wetlands need to support its designated uses? What is the value and consequence of changing lake levels? How do water levels affect GSL's watershed? How does the surface area of the exposed lakebed affect dust emissions in the watershed? How does the surface area of the exposed lakebed affect salt dispersion in the watershed?
Timeline	March 2024: Begin work June 2025: Complete desktop assessment
Linkages to Other Efforts	Division of Forestry, Fire & State Lands (FFSL) GSL Comprehensive Management Plan
Cost	GSLBIP: $300,000
Lead Entity and Key Partners	Lead: Utah Division of Water Resources Key partners: FFSL, United States Geological Survey, Utah Division of Air Quality, University of Utah, Utah State University, Dust^2, GSL Advisory Council

Great Salt Lake Data Hub Development

Category	Capacity Development
Goal	This project aims to determine the requirements and possibilities for a central database (Great Salt Lake [GSL] Data Hub) that integrates available water flow, supply, demand, and quality data to provide planners, managers, and users a consistent user interface. The GSL Data Hub will be a central repository for GSL information that can be accessed by multiple agencies and the public.
Need	Many efforts to monitor water quality and quantity within the GSL Basin are parallel and may be undertaken in isolation with little to no coordination. Developing a central repository for GSL information would help coordinate studies and projects, leverage existing resources, reduce redundancies, and facilitate a shared understanding of current conditions in the GSL Basin. Although both the Utah Division of Water Quality (DWQ) database (AWQMS) and United States Geological Survey (USGS) database (NWIS) push data to the nationwide U.S. Environmental Protection Agency (EPA) Water Quality Exchange database (WQX), they do not handle high-frequency data well, which complicate efforts to maintain water quality data at a single location. Furthermore, USGS is now using Aquarius to manage time-series data, but it is cost prohibitive for DWQ to switch to this platform. While the USGS GSL HydroMapper water data dashboard includes the entire GSL Basin, it offers minimal water quality information (water temperature and turbidity). DWQ's GSL Data Explorer pertains only to GSL monitoring locations and not the GSL Basin.
Description	Multiple agencies will need to convene to identify specific criteria and requirements of the GSL Data Hub and the type of data that can be stored. Potential GSL Data Hub criteria include the following: Ability to manage high-frequency data Ability to present information spatially in an interactive map-based environment Ability to provide a reports library and findings of GSL Basin ongoing strategic research studies Ability to either provide storage for, or links to, existing monitoring data within the GSL Basin Ability to integrate data from new gauging systems, annual reporting from public water suppliers, water, and supply modeling Ability to provide data outputs that can be readily integrated into water planning models and efforts Any additional information or sources determined during Phase I of database development One possibility for the GSL Data Hub is to leverage the existing USGS HydroMapper platform and link surface water locations to the EPA WQX database that is central to USGS and DWQ. GSL Data Hub development could be broken up into four phases. It is anticipated that Phases I, II, and III could be funded by the GSL Basin Integrated Plan (GSLBIP). The suggested four phases are as follows: Phase I: Determine Requirements of the GSL Data Hub Phase II: Evaluate Options and Possibilities Phase III: Develop a Technical Framework for GSL Data Hub Phase IV: Develop the GSL Data Hub
Key Questions Pertaining to the Gap Analysis	What is the quality of existing water bodies and water resources? What programs are being implemented to monitor and assess water quality? Where are the individual programmatic data housed? Numeric criteria, beneficial uses, and 303(d)/305(b) reporting What water quality monitoring data do we have and where? What is the condition of GSL's watershed? What mapping and data do we have to document and monitor the watershed's condition? What can be done to improve our water supply? What immediate enablers are needed to support water supply quantification activities? Data development? What are the current demands? How are water demands managed in each sector and at each scale? How are demands currently monitored? By whom? What are the existing data sources? How thorough and accurate are they? What immediate enablers can support water demand quantification activities/data development?

Great Salt Lake Data Hub Development continued

Timeline	January to March 2024: Project kickoff June 2024: Phase I: Determine Requirements July 2024 to December 2024: Phase II: Evaluate Possibilities and Options January 2025 to August 2025: Phase III: Develop Technical Requirements October 2025 to December 2026: Phase IV: Develop the GSL Data Hub Ongoing: Database maintenance and annual review to propose feature enhancements or integrate new information
Linkages to Other Efforts	▪ USGS Hydro Mapper Utah Geological Survey (UGS) Groundwater Quality Spatial Database DWQ GSL Data Explorer DWQ High Frequency Data Dashboard USGS NWIS Database USGS Saline Lakes Ecosystems Integrated Water Availability Assessment DWQ AWQMS Database Utah Division of Water Rights (WRi) Database and Map ▪ Utah Division of Wildlife Resources (DWR) GSL Ecosystem Program GSL Salinity Advisory Committee
Cost	GSLBIP: $200,000 Ongoing maintenance cost: to be determined
Lead Entity and Key Partners	Lead: Utah Division of Water Resources Key partners: USGS, GSL Advisory Council, Utah Division of Forestry, Fire and State Lands, DWQ, Utah Geological Survey, DWR, GSL Strike Team, WRi, Water providers within the GSL Basin, Utah State University, Colorado River Authority of Utah