# 2026 State Water Plan

# Draft

Not final text or design

Water Resources

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# Setting the Stage for Water Planning in Utah

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Photo credit Todd Stonely

Water is essential to every aspect of life in Utah, from supporting human health and economic well-being to producing the stunning natural landscapes that can be found nowhere else in the world. However, population growth and increasingly frequent natural extremes – such as drought, flooding and wildfire – are placing greater stress on watersheds and ecosystems, communities and agricultural production.

In the five years since Utah released its last state water plan in 2021, Utahns have experienced unprecedented extreme heat, severe wildfires, both record-high and record-low snowpack, and historically low water levels in Great Salt Lake and Lake Powell. These challenges underscore the need to strengthen Utah's long-term water resilience.

Utah continues to be a leader in western water policy and management, with many recent advances in state water law, management and funding (Table 1-1). These efforts have facilitated the development of innovative, collaborative solutions to Utah's water challenges. The 2026 State Water Plan builds on this progress by establishing shared priorities, informing strategic investment and strengthening collaboration across agencies, regions and sectors.

**Table 1-1. Select recent advancements in water management, law and funding.**

| Category | Specific Advances<br>(Year and Bill Number, if Applicable) |
|---|---|
| **Creation of new state entities related to water** | • Colorado River Authority of Utah (**2021** HB 297) within the Department of Natural Resources (**2026** HB 473)<br>• Utah Lake Authority (**2022** HB 232)<br>• Utah Water Ways created to support conservation messaging (**2023** HB 307)<br>• Office of the Great Salt Lake Commissioner (**2023** HB 491)<br>• State Water Agent (**2024** SB 211) |
| **Increased collaboration and communication** | • Watershed councils created (**2020** HB 166)<br>• Colorado River Authority of Utah Advisory Councils created (**2021** HB 297)<br>• State water plan statute updated to require interagency collaboration (**2024** HB 280)<br>• Unified Water Infrastructure Plan created to increase long-term planning and funding coordination among agencies (**2024** HB 280) |

| Category | Specific Advances<br>(Year and Bill Number, if Applicable) |
|---|---|
| **Water conservation and optimization** | • Forestry, Fire and State Lands authorized to hold water rights for the benefit of sovereign lands (**2022** HB 33)<br>• Landscape Incentive Program created and funded, resulting in record-breaking grass conversion (**2022** HB 121 and **2023** SB 118)<br>• General plans required to integrate water planning with land use (**2022** SB 110)<br>• Incentives for non-evaporative mineral extraction technologies on Great Salt Lake (**2023** HB 513, **2024** HB 453)<br>• Utah Colorado River Demand Management Pilot Program (2025-2026) created to evaluate depletion reductions in Utah's Colorado River Basin (**2023** SB 144)<br>• **$276 million** Agricultural Water Optimization program funding and process updates (**2023** SB 277)<br>• Dedicated Water Amendments to deliver water to Great Salt Lake and Colorado River (**2026** HB 348)<br>• Great Salt Lake Preservation Program created (**2026** HB 410) |
| **Water quality** | • Agricultural Voluntary Incentive Program (AgVIP) established (**2021**)<br>• Soil Health Program created (**2021** HB 296)<br>• **$30 million** federal American Rescue Plan Act funds for wastewater upgrades, stormwater improvements, agricultural nonpoint source and in-lake water quality improvements in Utah Lake and its watershed (**2022**)<br>• **$5 million** federal American Rescue Plan Act funds for expanded sewer infrastructure for the West Weber Mega Site (**2022**)<br>• Drinking water fee study ordered (**2025** SB 80)<br>• Great Salt Lake berm management adjusted (**2025** HB 1001) |
| **Funding for data, metering and infrastructure** | • **$15 million** federal American Rescue Plan Act funds for water reuse projects in southern Utah (**2022**)<br>• **$265 million** federal American Rescue Plan Act funds for secondary metering (**2022** HB 242, **2023** SB 251)<br>• **$40 million** for the Great Salt Lake Watershed Enhancement Trust (**2022** HB 410)<br>• **$50 million** for aqueduct resilience projects along the Wasatch Front (**2023** HB 3)<br>• **$2 million** federal Infrastructure Investment and Jobs Act funding for Colorado River system gap analysis study (completed in **2023**) and an additional **$2.9 million** in **2025** for system flow measurement and telemetry gaging instrumentation.<br>• **$1 million** state funding for Great Salt Lake Basin gaging, diversion measurement and telemetry (gap analysis completed in **2024**)<br>• Water District Development Council created to plan for generational water infrastructure and advance responsible development of water (**2024** SB 211) |

## Plan purpose, authority and scope

The 2026 State Water Plan provides a comprehensive framework for how Utah manages, uses and protects its water resources to ensure a safe and reliable water supply now and for future generations, as required by Utah Code.[1] The plan presents the most recent data on water supply and use as well as future scenarios to guide informed decision-making by those who govern, manage and depend on Utah's water resources. Although the plan is nonregulatory, it provides recommendations for increased investment in infrastructure, data, research, education, communication and policy to help achieve the plan's vision and goals. The plan was developed through an inclusive, transparent process that reflects both local conditions and statewide priorities.

## Plan development and public engagement

The 2026 State Water Plan was developed through a collaborative, multi-year process that included outreach to and involvement from tribes, state agencies, watershed councils, local governments, water conservancy districts, nonprofit organizations and members of the public.

During the summer and fall of 2025, the Division of Water Resources held public meetings in each hydrologic basin to gather input on local water challenges and priorities. These meetings were supplemented by interagency working groups, public surveys and ongoing coordination with watershed councils. Feedback from these efforts identified key challenges and helped to refine goals and develop recommendations. This collaborative approach helps ensure the plan reflects diverse regional conditions, values and needs while supporting a shared statewide vision for Utah's water future. It also builds on decades of statewide water planning and reflects the continued evolution of how Utah manages and protects its water resources.

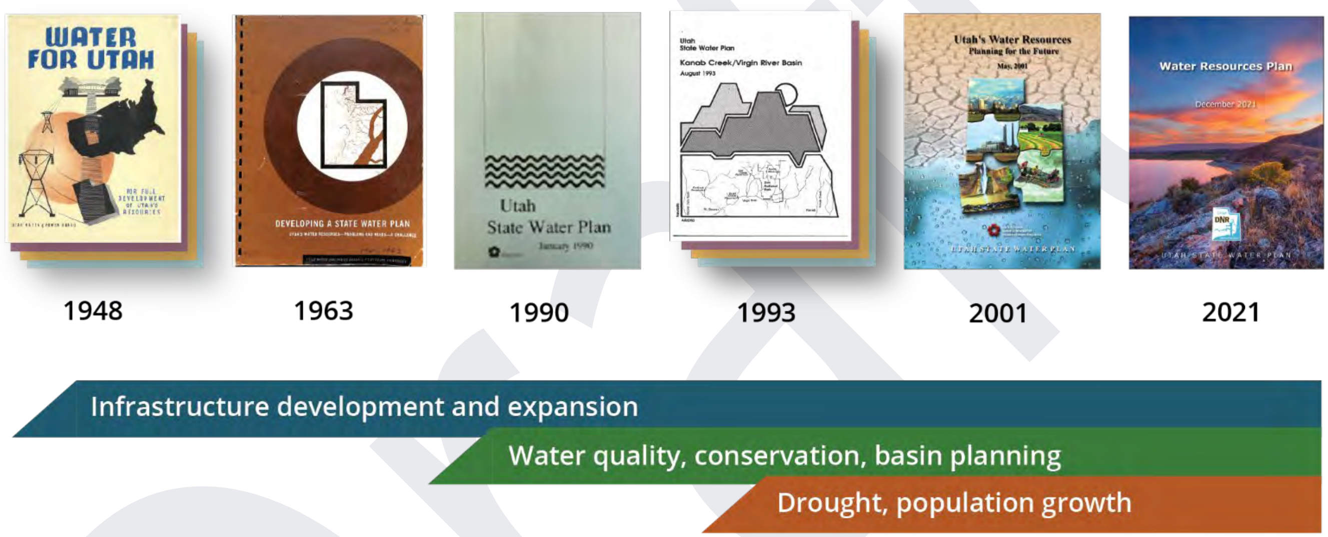
## Evolution of water planning in Utah

The Division of Water Resources has published state water plans and related documents for more than 75 years (Figure 1-1). These documents have guided water resource management by drawing on the most advanced science and technology at the time. Each plan reflects the priorities and realities of its era, responding to changing conditions, new information and emerging challenges.

Early plans focused on developing Utah's water supply through large, federally funded projects. As these water development projects were accomplished and population increased, it became apparent throughout Utah and the western U.S. that a more balanced approach to water management was needed.

Over the past several decades, Utah's state water plans have emphasized maintaining existing infrastructure, developing new supplies where feasible and implementing conservation strategies to manage demand. These plans also highlighted the importance of watershed health for water quality, wildlife and communities. The most recent state water plan, published in 2021, expanded this approach by incorporating planning for future climate uncertainty. Building on this history of water planning, the 2026 update marks an important step forward in the evolution of water planning in Utah.

**Figure 1-1. The evolution of Utah's state water planning.**




## What's new in the 2026 update

Utah's water landscape is not static and neither are the challenges and needs it faces. The 2026 update responds to changing conditions, emerging challenges and new opportunities while expanding the scope and depth of previous plans to support adaptive, integrated and forward-looking water planning.

The 2026 update is the most comprehensive version of the state water plan to date. This update includes expanded focus on water supply and use trends (Chapter 2), planning for future water conditions and infrastructure (Chapter 3), water governance (Chapter 4), protecting and improving healthy watersheds and ecosystems (Chapter 5), facilitating vibrant communities (Chapter 6) and supporting agriculture production (Chapter 7). Additionally, each basin has its own section highlighting the diverse needs and challenges across the state (Chapter 8). Together, these elements support a shared vision for Utah's water future and provide the foundation for the plan's goals and recommendations.

## Vision and goals

Utah's 2026 vision for water planning is:

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**A safe, reliable water supply that improves the environment, enhances urban and rural communities and supports the economy now and into the future.**

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This 2026 update focuses on building resilience for healthy watersheds and ecosystems, vibrant communities and productive agriculture. Achieving this vision will require action from all Utahns at every scale and sector.

Together, we will work to achieve the following **goals**:

- **Ensure long-term water security.**

  Plan for a safe, reliable and resilient water supply under changing demographic, hydrologic, climatic, economic and political conditions by strengthening Utah's capacity to adapt through innovative and proactive approaches to water management, planning and infrastructure.

- **Support growth and economic vitality within water constraints.**

  Align water planning, infrastructure investment and land use decisions to support communities, businesses and agriculture within long-term water constraints.

- **Strengthen innovation and coordination across interconnected water systems.**

  Recognize and manage the interconnectedness of Utah's water systems through coordinated and innovative approaches across regions, sectors and governance and management institutions to improve efficiency, accountability and responsible stewardship of water resources.

- **Protect and improve the environment.**

  Advance management approaches and stewardship practices, including inventive tools and techniques, that protect and improve watershed function and water-dependent ecosystems to support wildlife, recreation and human health.

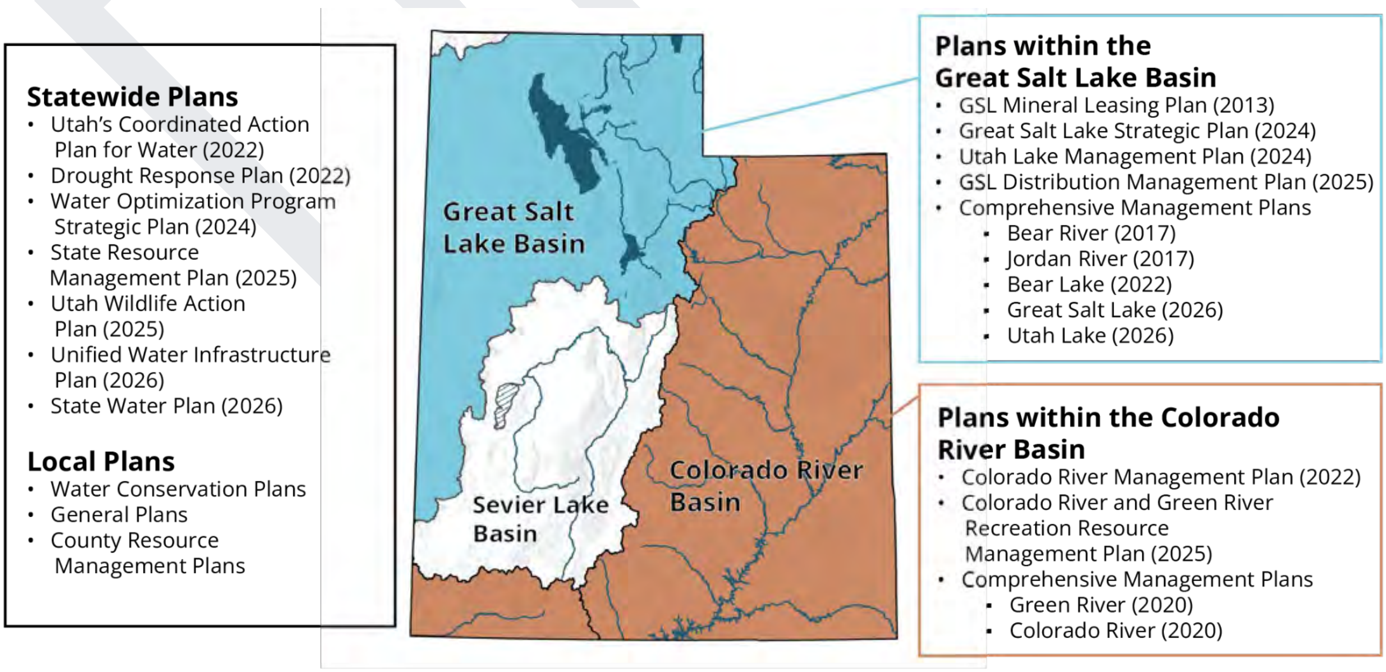
## Relationship to other plans

The vision and goals of the 2026 State Water Plan align with the priorities and goals of Governor Spencer Cox and the Utah Legislature. The administration prioritizes water security and resilience and, alongside the flurry of recent legislative advances (Table 1-1), has produced several complementary plans and strategies that address water-related issues. These include:

- 2022 Coordinated Action Plan for Water: A framework for state agencies and partners to prioritize recommendations, evaluate tradeoffs and streamline coordinated action.
- 2023 Guiding Our Growth campaign: A statewide conversation on how Utah can remain a great place for families and communities as the state grows, including outcomes and next steps related to water and other priority areas.
- 2025 Built Here: Second Term Strategic Plan: Includes key water objectives focused on municipal water efficiency and agricultural water optimization.

The 2026 State Water Plan aligns with and advances these efforts, as well as other high-level plans across the state (Figure 1-2), illustrating the interconnectedness of water planning and management in Utah. Within this broader policy and planning landscape, the plan applies a consistent set of guiding themes to support coordinated decision-making across sectors and regions.

**Figure 1-2. Selection of Utah water plans overseen by state agencies.**



# Themes

The 2026 State Water Plan is organized around three guiding themes: reliability and resilience, collaboration and stewardship. These themes shape priorities, inform tradeoffs and promote consistency across chapters. They also guide the development of recommendations throughout the plan.

## Reliability and resilience

**Reduce system risk and vulnerability**
Addresses exposure to natural disasters, infrastructure failure, cybersecurity threats and physical security risks.

**Perform under real-world constraints**
Reflects legal, physical, hydrologic, financial and operational limits.

**Improve long-term system reliability**
Strengthens flexibility and the ability to operate under a range of future conditions.

**Support affordability and community capacity**
Considers cost impacts, local capacity and the needs of rural and vulnerable populations.

**Integrate water and land decisions**
Aligns water management with land use, growth planning and infrastructure investment.

## Collaboration

**Improve coordination and communication**
Strengthens collaboration among federal, tribal, state, local and other partners.

**Break down silos and boundaries**
Supports coordination across basins, jurisdictions, disciplines and water sectors.

**Enable collaborative decision-making**
Builds processes and structures for joint planning, problem-solving and implementation.

**Create multiple benefits**
Advances solutions that deliver shared value across ecosystems, communities and the economy.

**Advance data sharing and integration**
Improves access to information, supports unified databases and promotes compatible systems.

## Stewardship

**Protect water quality and public health**
Safeguards drinking water, supports Clean Water Act objectives and maintains beneficial uses.

**Support long-term investment and financial stewardship**
Supports sustainable operations and maintenance to protect infrastructure and natural systems.

**Strengthen environmental stewardship**
Protects and improves watersheds and the natural systems that support water availability and quality.

**Promote shared responsibility**
Engages individuals, communities, and entities in sustaining water resources.

**Cleary communicates the "why"**
Improves public understanding of stewardship's importance for public health, economic vitality and watershed protection.

## How to use this plan

The 2026 State Water Plan is organized to help readers better understand Utah's water challenges and opportunities and to identify strategies for coordinated action. Chapters 2 through 4 describe the physical, legal and institutional landscape that shape water availability and management in Utah and define the conditions under which water-related decisions are made. Within these constraints, Chapters 5 through 7 identify challenges, opportunities and strategies to support healthy watersheds and ecosystems, vibrant communities and productive agriculture. Chapter 8, which was produced in collaboration with the local watershed councils, reviews the local challenges and needs in each basin. Each chapter concludes with recommendations intended to inform policy, investment and management decisions. Though some recommendations could apply to multiple chapters, each recommendation is unique and is included within the most relevant chapter to avoid repetition. All recommendations are then summarized in Chapter 9, the concluding chapter.

Taken together, the plan serves as a shared reference for: (1) individuals seeking to better understand Utah's water system; (2) local entities evaluating community-level needs and tradeoffs; and (3) agencies and partners coordinating policy, funding and long-term planning within a common statewide framework.



## References

1. Utah Code § 73-10-15 (2026). Le.utah.gov/xcode/Title73/Chapter10/73-10-S15.html.

# 2

# Water in Utah

In this chapter:

- Key points
- Utah's water conditions
- Utah's hydrologic basins
- Utah's water supply
  - Precipitation and evapotranspiration
  - Surface water
  - Groundwater
- Utah's water use
  - Natural system use
  - Human use: diversions, depletions and return flows
- Ensuring Utah's water future
- Recommendations
- References

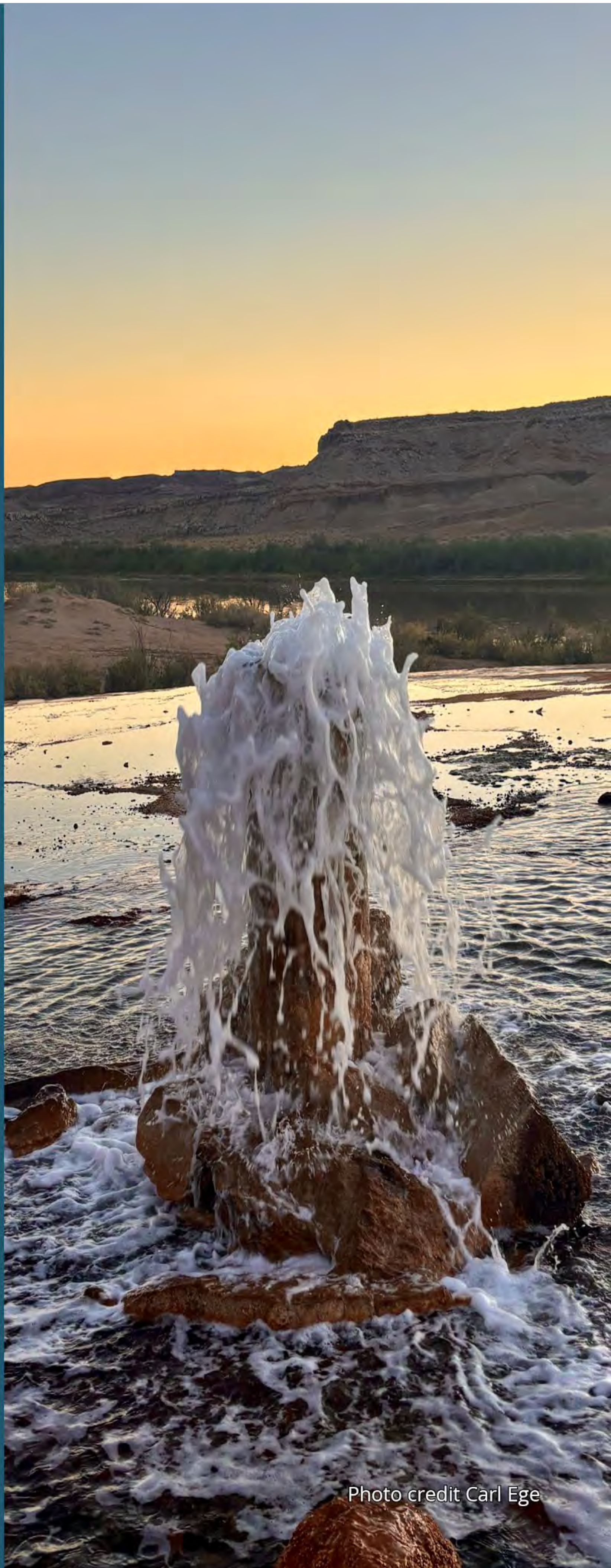


Photo credit Carl Ege

## Key points

- Declining groundwater, lake and large reservoir levels suggest an imbalance between water supply and use across the state.
- Statewide, total human water use (diversions and depletions) has not changed substantially since 1989, but the proportion of agricultural water use has declined, while municipal and industrial use has increased. At the basin scale, use varies; some have increasing, decreasing or no change in human water use.
- On average across the state, 72% of diverted water comes from surface water and 28% comes from groundwater. Surface water diversions have decreased and groundwater diversions (pumping) have increased since 1989.
- Better data and modeling are needed to contextualize these human water use trends within the available water supply.

## Utah's water conditions

Utah is one of the driest states in the nation and faces substantial water resource challenges. Persistently declining groundwater, lake and reservoir levels warn that there is an imbalance between water demand and a shrinking natural water supply. Groundwater, monitoring wells and remote sensing in many aquifers across the state report declining trends.[1,2] At the same time, Great Salt Lake and Lake Powell have hit record lows.[3,4] These worrying trends mean that more work is needed to bring water use in balance with supply.

To guide management efforts, more research is needed to understand how much the state's water supply has changed and will change given possible future scenarios. This chapter reviews trends in water supply and use, using the best available data, with recommendations to improve our hydrologic understanding. Because water is local, we review water trends by hydrologic basin.

## Utah's hydrologic basins

Hydrologic basins are natural drainage areas that generally follow topographic divides, shaping how water moves across the landscape. Basins can be delineated at multiple scales, with smaller basins nested within progressively larger drainage areas.

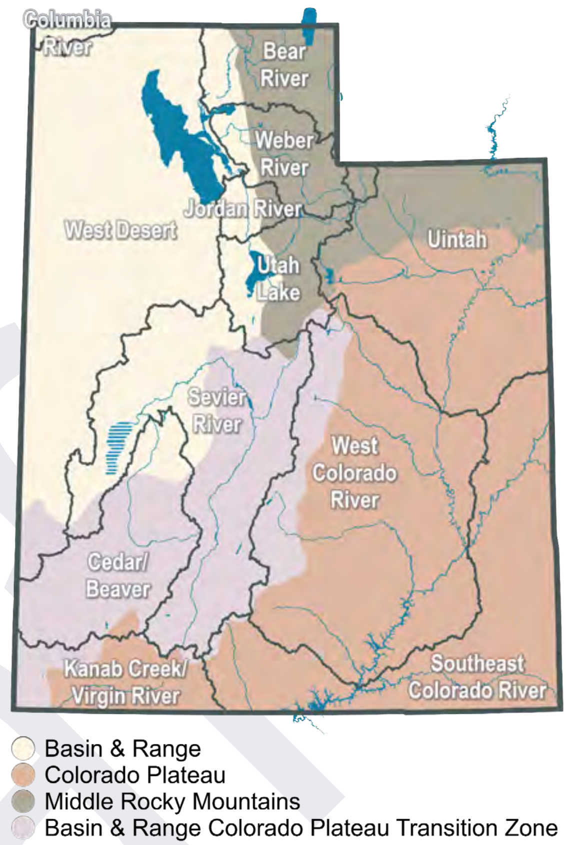
At the broadest scale, Utah lies within four major hydrologic basins: two river basins, the Colorado River and Columbia River, and two lake basins, Great Salt Lake and Sevier Lake. The Colorado River and Columbia River basins flow towards the Pacific Ocean, whereas the Great Salt Lake and Sevier Lake basins are terminal, meaning water flows to these inland lakes with no outlet to the ocean.

To support water planning and management, the Division of Water Resources organizes the state into smaller hydrologic basins: [5]

- The portion of the Colorado River Basin within Utah is divided into four smaller basins: the Uintah, West Colorado River, Southeast Colorado River and Kanab Creek/Virgin River basins.
- The portion of the Columbia River Basin within Utah is a small, remote area in the northwest corner of the state. This area's supply and use data are combined with the neighboring West Desert basin and for the remainder of this report are referred to as the West Desert basin.
- The portion of the Great Salt Lake Basin in Utah is divided into five smaller basins: the Bear River, Weber River, Jordan River, Utah Lake and West Desert basins.
- The Sevier Lake Basin, which is entirely within Utah state boundaries, is divided into two smaller basins: the Sevier River and Cedar/Beaver basins.

Together, Utah's hydrologic basins span diverse landscapes that reflect the state's natural variability in climate, hydrology and water resources (Figure 2-1).

**Figure 2-1. Utah's broad landscape zones and hydrologic basins.**

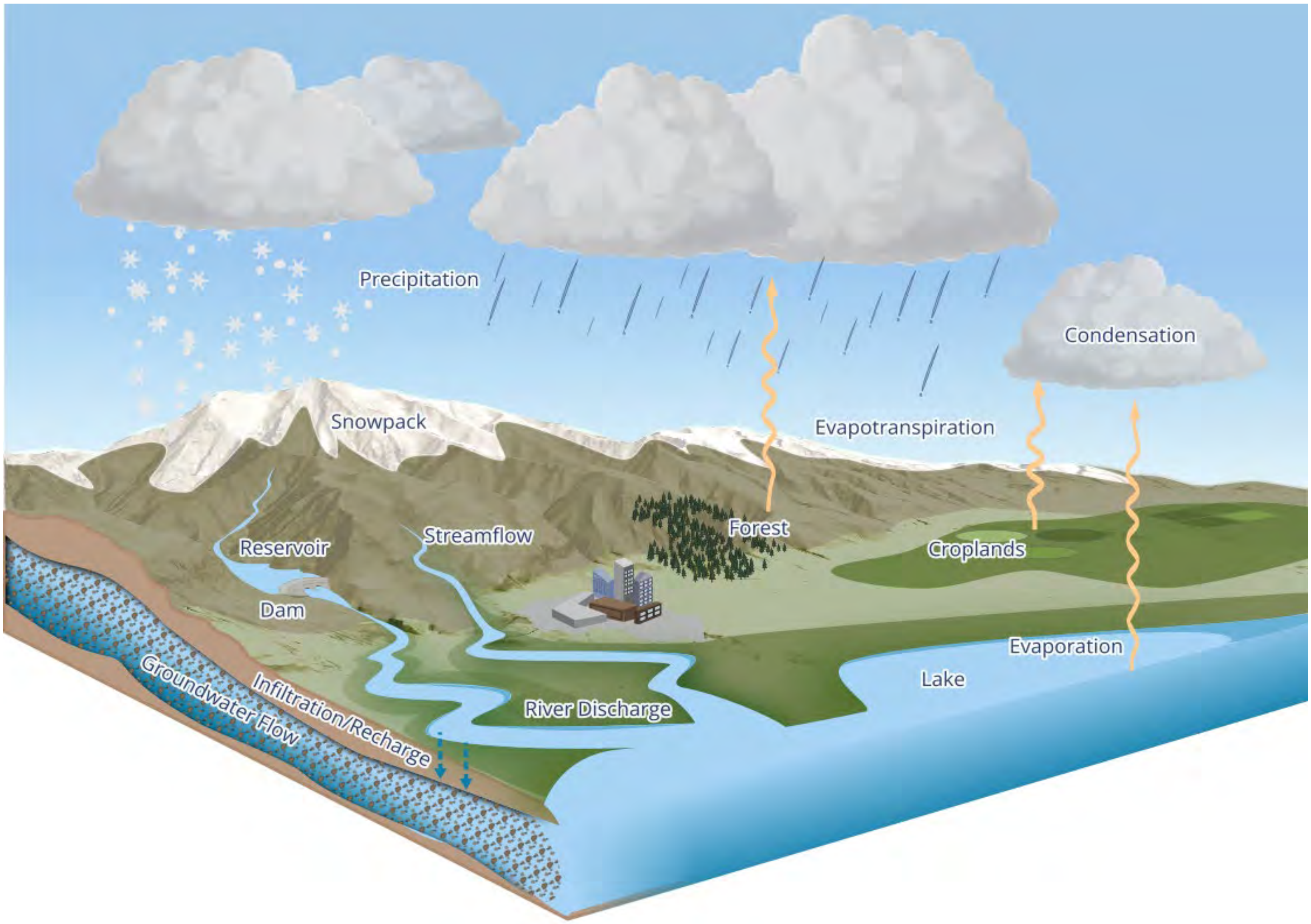



*Data sources: Division of Water Resources Hydrologic Basins and Utah Geological Survey Physiographic Regions.*

## Utah's water supply

Utah's water supply comes from surface water and groundwater sources (Figure 2-2). These sources are fed by precipitation, most of which falls as winter snow in the mountains. In the spring, snowmelt feeds streams and rivers and infiltrates into the ground, recharging aquifers. Reservoirs capture a portion of the streamflow and store it for later use during dry periods. However, due to the state's semi-arid climate, more than half of the precipitation returns to the atmosphere through evapotranspiration. The following sections describe Utah's water sources and how they have changed over the past 30 or more years.

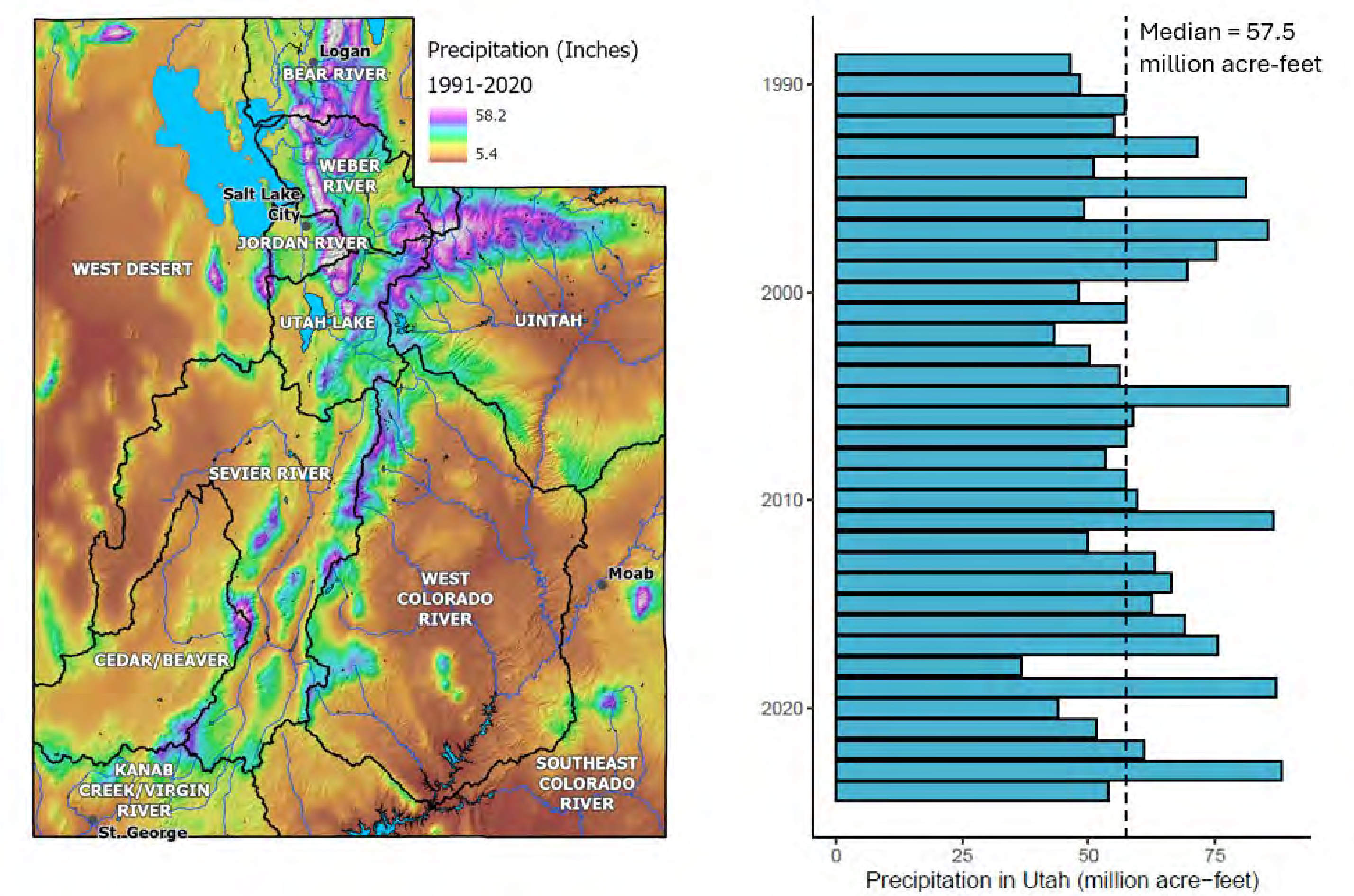
**Figure 2-2. Utah's water cycle.**




## Precipitation and evapotranspiration

Precipitation, in the form of snow and rain, is the foundation of Utah's water supply. Median annual precipitation is approximately 57.5 million acre-feet (1989-2024), though some years Utah gets much more or much less (Figure 2-3). Precipitation distribution in the state varies, with most precipitation falling in Northern Utah during the winter in the Uinta and Wasatch mountains. In Southern Utah, mountain snowpack and summer monsoon rains are the main water sources. Over the past 35 years, there has been no overall increasing or decreasing trend in the amount of precipitation falling in the state or across basins (Appendix A, Figure A-2). However, temperatures have increased across the state, increasing the proportion of precipitation that falls as rain and drives earlier snowmelt.[6] Because Utah's reservoirs have been primarily designed to capture mountain snowmelt, this shift in precipitation type will impact reservoir storage and management strategies.

**Figure 2-3. Spatial and temporal variability of precipitation in Utah.**




*The map on the left shows average annual precipitation across the state. The plot on the right shows statewide annual precipitation from 1989 to 2024. Data source: Daymet.*

Evapotranspiration converts liquid water to water vapor and returns it to the atmosphere. This includes direct evaporation from land or water and transpiration from plants. Evapotranspiration occurs in natural and human-designed systems and varies substantially from year to year, with more evapotranspiration occurring when more water is available and temperatures are warmer. In Utah's natural systems, evapotranspiration has increased by 13% between 2001 and 2024 as temperatures and the growing season have increased (Appendix A, Figure A-1).

## Surface water


*Major surface waters of Utah.*

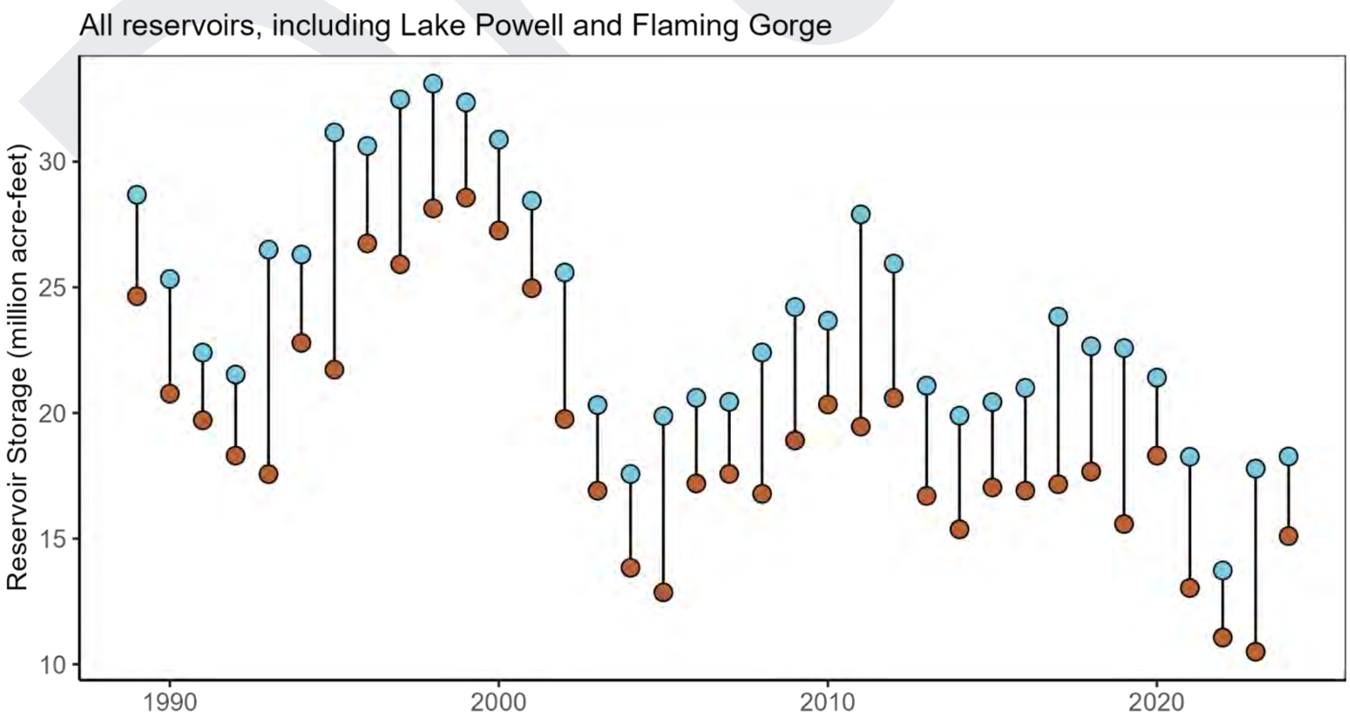
Surface water resources include water in rivers, streams, lakes and reservoirs. Some river systems cross state boundaries, such as the Bear River and the Colorado River. Interstate agreements govern how much water can be used by each state from those rivers and streams (see Chapter 4). Other important river systems include the Provo, Jordan, Weber and Sevier rivers, whose watersheds are located entirely within the state. Utah is also home to several large lakes, some salty and some fresh. Salty lakes in the Great Basin region have no surface water outlet, allowing salts to accumulate as water evaporates. The largest of these is Great Salt Lake. Freshwater lakes include Bear Lake and Utah Lake, whose water levels are actively managed to deliver water to downstream users.

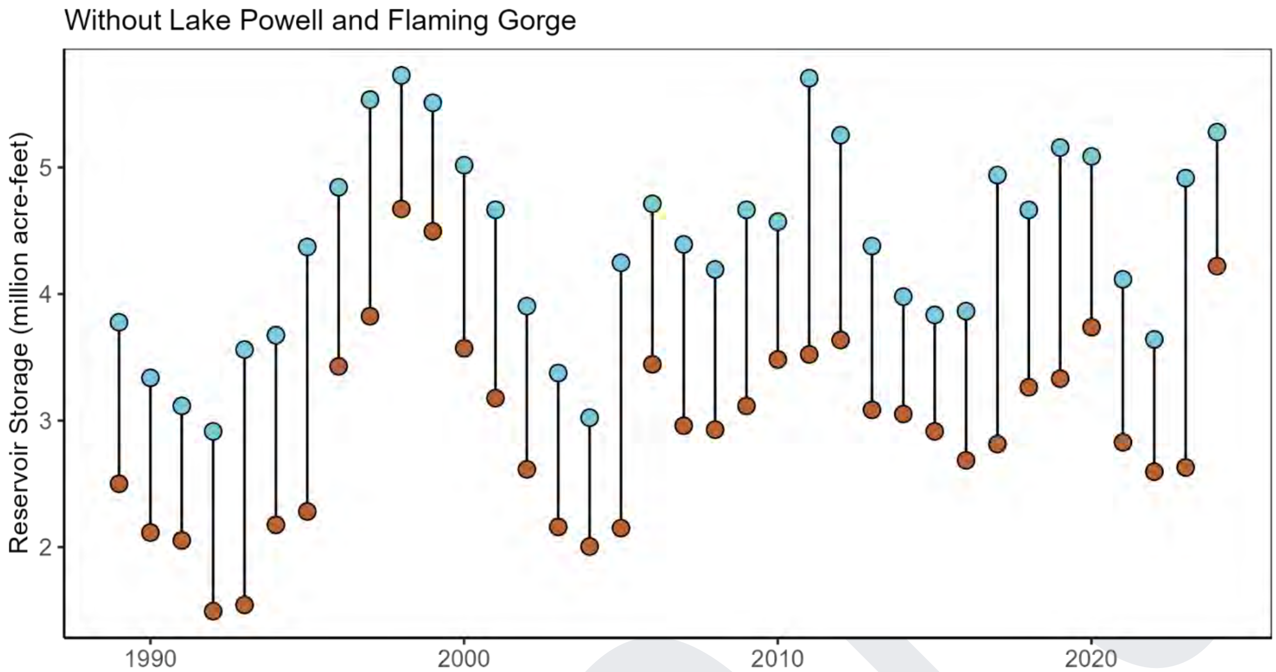
Reservoirs store water for use during dry periods and are essential to support large populations in the arid climate of the western United States. Reservoirs help with flood control and some dams generate hydroelectric power. Reservoirs accumulate sediment and lose water storage capacity over time. They also lose water through evaporation.

Utah's surface water is stored in small-to-medium sized reservoirs, many of which are upstream in mountain headwaters, as well as large reservoirs including Lake Powell and Flaming Gorge. Water stored in Lake Powell allows the Upper Division states to develop their Colorado River Compact allocations while continuing to meet compact obligations (see Chapter 4). At maximum capacity, Flaming Gorge and Lake Powell can store about 27 million acre-feet, most of which is not available for use in Utah. The rest of the state's major reservoirs can store about 5.5 million acre-feet.[7] It is important to assess storage trends with and without Lake Powell and Flaming Gorge to understand basin-scale hydrology (Figure 2-4).

Reservoir storage is balanced by managing inflows and outflows. Though the state lacks a comprehensive analysis of surface water supply and trends, regional analyses and some reservoir storage trends suggest that surface water supplies are decreasing. For example, headwater streamflow and river flow to Great Salt Lake has decreased over the past few decades.[8] Additionally, natural flow in the Colorado River and reservoir storage in Lake Powell have been declining since 2000 (Figure 2-4).[9] However, storage in small-to-medium reservoirs in the state increased in the 1990s as new reservoirs were built, and reservoir storage has remained fairly stable over the past decade. This stability highlights how critical active reservoir management is at local and basin scales to balance diminishing inflows with water needs for human and environmental use.

**Figure 2-4. Utah's total annual reservoir storage.**






*Blue dots show annual maximums and brown dots show annual minimums. Data source: NRCS Air & Water Report Generator.*

## Groundwater

Groundwater is the term for water stored in soil and rock pore spaces underground. Soil moisture refers to water stored in soil close to the ground surface. This moisture can be evaporated or transpired by plants back to the atmosphere. Water that percolates deeper collects in a saturated zone known as an aquifer. Generally, this water is stored without losses from evapotranspiration, making many aquifers ideal natural storage reservoirs. Aquifers store and transport water slowly down-gradient (i.e., from higher to lower elevation) to connected surface waters and proximate aquifers.

Aquifers, like sponges, absorb water when dry and shed water when wet. Therefore, when aquifers are relatively full and soil moisture is at a high level, more rain and snowmelt is likely to flow into surface waters. When soil moisture is low and aquifers are not full, precipitation is more likely to replenish soil moisture and recharge aquifers before providing streamflow. Therefore, surface water bodies can either transmit water into aquifers or receive water from aquifers, depending on groundwater levels. Many streams and rivers in the state have sustained flows in the summer thanks to groundwater inflow. Groundwater flow into streams also maintains cooler water temperature, helping to sustain healthy fish habitat. However, when groundwater levels become depleted due to drought or over-pumping, less water is available to sustain surface waters, reducing streamflows and the reliability of water supplies.

Groundwater levels are declining throughout Utah,[1,2,8,10,11] especially where aquifers serve as a primary source of water. While many aquifers are recharged by precipitation and surface water, others fill slowly, containing old water that dates back thousands of years to glacial periods. When the groundwater withdrawal rate is greater than the rate of recharge, aquifer water levels decline. Reduced groundwater levels can decrease surface supplies, degrade water quality and cause permanent damage such as ground subsidence, fissures and reduced storage capacity.

Utah's aquifers must be managed as a sustainable resource based on evaluation of their safe yield (Chapter 4). Evaluating safe yield requires accounting for groundwater in storage and, more importantly, quantifying the rates and sources of recharge and identifying where groundwater flows into streams, springs, wetlands, lakes and reservoirs. Quantifying groundwater resources is time consuming and technically demanding. The U.S. Geological Survey and the Utah Geological Survey have collected data and conducted basin studies for decades to quantify groundwater resources. Techniques for measuring and analyzing evapotranspiration, stream flow, groundwater levels and climate have improved significantly in recent years, supporting more defensible estimates of groundwater storage, flow and surface-water connectivity. Future work should leverage these methods to improve the accuracy and reduce the uncertainty of basin-scale water budgets. Priority issues noted by the Division of Water Rights are: (1) defining aquifer safe yield in basins with long-term declines and (2) better understanding surface and groundwater interactions. Additional needs include quantifying wetland dependence on groundwater inflows, evaluating hydrologic effects of watershed restoration and clarifying the role of groundwater in sustaining Great Salt Lake levels and water quality.

# Utah's water use

## Natural system use

The largest user of water in Utah is the natural environment, including forests, rangelands, wetlands, lakes and rivers. The natural environment follows basic laws of physics, chemistry and biology to grow plants and influence when and where water is retained and released. Although difficult to measure precisely, natural systems account for more than half of Utah's water use, primarily through evapotranspiration.

## Human use: diversions, depletions and return flows

Human water use includes water for agriculture and municipal and industrial (M&I) use and is reported by the Division of Water Resources as diversions and depletions. Diversions include all water extracted from surface water and groundwater. Depletions estimate the amount of water removed from the system by human use and are almost always less than the amount diverted (sometimes depletions can be equal to diversions but by definition cannot be greater than diversions). Depletions are important to estimate to understand the amount of water consumed, evaporated, transpired or otherwise no longer available to the hydrologic system.

The difference between diversions and depletions is the amount of water that returns to the hydrologic system through groundwater or surface water pathways, commonly referred to as return flow. Return flows may occur at different locations, at later times or with altered water quality, which can affect their availability and usefulness for subsequent uses.

Diversions, depletions and return flows are essential to monitor for water rights distribution, basin planning and ecological needs.

**Utah's Water Budget model**

To estimate Utah's available water supply and uses, the Division of Water Resources uses a detailed water budget model.[12] Like a budget for money, the model accounts for water inputs and outputs to track where our water goes so we can make informed decisions. The model is used for statewide and basin planning to understand trends in water use.

**Measuring water supply and use**

The water budget model calculates water use from climate, water resources and land use data. Climate data includes precipitation and evapotranspiration (calculated from temperature, wind and solar radiation data). Water resource data includes streamflow, groundwater use, reservoir storage and M&I water use. Land use data includes agricultural land use and crop spatial datasets. The division sources data from the federal government, state government, academic and private sectors and includes direct field observations, remote sensing and modeled data.

The results from the water budget model report Utah's water use by agricultural and M&I sectors at basin- and statewide scales. The division reports M&I and agricultural water use as diversions and depletions annually on their website.

**Model limitations**

Lack of data is a significant source of uncertainty in the water budget model. Ungauged streams, in particular, are a challenge and their flow must be estimated from established statistical relationships. Secondary water has historically been estimated as well, but more data is becoming available as new metering requirements are implemented. Interactions between groundwater and surface water are an additional source of uncertainty. Investing in measurement stations where no data is available, as well as research and model improvement, will improve water budget results.

## Diversions

Statewide water diversions are about 5.1 million acre-feet per year (5-year average, 2020-2024;

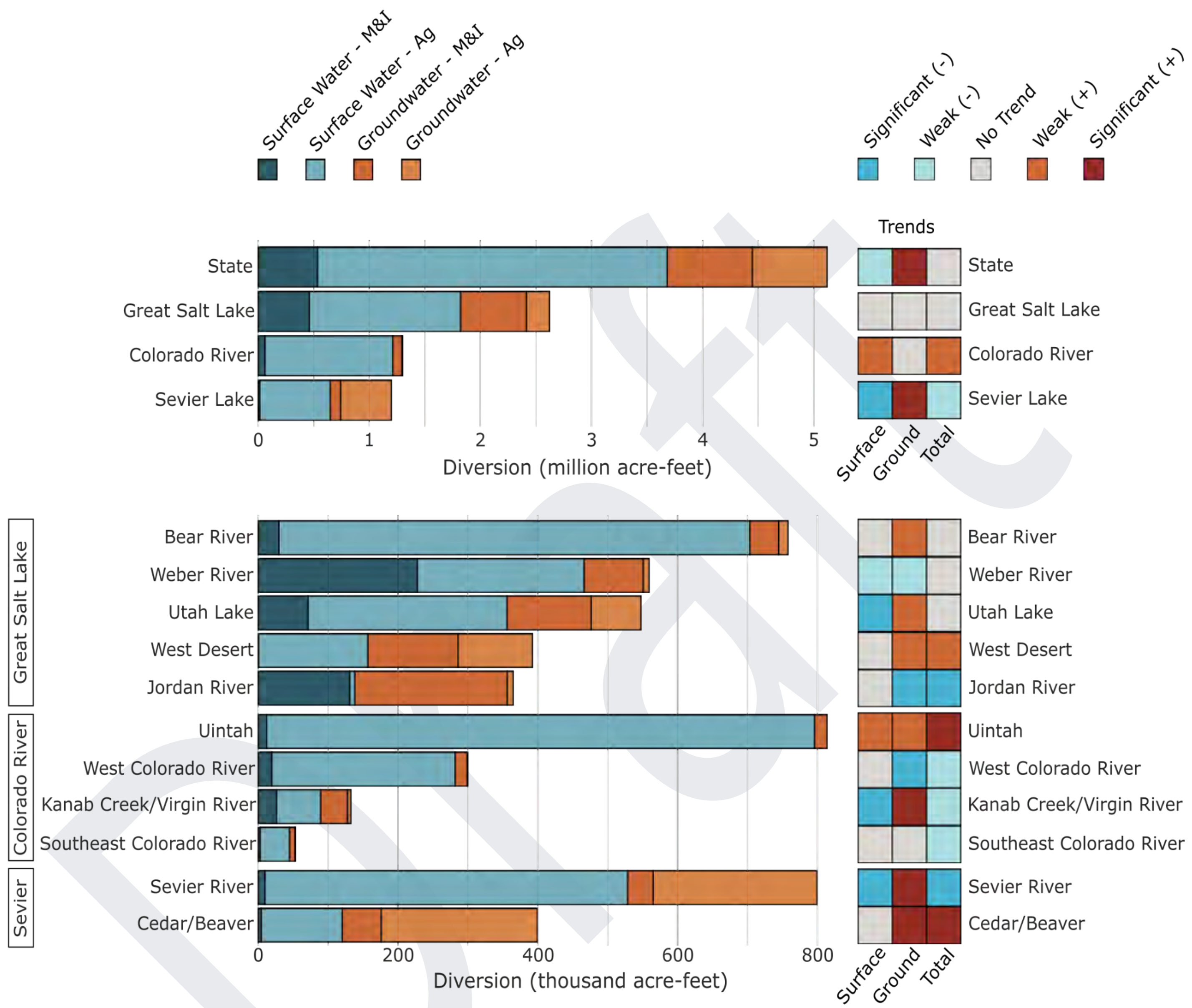
Figure 2-5). Most diverted water comes from surface sources, which supply 72% (3.7 million acre-feet per year) of the total, while groundwater provides the remaining 28% (1.4 million acre-feet per year). Agriculture is the dominant water user statewide, accounting for 75% of water diversions, mostly from surface water sources. Statewide M&I water use accounts for the remaining 25% of diversions, drawing roughly equal amounts from surface and groundwater sources.

While this statewide pattern is consistent across much of Utah, human water use varies by basin due to variability in the amount and type of water resources available. In most basins, agriculture is the main water use and surface water diversions far exceed groundwater diversions. However, a few basins break this general pattern. For example, the Cedar/Beaver, Jordan River and West Desert basins divert more than 50% of their water from groundwater. For the Cedar/Beaver Basin, most of this water is for agriculture, whereas in the Jordan River Basin, most of the groundwater is for M&I use, while the West Desert Basin maintains an even split for agriculture and M&I use. This data highlights the critical role that groundwater plays in some regions and underscores the importance of aquifer stability as a basinwide management priority.

## Diversion trends from 1989 to 2024

Over the past 35 years (1989-2024) statewide total diversions have remained about the same (Figure 2-5; Appendix A, Figure A-3). Groundwater diversions, however, have increased, while surface water diversions have slightly decreased. At the basin scale, total diversion trends vary. Changes in diversion sources show more increasing trends in groundwater diversions than from surface water. This data highlights a growing dependence on groundwater. In some areas, there are known issues with aquifer depletion and some of these areas have groundwater management plans (more on these in Chapter 4), highlighting the need to coordinate efforts to safeguard groundwater resources.

**Figure 2-5. Diversions and long-term trends by hydrologic basin.**




*Surface water and groundwater diversions (5-year average, 2020–2024) and long-term trends (1989–2024). Average values (left plot) and trends (right plot) are shown for the whole state; the Utah portions of large river and lake basins; and smaller nested hydrologic basins. Trends were determined using a Mann-Kendall test, a robust statistical tool for trend analysis. Data source: Division of Water Resources water budget model.*

## Depletions

Statewide depletions associated with human water use are about 3.6 million acre-feet per year (5-year average, 2020–2024; Figure 2-6).

Agriculture accounts for 70% of annual statewide depletions. The agriculture sector accounts for most of the depletions because it diverts the most water. The rate of depletion varies by irrigation method, crop type, local climate and soil properties.

Water for M&I use includes residential, commercial and institutional indoor and outdoor uses, accounting for 21% of annual statewide depletions. Indoor municipal water depletion accounts for less than 1% of statewide depletions. Indoor depletions are low because less water is used indoors than outdoors, and most indoor water use is returned to wastewater treatment facilities that return treated water to the hydrologic system. Municipal outdoor water depletion accounts for 13% of statewide water depletions. Some outdoor water use is returned to the hydrologic system, but most (around 90%) of the outdoor water applied in municipal settings is evaporated or transpired. Because this water goes primarily to watering thirsty lawns, outdoor municipal water use is a major conservation opportunity.

Industrial activities and Great Salt Lake mineral extraction account for 7% and 5% of statewide depletions, respectively. In both cases, the division's model assumes that 100% of diverted water is depleted.

Reservoir and incidental water losses account for 4% of statewide depletions. The reservoir depletion numbers presented here do not account for evaporation from Flaming Gorge reservoir and Lake Powell because those depletions are shared across the Upper Colorado River Basin states (see Chapter 4) nor do they include Bear Lake and Utah Lake, which are natural water bodies managed as reservoirs. Incidental depletions include depletions that occur along conveyance systems and at the fringe of agricultural fields. The incidental depletion reported here is an estimate prone to substantial error because these areas aren't consistently mapped.

Across basins, the broader Sevier Lake and Colorado River Basin depletions are mostly related to the agricultural sector. However, the Great Salt Lake Basin has a substantial portion of depletions from the M&I sector and mineral extraction on Great Salt Lake. Therefore, different water management strategies are needed across basins for depletion management. For example, the Division of Forestry, Fire and State Lands has recently entered into voluntary agreements with mineral companies to reduce their depletions when lake levels are low.

### Depletion trends from 1989 to 2024

Similar to diversions, total human-caused depletions have not increased or decreased statewide over the past 35 years (Figure 2-6; Appendix A, Figure A-4). However, due to growing populations in urban centers, M&I

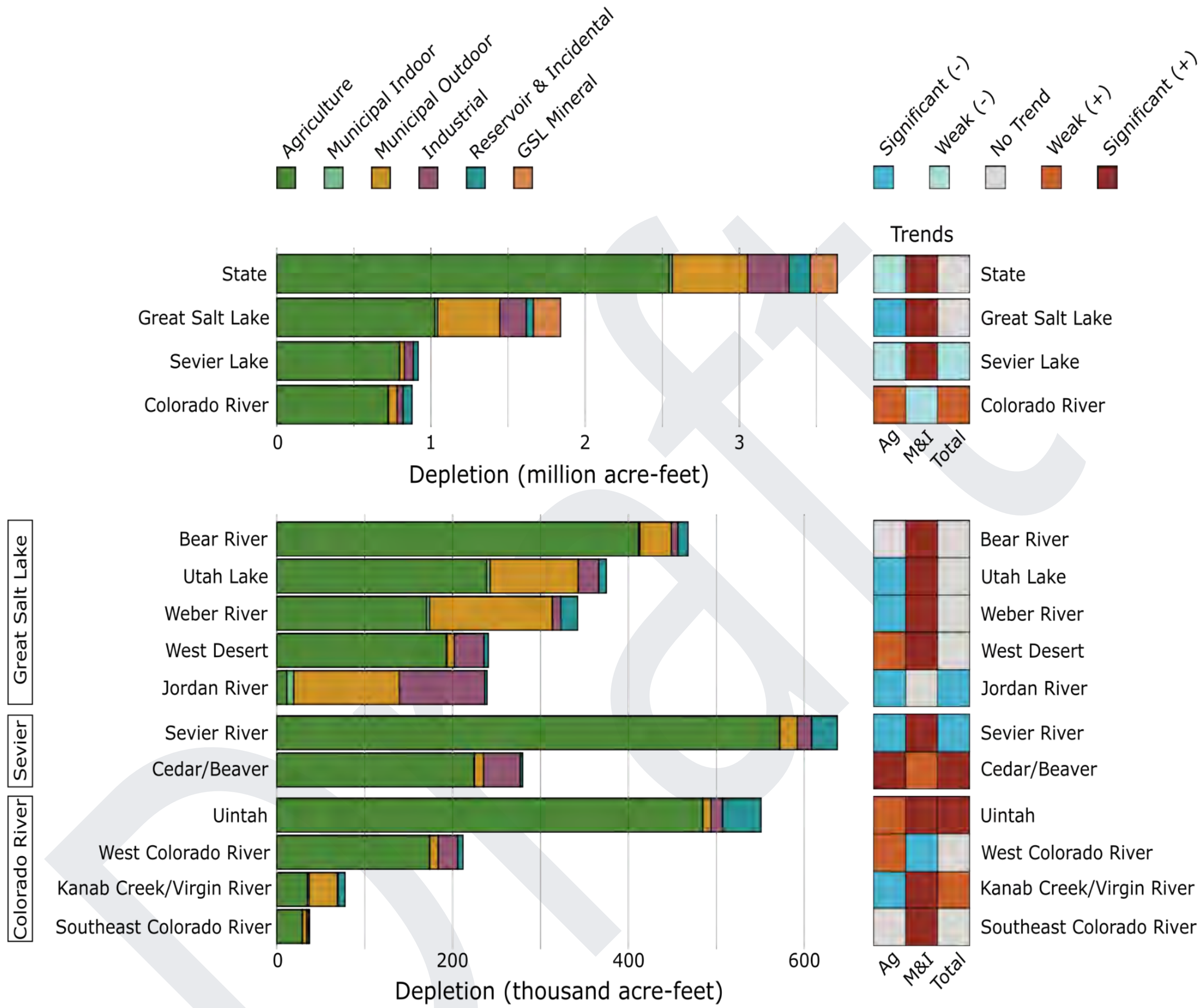
depletions have significantly increased while agricultural depletions have slightly decreased.

Declining water levels in Great Salt Lake have spurred action to decrease depletions basinwide. Many of the smaller basins that flow into the Great Salt Lake Basin have maintained steady depletion trends since 1989, with noticeable decreases in agricultural depletions and significant increases in M&I depletions (Appendix A, Figure A-4). Only the Jordan River Basin has decreased total depletions over the period of record. The basin accomplished this by decreasing agricultural depletions and stabilizing M&I depletions, even though the population has substantially increased. The Jordan River Basin highlights that reducing depletions while growing is possible, but often comes at a cost to agricultural productivity. To manage these tradeoffs, the Office of the Great Salt Lake Commissioner is coordinating water management efforts to increase and stabilize water levels in Great Salt Lake (more on these efforts in Chapter 4 and 5).

Within the broader Sevier Lake Basin, depletions have decreased due to reductions in agricultural depletions in the Sevier River Basin. However, the Cedar/Beaver Basin has increased total depletions. Both basins have increased their reliance on groundwater to support their water supply. In some areas within these basins, aquifer depletion has grown at unsustainable rates, requiring the development of groundwater management plans that will systematically reduce groundwater pumping over the next 100 years.

Within Utah's portion of the Colorado River system, increased depletions have occurred in the Uintah Basin over the past 35 years as the region has developed, due in large part to Colorado River water project investments. However, the realities of the current drought and long-term aridification are stressing the Colorado River system and its governance structure. The Colorado River Authority of Utah is the state agency responsible for coordinating these efforts (see Chapter 4).

**Figure 2-6. Depletions and long-term trends by hydrologic basin and sector.**




*Depletions (5-year average, 2020-2024) and long-term trends (1989-2024). Average values (left plot) and trends (right plot) are shown for the whole state; the Utah portions of large river and lake basins; and smaller nested hydrologic basins. Trends were determined using a Mann-Kendall test, a robust statistical tool for trend analysis. Data source: Division of Water Resources Water Budget Model.*

## Ensuring Utah's water future

Proactive water planning and management are needed to meet tomorrow's challenges. To manage water levels in Great Salt Lake, ensure Colorado River water use continues to be in line with available supply, adapt to modern hydrologic realities across the state and meet the needs of Utah's growing population, it will be essential to decrease diversions and depletions. Though historical water use can be a useful benchmark, it cannot be the blueprint going forward.

The next chapter will examine the projections for Utah's population and climate and discuss how planning can be used to adapt to a world of increasing water scarcity. Later in the plan, chapters 4 through 7 will explore the legal, ecological and human water perspectives and challenges that shape how we will adapt. Effective adaptation will necessitate balancing human water use with the current realities of a diminishing water supply.

## Recommendations

2-1. The Legislature should expand capacity to study groundwater conditions, including groundwater resources, groundwater quality and surface water-groundwater interactions.

2-2. The Legislature should create policy and funding mechanisms for state water agencies to publish data and reports to a central water data hub following best practices in data accessibility.

2-3. The Legislature should continue to provide funding to fill gaps in statewide data collection and modeling for water supply, quality and use, leveraging collaborations with key federal partners.

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# 3

# Planning for Utah's Water Future

In this chapter:




Photo credit Ron Hall

# Key points

- Uncertainty related to population growth, land use change, economic development and climate variability makes planning both more challenging and more important than ever.
- Current modeling shows that without continued conservation progress, projected M&I water demands by 2060 could exceed available supplies; with conservation progress, most needs are projected to  be met.
- Consistent investment in water infrastructure throughout the state is essential to maintain reliable water supply.
- The next iteration of state water planning should incorporate a variety of modeling scenarios, informed by local water entities, to better prepare for the future.

Population growth, land use change, economic development and climate variability increase uncertainty for Utah's water resources, making water planning both more difficult and more important than ever. The state's population is expected to continue growing, and climate variability is impacting both water supply and water demand. Changes in land use and economic development also modify how water is used across the state.

At the same time, most available surface water and groundwater resources have already been developed, and the storage and conveyance infrastructure that supports them is largely in place. As a result, opportunities for new water supply projects are limited, increasingly challenging and more expensive. Many of yesterday's approaches are no longer sufficient; water planners will require new tools and strategies to guide water management in an uncertain future. This chapter examines the key drivers shaping Utah's water future, models potential changes in water supply and demand, and discusses ways to strengthen water planning under uncertain conditions.

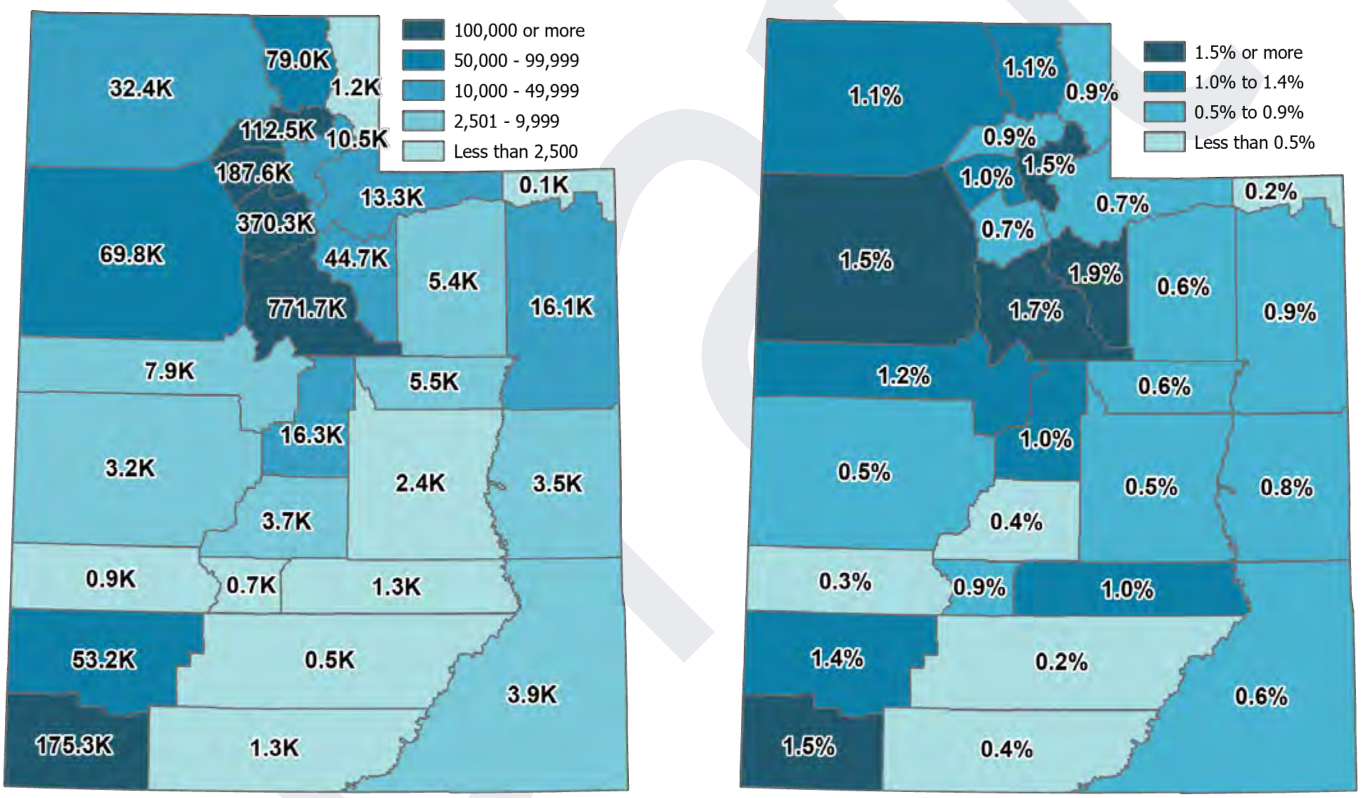
# Drivers of change

## Population growth

Population growth is an important factor shaping future water demand in Utah. The state's population is projected to increase from 3.6 million in 2025 to 5.6 million by 2065.[1] About 80% of Utah's residents currently live in the Wasatch Front and Wasatch Back region, which includes the counties of Utah, Salt Lake, Davis, Weber, Summit, Morgan and Wasatch. Future growth is expected to vary across the state, with the largest increases occurring along the Wasatch Front and in Washington County (Figure 3-1).

Population growth is often assumed to increase water demand, but this relationship isn't fixed. Many water-stressed regions in the West have successfully decoupled growth from M&I water use through demand management and water reuse.[2] These strategies can not only significantly reduce per capita water use but stabilize or even reduce overall water use. Whether or not decoupling is possible depends on a variety of factors but is most likely to occur in areas where water supplies are limited, growth is constrained upward and not outward and in densely populated metropolitan regions, such as Salt Lake Valley and other areas along the Wasatch Front. Therefore, population growth remains an important factor to track, but it does not have to result in increased water demand.

**Figure 3-1. Projected population growth by county from 2025 to 2065.**




*The left plot shows projected population change and the right plot shows the projected average annual rate of population change. Data source: Gardner Institute.*

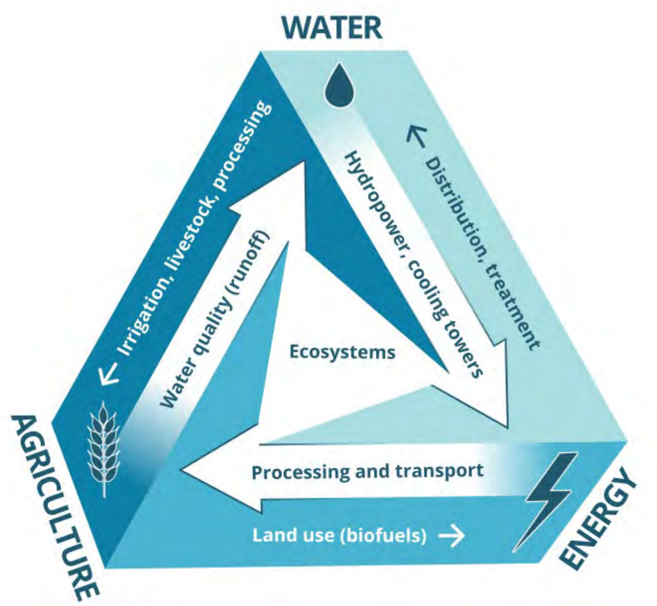
## Changing land use and economic development

Land use and industry trends are changing, and how land is used directly influences water demand. Water supports basic human needs, food production, outdoor irrigation, industrial processes and energy production.[3] As communities expand and the economy grows, M&I water use is also expected to increase.

Currently, agricultural acreage is decreasing (see Chapter 7) and development and water-intensive industries are increasing. The shift toward large-scale energy production and the proliferation of high-density infrastructure, such as data centers and new mining operations, will locally increase consumptive water use.

Balancing water needs across diverse users requires a nexus approach that recognizes the interconnectedness of society and the environment (Figure 3-2).[4] Because energy and industrial development often require significant and sustained water resources, changes in this sector will affect others. Therefore, planning must consider these linkages to support economic growth, food production, energy development and environmental needs within Utah's highly variable water constraints.

**Figure 3-2. The water-food-energy nexus.**




## Climate variability

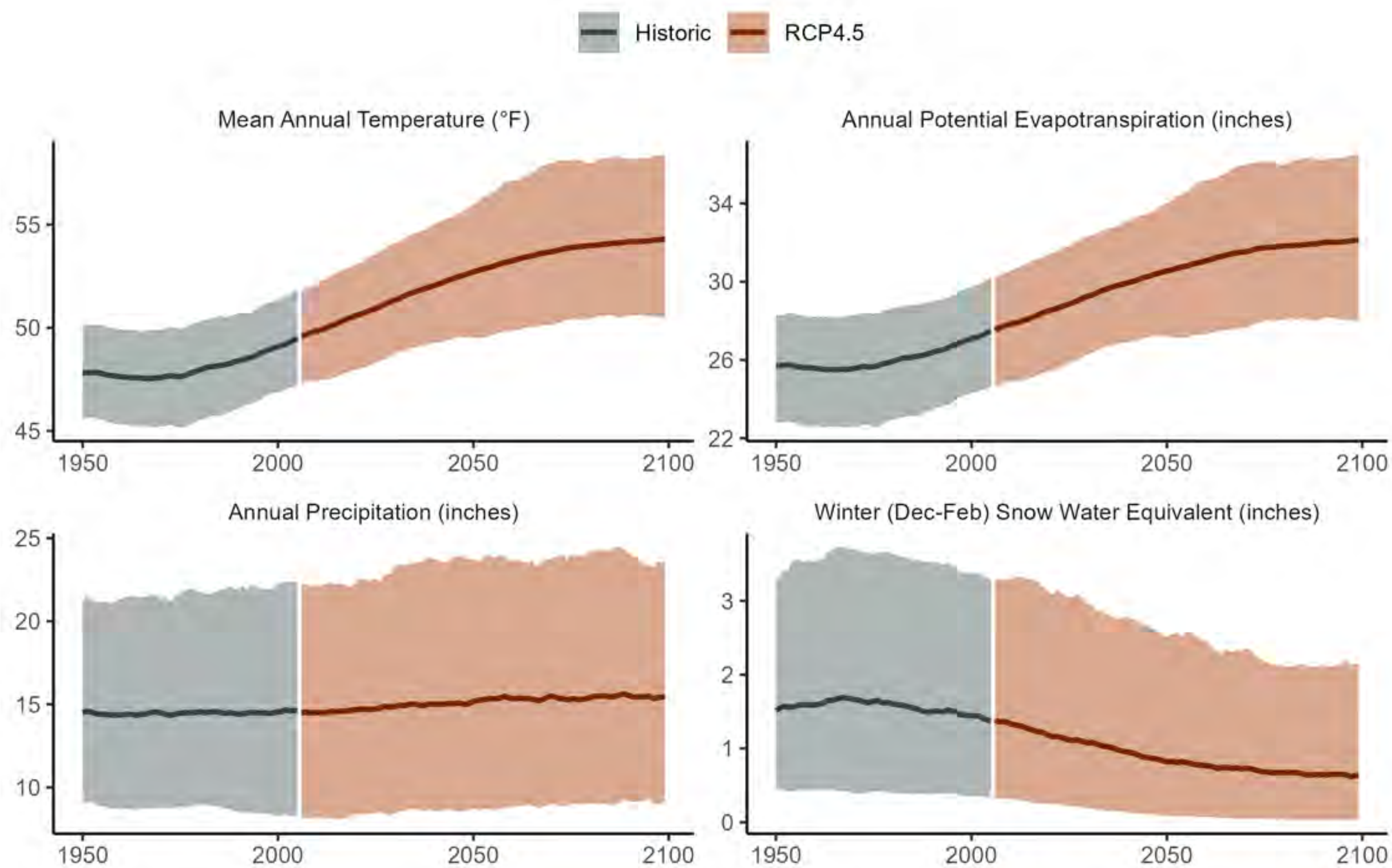
Utah's climate is warming, with important implications for water demand and supply across the state. Climate refers to prevailing weather conditions over long periods of time, typically 30 years or more. In Utah, mean annual temperature has increased by about 0.4 degrees Fahrenheit per decade over the past 40 years.[5,6] This represents an average rate of change across the state, though warming trends vary by region and elevation.

Warmer temperatures affect Utah's water resources in several ways. They increase demand and reduce supply by increasing evapotranspiration, altering the timing of runoff and decreasing groundwater recharge and reservoir storage. Warmer conditions also shift precipitation from snow to rain, contribute to more intense storms and droughts and increase wildfire risk.[5] Over the past several decades, declines in streamflow and groundwater have already been documented in the Colorado River,[7] Great Salt Lake[8] and other basins.

Climate models predict with high confidence that temperatures will continue to rise.[9] While these models do not converge on a clear trend for precipitation – suggesting Utah could receive more, less or roughly the same amount in the coming decades – rising temperatures will shift precipitation to fall more as rain than snow.

Because specific projections depend on differing levels of global greenhouse gas emissions (Figure 3-3), the exact impact on evapotranspiration, streamflow and groundwater remains uncertain. However, a decrease of up to 8% in average annual streamflow is projected for several river basins in the southwestern U.S., with similar trends expected in Utah.[6] Rather than delaying action, this uncertainty highlights the need to build a resilient water future capable of withstanding a range of climate scenarios.

**Figure 3-3. Climate change projections for Utah.**




*The Representative Concentration Pathway (RCP) 4.5 and 8.5 climate scenarios indicate moderate and high global emissions, respectively. Scenario projections include changes in temperature, evapotranspiration, precipitation, and snow water equivalent. Data source: Climate Toolbox.*

## Future water supply and demand

Understanding how these drivers may influence future water supply and demand is essential for effective planning. The Division of Water Resources develops models to explore potential future scenarios to support long-term water planning. Current efforts primarily focus on how M&I water supply and demand could change over time.

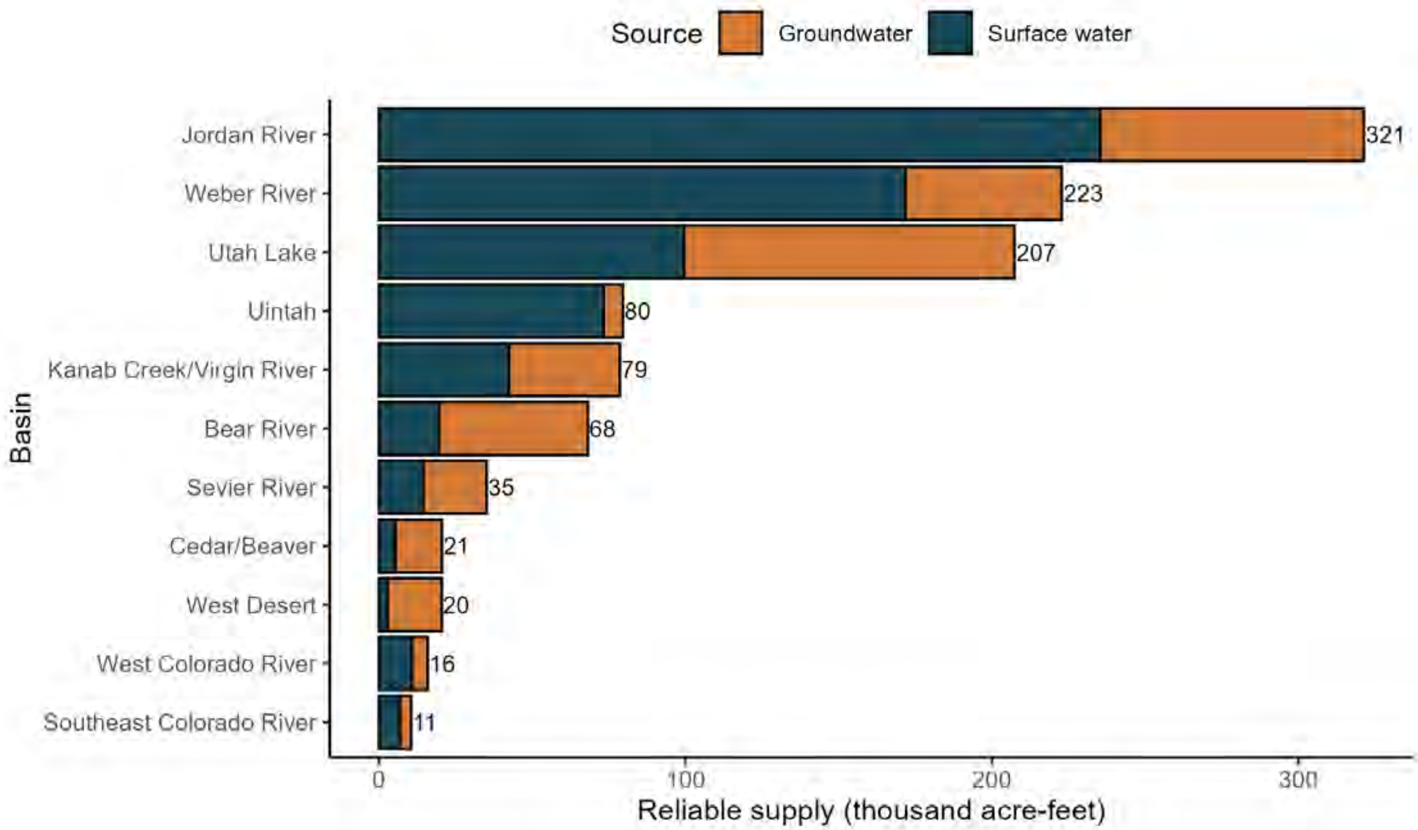
In this section, M&I water demand scenarios and potential supply deficits are reported out to 2060. This planning horizon was selected to provide a long-term planning perspective while maintaining a reasonable level of confidence in model assumptions, recognizing that uncertainty increases over longer time frames.

### Reliable water supply for M&I sectors

M&I sectors require reliable water sources with sufficient water quality to meet their needs. Water suppliers typically estimate customer demand and then develop reliable water sources to meet those demands. The amount of water that can be developed is constrained by hydrology, infrastructure and governance.[10] In other words, reliable water sources are defined by the amount of physical water available, the infrastructure needed to deliver that water to users and the legal rights to that water. Many water suppliers account for their reliable water sources and estimate their reliable supply as the amount of water available on an average year or under dry conditions.

The Division of Water Resources has estimated the current statewide reliable water supply based on existing water rights and infrastructure constraints (see Appendix B), totaling approximately 1.1 million acre-feet per year (Figure 3-4). However, this current estimate requires further refinement. A more concerted effort is needed to integrate local water supplier data into the statewide framework and reconcile these estimates with basin-scale hydrological constraints. To be a viable planning tool, future iterations must account for shifting conditions driven by climate variability and development. In addition, reliable supply targets must stay within the physical limits of surface and groundwater systems while explicitly accounting for the water needed to sustain healthy watersheds and ecosystems.

**Figure 3-4. Estimated M&I reliable supply for each hydrologic basin.**




*Data source: Division of Water Resources Reliable Supply Estimation.*

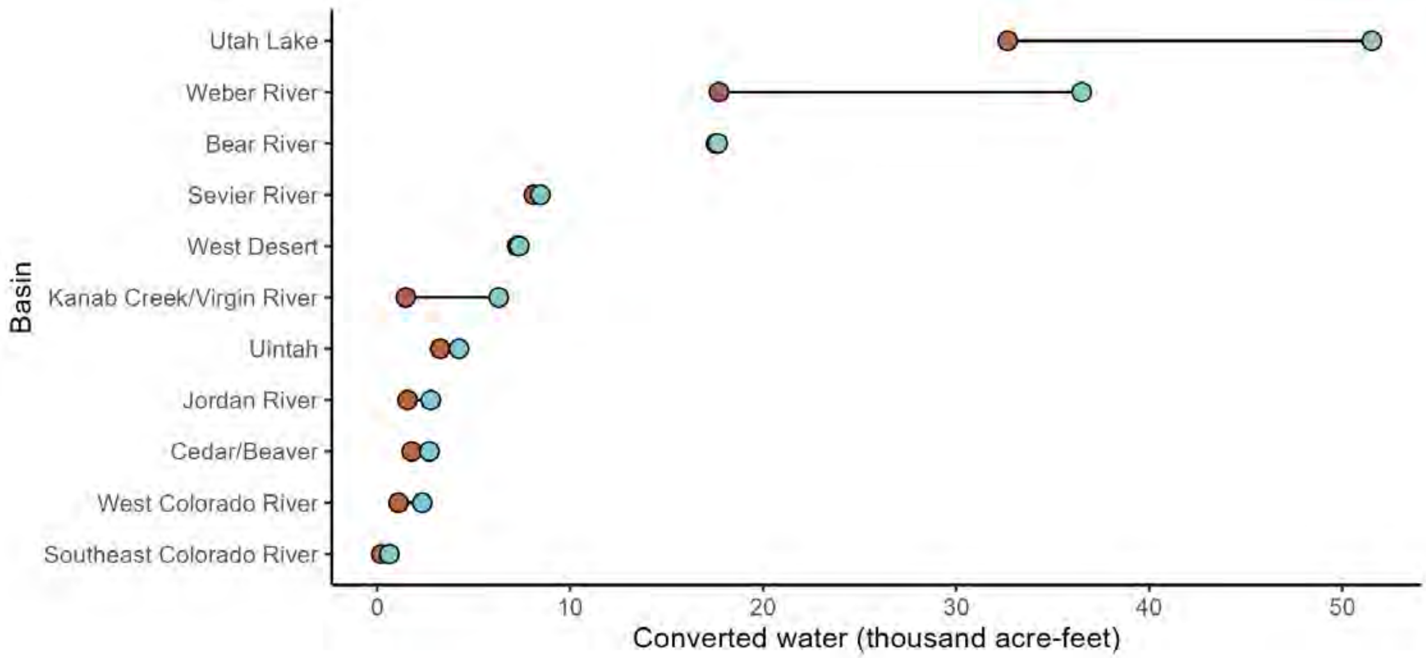
## Water supply converted from agricultural to M&I use

In many areas of the state, agricultural land is being sold and water rights are being converted to M&I use. These transactions are largely driven by market forces as developers and growing communities seek land and water to support new development. When water rights are included in the land transfer and are of sufficient quality, they provide an additional source of water for M&I use.

For long-term planning purposes, the division projects the amount of water communities might acquire from converting agricultural water to M&I use (Figure 3-5). These estimates do not represent a commitment or prediction that such transfer will occur, as it is impossible to know exactly where and when this water may be transferred in the future. The division derived these estimates in two parts:

- First estimating the amount of land transitioning from agricultural use to M&I use.
- Then estimating the resulting change in water demand.

**Figure 3-5. Estimated agricultural-to-M&I water conversions by hydrologic basin.**




*Estimated range of water that could be converted from agricultural use to M&I use by 2060 within each hydrologic basin. Blue dots represent the upper estimate and brown dots represent the lower estimate. Estimates are based on projected agricultural land conversion and associated changes in water demand. Data source: Division of Water Resources Agriculture to M&I Conversion Model.*

## M&I water demand

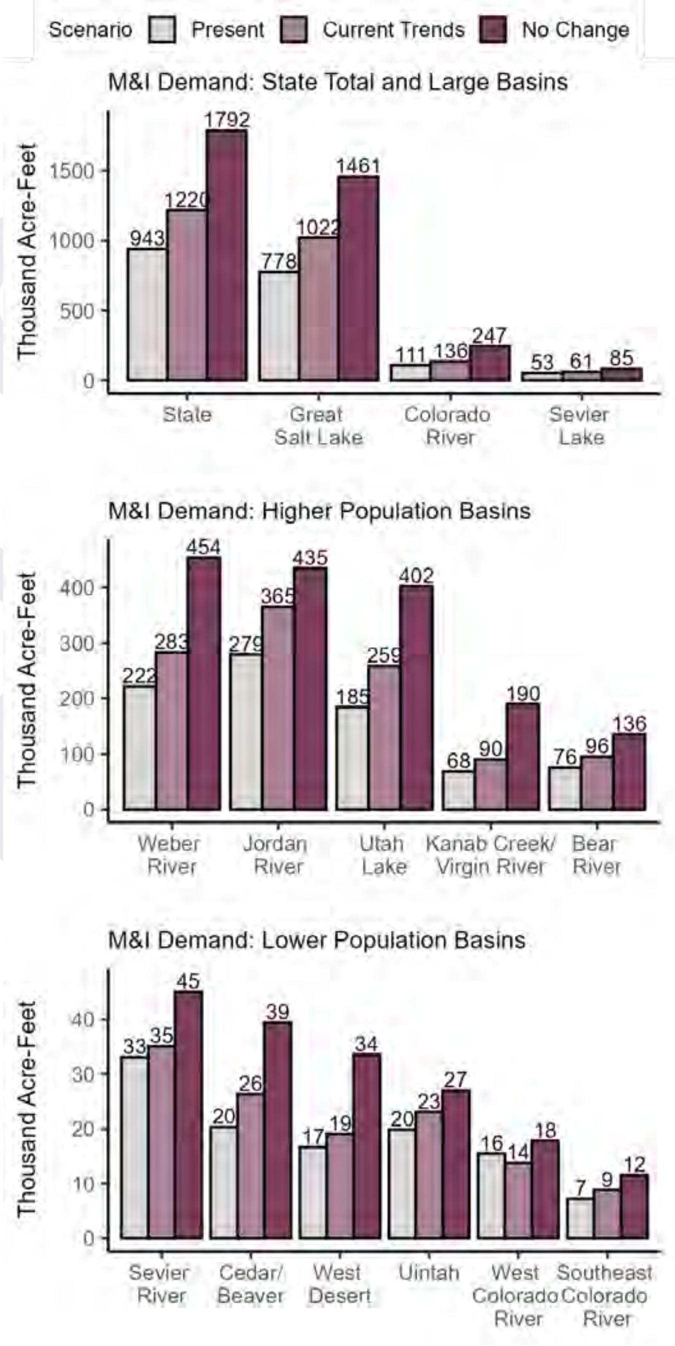
To better understand how M&I water demand may change in the future, the division developed a model to investigate future scenarios within public water supplier service areas (see Appendix B). The model estimates M&I customer demand and includes 12-15% water system loss, but does not include water required for system operations or agricultural water use.

The model accounts for several factors that influence water demand, including projected population growth, future land use characteristics (such as conversion of lawns to waterwise landscaping), housing type, lot size and evapotranspiration under different climate conditions. Evapotranspiration assumptions are based on modeled climate conditions under the RCP 4.5 greenhouse gas emissions scenario, which represents a moderate future emissions pathway.[11]

The division evaluated two conservation scenarios to examine their effect on demand out to 2060. The No Change scenario used average conditions (2019-2023) for land use, housing type, lot size and indoor and outdoor water use efficiencies and kept these variables constant into the future amid population growth and climate variability. The Current Trends scenario used current trends (2019-2023) in land use, housing type, lot size and indoor and outdoor water use efficiencies and extrapolated those trends into the future.

Demand scenarios suggest that continued conservation progress could substantially reduce future water demand (Figure 3-6). Under the Current Trends scenario, statewide demand could be about 47% lower than under the No Change scenario. These reductions would come from continued implementation of state and local conservation programs such as the Landscape Incentives Program, secondary metering, zoning and improved efficiency standards. These conservation programs are discussed more in Chapter 6.

**Figure 3-6. Current M&I water demand compared to future conservation scenarios.**



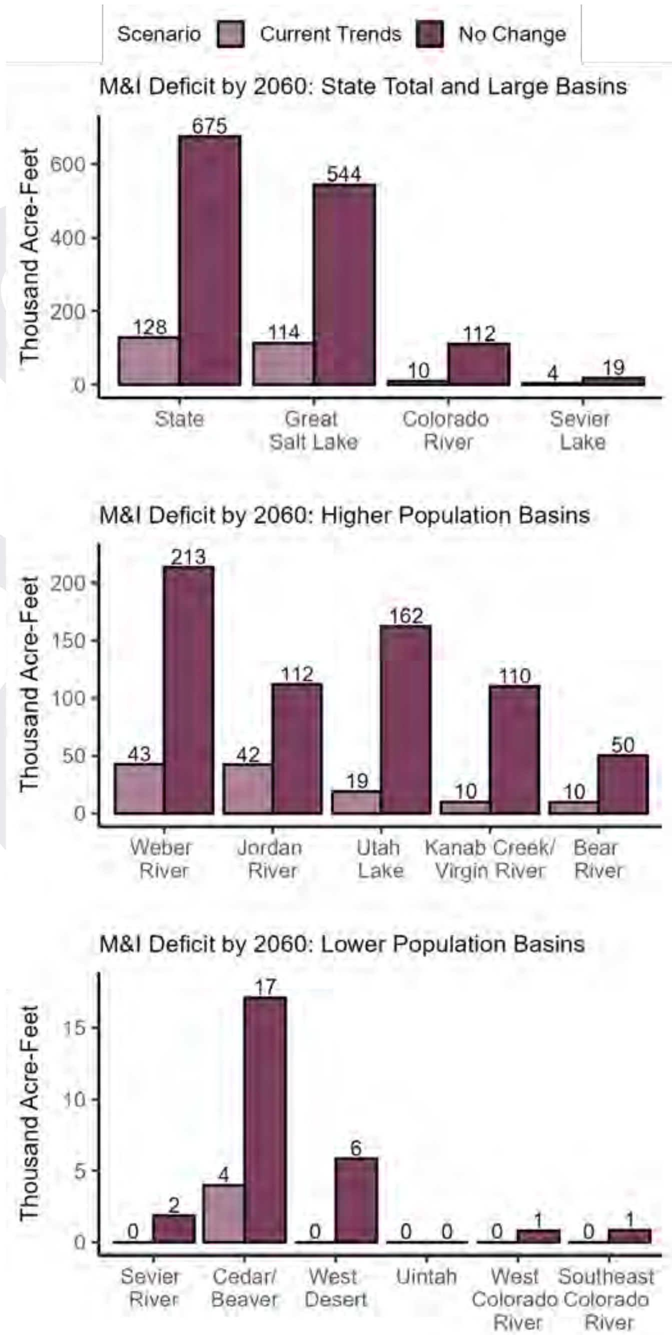

*M&I water demand by basin for present-day conditions (2019-2023 average) and two 2060 conservation scenarios. The "Current Trends" scenario assumes continued conservation progress, while the "No Change" scenario assumes current water use practices remain unchanged. Data source: Division of Water Resources Water Demand Model.*

## Potential water deficits by 2060

Comparing supply and demand scenarios helps illustrate the actions needed to ensure reliable water supplies into the future. When future demand scenarios are compared with estimates of reliable supply and potential water converted from agriculture, the importance of conservation is clear (Figure 3-7). Under the No Change scenario, statewide demand could exceed available supply by 674,000 acre-feet by 2060. Under the Current Trends scenario, conservation could reduce that deficit to about 128,000 acre-feet.

Future supply and demand conditions, including the scenarios presented here, remain uncertain. In many cities across Utah and the U.S., actual water demand has been appreciably lower than earlier estimates. Supply and demand forecasting is inherently challenging because it must account for changes in technology, waterwise growth, conservation programs, water resource management and a changing climate. For this reason, water planning must remain flexible and resilient across a range of possible future scenarios.

**Figure 3-7. Potential future M&I water deficits under conservation scenarios.**




*Potential M&I water deficits by basin in 2060 under the two conservation scenarios, assuming the low estimate for agricultural-to-M&I water conversion. Deficits are substantially larger under the No Change scenario than under the Current Trends scenario. Note that the y-axes use different scales.*

## Planning for Utah's water infrastructure

The state developed a new plan to proactively identify and coordinate funds for maintenance and improvements to water infrastructure. In 2024, the Legislature passed HB 280, which called for a study to evaluate the scale of future infrastructure needs, established the Water Infrastructure Fund and initiated the Unified Water Infrastructure Plan.

The 2025 Water Infrastructure Projects Fee Study found that water infrastructure entities in Utah will need approximately $1.2 billion in additional funds on an annual basis to build, maintain and upgrade infrastructure as population grows and federal funding declines. Approximately $850 million can be raised by water providers by increasing rates to an equitable rate (based on local median adjusted gross income); while the state could allocate funds or charge a statewide usage fee to make up the difference.[12]

The Water Infrastructure Fund is a dynamic account that combines infrastructure funding from federal, state and other sources (Table 3-1). The Unified Water Infrastructure Plan is the strategic framework to allocate those funds, establishing a project database and a transparent system to prioritize water infrastructure projects. It includes the state's comprehensive, long-term list of prioritized water infrastructure projects across the state. By centralizing these needs, the state can proactively identify funding deficits, distribute money based on current need and request additional funds from the Legislature if necessary. By tying funding to the plan's standards, the state ensures that tax dollars are invested in projects that follow sound engineering principles and promote long-term water resilience. This process will encourage long-term planning at the state and local levels.

To ensure that small rural projects, such as irrigation infrastructure, are not overshadowed by large metropolitan projects, the prioritization process also factors in the population served, diversity of funding sources and level of economic hardship (Figure 3-8).

The Water Development Coordinating Council manages the fund and consists of representatives of the following agencies:

- Division of Water Resources
- Division of Drinking Water
- Division of Water Quality
- Department of Agriculture and Food
- Housing and Community Development Division
- State Treasurer's Office
- Large water conservancy districts

The council prioritizes water infrastructure projects by coordinating with its members and considering advice from the Utah Watersheds Council.

The divisions of Drinking Water, Water Quality and Water Resources will continue to fund water projects with revolving loans and grants through their authorized boards (see WaterFunding.utah.gov for more details). These established funds have supported various water projects across Utah for many years.

**Table 3-1. Funding buckets for each relevant agency and the Water Development Coordinating Council.**

| Agency or Council | Funding Options |
|---|---|
| Board of Water Resources | • Conservation and Development Fund<br>• Revolving Construction Fund<br>• Water Infrastructure Restricted Account |
| Drinking Water Board | • Drinking Water State Revolving Fund<br>• Drinking Water State Fund<br>• State & Federal Hardship Fund<br>• State & Federal Origination Fees Fund |
| Water Quality Board | • Water Quality State Revolving Fund<br>• Utah Wastewater Loan Fund<br>• State & Federal Hardship Fund |
| Water Development Coordinating Council | • Water Infrastructure Fund |

**Figure 3-8. Unified Water Infrastructure Plan prioritization process.**

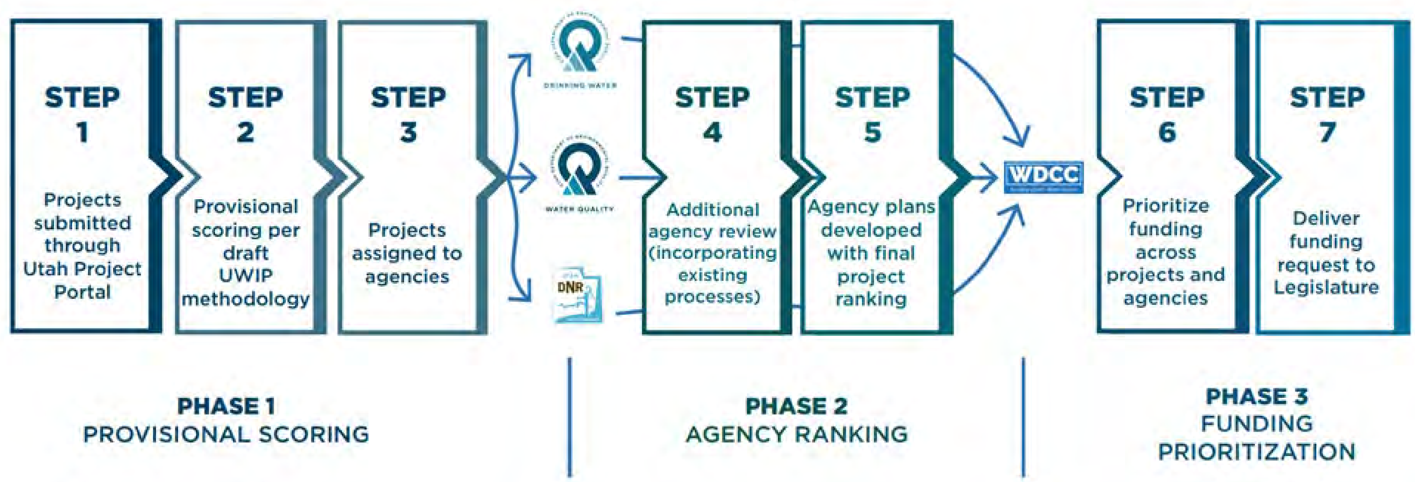


**Figure 3-9. Estimated project costs from the Unified Water Infrastructure Plan.**

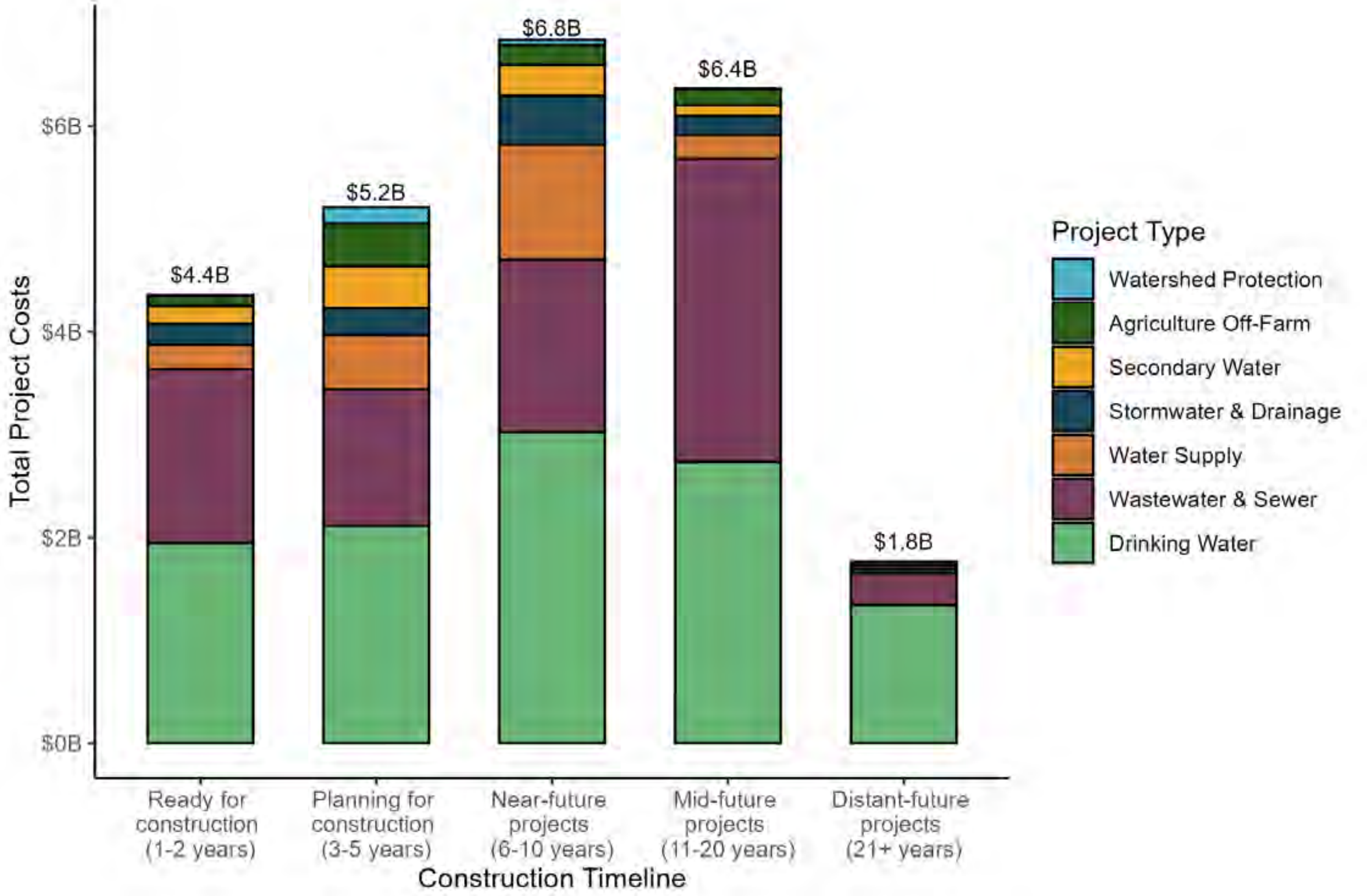
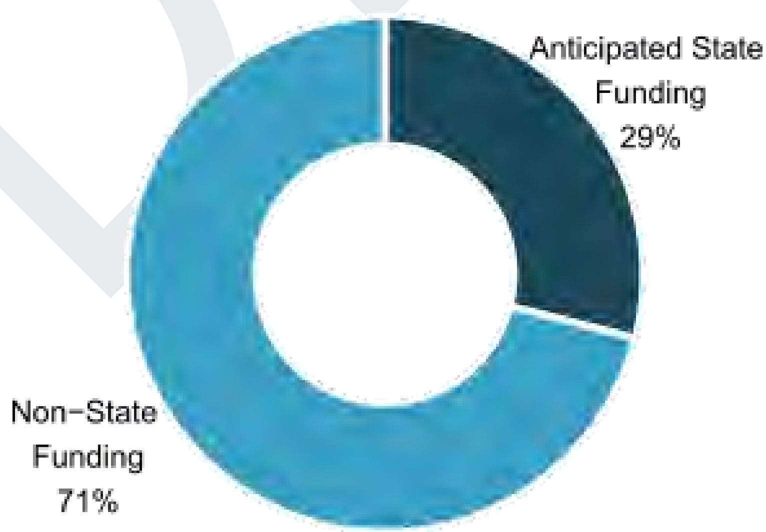



**Figure 3-10. Estimated funding sources from the Unified Water Infrastructure Plan.**



## Improving state planning: a technical update

Given the inherent uncertainty in water forecasting, the next state water plan should transition to an integrated, adaptive approach that ensures resilience across a range of hydrologic futures. The goal is to move beyond single-scenario projections to robust outcomes that remain viable whether the future is wetter, drier or more volatile than historical norms. To achieve this goal, a state water plan technical update will be needed.

The technical update will be led by the Division of Water Resources in collaboration with other state water agencies, federal partners, watershed councils and local entities. The primary objective is to refine the state's understanding of long-term (40 + years) water supply and demand through a unified, consistent dataset. The division will work on the following:

- Develop a range of plausible future scenarios that represent a range in climate, hydrology and growth trajectories.
- Use the scenarios to model impacts to water supply and demand across hydrologic basins for agriculture, M&I and the environment.

The success of the technical update will depend on additional funding and collaboration among state water agencies and interested parties. The results from the update will allow the state to make more informed decisions about the trade-offs necessary to align total water use within evolving supply constraints. This collaborative scenario approach sets the stage for a fundamental change in planning and prioritizing water security in Utah, helping to secure a resilient water future for generations to come.

## Recommendations

3-1. The Division of Water Resources should improve statewide long-term planning by developing future scenarios and more robust water supply and demand models that include the possibility of variable precipitation and prolonged drought and the impacts to surface water and groundwater.

3-2. The Division of Water Resources should facilitate or coordinate basin-level planning with interested parties.

3-3. The Legislature should support the implementation of the Unified Water Infrastructure Plan and allocate additional funds to the Water Infrastructure Fund to build, repair and replace water infrastructure.

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# 4

# Water Administration

In this chapter:

- Key points
- Water entities
  - Federal
  - State
  - Regional and local
- Water law
  - Water rights
  - Water compacts, decrees and operational agreements
  - Sovereign lands
  - Water quality protection
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# Key points

- Utah's water is administered and managed by numerous public and private entities.
- Utah's water law safeguards water quantity and quality for the public good.
- State agencies and federal partners are improving data collection and modeling, enabling better water administration.
- Water rights have become more flexible, reflecting the evolving needs and values of Utahns, including environmental protection.
- Strategic investments are needed to improve system resilience by protecting interstate stream rights and improving system monitoring and distribution.

Water administration encompasses the people, organizations and legal frameworks that provide an orderly system for water management. Even for those who have worked in the water world for many years, this system can be difficult to understand and navigate. This chapter provides an overview of who does what in water management and administration, introduces basic principles of water law and discusses the importance of data and innovation to effectively administer Utah's water.

# Water entities

Overseeing Utah's water relies on collective efforts at multiple levels from federal, state, regional and local entities. Each plays a role in ensuring Utah's water is protected and used wisely and lawfully.

## Federal

At the national level, federal agencies are essential partners, influencing Utah's water through a wide range of responsibilities. These include managing land and reservoirs, providing technical and financial support, conducting research and sharing essential data. Federal agencies also oversee adherence to federal environmental regulations and offer funding opportunities that support water management and infrastructure. During the 20th century, many of Utah's large water projects were funded and constructed through federal programs that otherwise would not have been possible by the state alone. Although many federally initiated projects are operated and maintained by regional entities, federal agencies remain important partners in many aspects of the state's water governance.

**Figure 4-1. Federal agencies in Utah water management listed alphabetically.**

### U.S. Department of Agriculture

**Natural Resources Conservation Service** provides agricultural conservation assistance and operates the SNOTEL network, monitoring mountain snowpack for water supply forecasts.

**U.S. Forest Service** manages national forests, balancing wildfire mitigation, rangeland health and aquatic ecosystem restoration.

### U.S. Department of the Interior

**National Park Service** manages national parks, monuments, recreation areas and historic sites in the state.

**U.S Bureau of Land Management** administers vast public lands for multiple uses, including recreation, livestock grazing, and energy and mineral development.

**U.S. Bureau of Reclamation** operates federal water projects for hydroelectric power, flood control and water storage and delivery.

**U.S. Fish and Wildlife Service** conserves aquatic habitat and protects species under the Endangered Species Act.

**U.S. Geological Survey** conducts scientific monitoring of water resources, including maintaining a network of streamgages and monitoring Great Salt Lake water levels.

### Other Water-Related Agencies

**Environmental Protection Agency** establishes and enforces national water quality standards under the Clean Water Act, overseeing programs to control pollution and ensure the safety of public drinking water systems.

**National Oceanic and Atmospheric Administration** (NOAA) provides weather and river forecasting, severe storm warnings and climate monitoring to support regional planning and emergency management.

**U.S. Army Corps of Engineers** provides engineering for flood risk management and regulates permits for activities impacting wetlands and navigable waters.

## State

Long-established law makes authority over water resources primarily a state matter. While the State Engineer is the state's sole regulator and administrator over Utah's water rights, numerous other state entities play important roles in overseeing Utah's water. Some have water as their primary mission, focusing on planning, measurement, conservation, development, permitting, regulation or quality. These water-focused entities may also provide critical funding for water infrastructure projects, such as dams, drinking water, treatment, reuse and supply resilience. Many state entities also advise policymakers on critical water issues such as protecting native species, preserving wetlands or managing interstate streams. Some entities, though not directly focused on water, significantly influence its management through their work in recreation, wildlife or land management. Collectively, these groups influence how water is managed, protected and used for the benefit of the public.

**Figure 4-2. State entities in Utah water management listed alphabetically.**

## Department of Agriculture and Food

**Conservation Division** supports implementation of voluntary water and land best management practices and conservation easements to protect Utah's agricultural heritage.

## Department of Environmental Quality

**Division of Drinking Water** enforces and oversees drinking water standards for public water systems, ensuring access to safe, reliable drinking water.

**Division of Water Quality** prevents, controls and abates water pollution in surface water and groundwater across the state.

## Department of Natural Resources

**Colorado River Authority of Utah** directs policy and management of Utah's Colorado River share, collaborating with other basin states to protect long-term water security.

**Division of Forestry, Fire, and State Lands** manages forest health, wildland fire response and sovereign lands, including the beds of navigable lakes and rivers.

**Division of Outdoor Recreation** expands recreation access and economic growth while promoting sustainable recreation in Utah's watersheds.

**Division of State Parks** manages state parks, including reservoir recreation and law enforcement.

**Division of Water Resources** plans, conserves, develops and protects Utah's water resources, including producing the state water plan.

**Division of Water Rights** administers the measurement, appropriation, apportionment, and distribution of Utah's water resources.

**Division of Wildlife Resources** conserves, enhances and manages Utah's protected fish and wildlife populations, their habitats and the water resources they rely on.

**Office of the Great Salt Lake Commissioner** coordinates collaborative efforts and develops strategic plans to protect Great Salt Lake, balancing diverse interests to ensure the lake's long-term health.

**Public Lands Policy Coordinating Office** coordinates Utah's public land policies, providing legal and policy analysis to manage state-federal land issues.

**Utah Geological Survey** provides scientific data on Utah's geology, hazards and natural resources including wetlands and groundwater.

## Water Councils

**Utah Watersheds Council** facilitates coordination among water entities in the local watershed councils, advising the governor and Legislature on regional and statewide water issues.

**Water Development Coordinating Council** coordinates financial assistance for water development, conservation, and infrastructure projects in Utah.

## Regional and local

Dozens of regional and hundreds of local entities are on the front lines of water management in Utah. Many have the responsibility of funding and maintaining local infrastructure as well as ensuring the delivery of safe and reliable water to meet various needs. These entities are also responsible for implementing and complying with, as well as informing, federal and state water-related regulations and mandates. Their work plays a vital role in securing a sustainable water future for the state.

**Figure 4-3. Regional and local entities in Utah water management listed alphabetically.**

| Regional Entities | Local Entities | |
|---|---|---|
| **Colorado River Authority of Utah Advisory Councils** provide forums for citizens and experts to advise the authority on policy, management and long-term protection of Utah's Colorado River interests. | **Local governments** provide retail services to their residents. Cities and towns often provide drinking water and sewer services. Counties primarily manage flood control. | **Special service districts** provide retail water services, including drinking water and sewer. Special service districts can also be regional entities that service multiple localities. |
| **Local watershed councils** provide forums to discuss water policy and resource issues at the watershed level, coordinating local needs with the statewide Utah Watersheds Council. | **Private canal and irrigation companies** deliver agricultural irrigation and residential secondary water to users. Users are typically shareholders in the company and have a vote in some company decisions. | **Utah Lake Authority** is responsible for managing Utah Lake and coordinating efforts to improve water quality, restore native ecosystems, and support recreational and economic uses. |
| **Water conservancy districts and metropolitan water districts** act primarily water wholesalers of drinking and secondary water, and some also act as retailers to users. Many water conservancy district also provide irrigation water for agriculture. | **Private water companies** provide retail drinking water and sewer services to specific developments or homeowner associations, typically in areas outside of incorporated municipal service boundaries. | **Water-related nonprofits** organize citizens to engage in water issues, hosting community meetings and advocating for conservation and ecological health to influence local and state water policy. |
| | **Soil and water conservation districts** assist agricultural producers in reducing soil erosion and conserving water through technical support, invasive weed eradication, and water quality projects. | |

# Water law

Water is governed by a comprehensive system of state laws and administrative oversight. A key tenet of water law and policy in Utah is the principle that all water - both surface and groundwater - is the property of the public. The right to use water is granted through a system of appropriative rights, administered by the State Engineer.[1,2] The foundation of this system is the doctrine of prior appropriation, where water is allocated based on an appropriator's relative seniority with respect to other water rights. This principle is widely used throughout the western U.S., where limited water supplies led to the development of a seniority-based system to promote certainty and efficient allocation. This framework supports orderly development, protects existing rights and promotes the beneficial use of water, safeguarding both quantity and quality. Utah's water laws and policies continue to evolve to meet the challenges of growth, shifting cultural values and increasing demand on Utah's water supply.

## Water rights

Administrative supervision of the state's water is the responsibility of the State Engineer, who serves as the Director of the Division of Water Rights. The division maintains detailed records, acts on applications, oversees enforcement and manages distribution of the state's water.

To divert and use water legally, a person or entity must obtain a water right by applying to the division. Water rights are defined by several elements, including the source of water, quantity of water, point of diversion, place of use, period of use and type of use. Rights can be modified through a formal change application process, wherein the State Engineer evaluates the application against the statutory framework to determine whether other rights will be impaired by the proposed change. This legal framework provides both flexibility and protection for existing water users.

Water rights are also adjudicated in a formal legal process within the state court system that confirms or denies claimed rights. The State Engineer plays a key role in the process by evaluating claims and making a recommendation, known as a proposed determination, to the court as to how the claims should be recognized. There are several ongoing general adjudications across the state, helping to validate the legal status of thousands of water rights and bringing further clarity to the record.

### Prior appropriation

Water rights are administered according to the doctrine of prior appropriation, often referred to as "first in time, first in right." Under this doctrine, water is allocated to users based on the underlying beneficial use and priority date of their water right. Those with earlier (senior) rights are entitled to fulfill their needs before later (junior) rights receive any water.

To secure a water right, an individual or entity must apply to the Division of Water Rights and demonstrate a beneficial use for the water. In Utah, beneficial use is the basis, measure and limit of a water right. This is a foundation of water law because the amount of water legally recognized is measured by what is reasonably applied, and no right extends beyond that limit.

Because beneficial use defines and limits a water right, failing to continue that use over time can result in uncertainty about the right's validity. Consequently, water not used over a seven-year period may be subject to forfeiture through the courts, though some protections exist for nonuse under specific statutory exceptions. This system encourages efficiency and prevents speculation or monopolization of the limited resource.

Priority administration is a constant feature of Utah water law, as water is always distributed according to priority. Consequently, when supplies are insufficient to satisfy all rights, the State Engineer enforces this system of distribution, often through a water commissioner who acts as the State Engineer's employee.

## Closed water right basins

Many areas of the state are fully-appropriated or, in some cases, over-appropriated, meaning that the amount of water approved for beneficial use is more than the amount of water available in an average year. As a result, the governor has designated certain hydrologic basins, such as the Great Salt Lake Basin, as closed to new appropriations via proclamation. In other areas, the State Engineer has adopted administrative policies that limit new appropriations.

Closure of basins protects existing rights and helps avoid overdevelopment of limited water supplies. It also reflects the physical limits of Utah's semi-arid climate and variable natural flows in many regions. Water users in closed basins may still pursue changes to existing water rights, such as altering the point of diversion or type of use. However, these changes must go through public notice and protest periods and must not impair other rights. In practice, changes are often the only pathway to establish new consumptive uses in a closed basin.

Some basins are partially closed, where surface water is unavailable for new rights but limited groundwater development may be allowed. Even in these cases, careful review is required to assess potential impairment to existing water rights. The State Engineer increasingly uses hydrologic models to support these assessments.

## Groundwater management plans

Groundwater plays a crucial role in Utah's water supply. Over time, however, many aquifers have become overdrawn — where pumping exceeds the safe yield. Safe yield is the amount of groundwater that can be withdrawn over a period of time without exceeding the long-term recharge of the aquifer. To assess whether a basin exceeds safe yield, the State Engineer collaborates with the Utah Geological Survey or U.S. Geological Survey, who provide technical studies quantifying recharge and withdrawals in the aquifer.

The State Engineer has implemented groundwater management plans in several critical management areas where groundwater withdrawals consistently exceed the safe yield of the respective aquifer. A groundwater management plan outlines objectives for an aquifer to reach safe yield and establishes a framework for reducing withdrawals. These plans may include safe yield limits, tiered reductions and timelines for curtailment of junior rights. Plans are developed in consultation with water users, irrigation companies, municipalities and local governments and are typically enforced through priority regulation. While the State Engineer has statutory authority to regulate groundwater, collaborative planning increases local buy-in and improves compliance. The process often begins with data collection, modeling and meetings with interested parties.

### Federal reserved water rights (including tribal rights)

Federal reserved water rights arise when the U.S. government withdraws land from the public domain for a specific purpose, such as creating a national park, national monument, national forest or tribal reservation. Under the 1908 Winters Doctrine,[3] the federal government is entitled to sufficient water to fulfill the primary purpose of the respective reservation. These rights carry an implied priority date of when the reservation was created.

Reserved rights are often quantified through settlement negotiations coupled with recognition in the general adjudication process. In Utah, several federal reserved rights have been formally adjudicated or are under ongoing negotiations. These include claims for national parks, U.S. Forest Service lands and tribal lands.

To avoid prolonged litigation, Utah has typically pursued negotiated settlements with affected entities. For example, the Navajo Nation Utah Water Rights Settlement — finalized in 2022 and decreed in the general adjudication in 2025 — quantifies Navajo Nation rights to water from the Colorado River Basin in Utah.[4] The settlement includes funding for water infrastructure and affirms the tribe's role in managing its resources.

Other negotiations are ongoing, with the goal of balancing federal claims, state interests and existing water rights. These settlements help integrate federal reserved water rights into the state's water right administration system and reduce uncertainty for all users.

## Water compacts, decrees and operational agreements

Utah has many rivers and streams located entirely in the state and shares several rivers of varying sizes with other states. Both situations make legal agreements essential for managing water for the diverse array of entities and individuals who use the water. These include compacts, court decrees and operational agreements that define how water is allocated, stored and delivered. Together, they form a foundational legal framework for predictable and cooperative water use.

Compacts are formal agreements between states, approved by Congress, that divide water among the various states. Decrees are the product of limited court rulings or general water rights adjudications that settle disputes and define water rights and priorities. In the case of general adjudications, they result in comprehensive judicial decrees that confirm the validity, extent and priority of each water right within a defined hydrologic area. These decrees serve as the legal foundation for future water administration and are critical in resolving conflicts among competing users. Finally, operational agreements generally provide day-to-day management frameworks within the water rights system. These agreements help supplement compacts and decrees to inform implementation under real-time conditions.

These tools work together to reduce conflict, guide planning and ensure that water users receive their respective rights. Their importance continues to grow as population, demand and other cultural pressures increase.

## Interstate streams

Several of Utah's largest rivers flow across state lines, making interstate coordination imperative. Because water use in one state can affect supply in another, these rivers are governed by interstate compacts. These compacts apportion water among the various states, define rights and responsibilities and provide mechanisms for conflict resolution. Effective administration is vital to preserving Utah's legal entitlements and ensuring long-term water security.

The Colorado River and Bear River systems are two important interstate rivers that Utah heavily relies on for water supply. Utah is a signatory to three compacts that affect the management and development of its water resources. These include the Colorado River Compact (1922), the Upper Colorado River Compact (1948) and the Amended Bear River Compact (1980).

### Colorado River

The Colorado River is an essential water source that supports 40 million people, nearly 5.5 million acres of agricultural land and 30 federally recognized tribes.[5] The river is approximately 1,400 miles long with a basin covering about 250,000 square miles. To administer water use, the basin is divided into an upper and lower basin at Lees Ferry, Arizona. The Upper Basin includes the states of Utah, Wyoming, New Mexico and Colorado; while the Lower Basin comprises the states of Arizona, California and Nevada and Mexico. Nearly 90% of Colorado River water originates in the Upper Basin, primarily as snowmelt in the Rocky Mountains. The river then flows through some of the most arid regions of the U.S. and Mexico, terminating in the Gulf of California.

In the early 1900s, it became apparent that an agreement was needed to apportion the Colorado River to allow development throughout the basin states. In 1922 the Colorado River Compact[6] was signed "to provide for the equitable division and apportionment of the use of the waters of the Colorado River System".[7] At its essence, the compact divided the use of the river's waters between the Upper and Lower basin states (Figure 4-4).

Subsequently, the 1948 Upper Colorado River Basin Compact[8] apportioned the Upper Basin share among its member states, and federal statutes and court decrees divided the Lower Basin's share among its member states. In 1944, Mexico signed a treaty with the U.S. regarding its Colorado River allocation. These compacts and agreements along with other laws and regulations are collectively known as "The Law of the River."

**Figure 4-4. Upper and Lower Basins of the Colorado River system.**


*Map of the Colorado River system showing the Upper and Lower basins, major tributaries, dams and selected cities and water infrastructure across the western United States and Mexico.*

The Colorado River accounts for approximately 27% of all water used in Utah. In addition to supporting agricultural and M&I uses in Utah's portion of the Colorado River Basin, some of the state's Colorado River allocation is diverted to the Great Salt Lake Basin through the Central Utah Project and Duchesne Tunnel. Reserved water rights settlements for tribes located within the Upper Basin of Utah are satisfied from Utah's Upper Basin compact allocation of 23% of available supply. Utah has lands in both the

Upper and Lower basins. The state's use of Lower Basin water comes principally from the Virgin River, a tributary of the Colorado River located below Lees Ferry. In years of full supply, Utah consumptively uses approximately 1 million acre-feet of Colorado River Basin water.

The Colorado River is over-allocated and declining flows on the river, combined with historic low reservoir elevations since the turn of the 21st century, have required the basin states to negotiate various agreements to operate the Colorado River system in light of these changing conditions (Table 4-1). The current operating guidelines for Lake Powell and Lake Mead expire in 2026 and new operating guidelines will need to be implemented for the 2027 water year and beyond. The negotiations are happening in parallel with a National Environmental Policy Act process for Colorado River operations (post-2026). Declining flows have also inspired novel and collaborative management plans (Table 4-2).

**Table 4-1. Colorado River Collaborative Actions**

| Concern | Response Action | Key Provisions |
|---|---|---|
| Salinity | Colorado River Basin Salinity Control Act of 1974 (Public Law 93-320) | Improve water quality through salinity control projects in the U.S. such as construction of a desalination plant in Yuma, Arizona and on-farm efforts to improve irrigation efficiency, thereby reducing deep percolation and runoff. |
| Prolonged Drought | Minute 323 and 330 | Minute 323 (2017) is an agreement between the U.S. and Mexico under the 1944 Treaty allowing Mexico to store water in Lake Mead, take delivery reductions during shortages and participate in conservation measures similar to the Lower Basin Drought Contingency Plan. Minute 330 (2024) extends Mexico's collaboration under Minute 323 by adding new conservation commitments that align with U.S. Lower Basin reductions outlined in the 2024 Supplemental Environmental Impact Statement. |

| Concern | Response Action | Key Provisions |
| --- | --- | --- |
| Prolonged Drought | 2019 Drought Contingency Plans | The Upper Basin Drought Contingency Plan was designed to protect Lake Powell from falling below critical elevations to protect infrastructure to ensure continued Compact compliance. The Lower Basin Drought Contingency Plan defined additional shortages and incentivized voluntary conservation of water at Lake Mead. |
| Prolonged Drought | 2024 Supplemental Environmental Impact Statement and record of decision | Provides for additional Lower Basin reductions and allows the U.S. Bureau of Reclamation to reduce releases from Lake Powell to protect critical reservoir elevation. |

**Table 4-2. Colorado River management programs that Utah is involved in.**

| Program | Program Lead | Program Description |
| --- | --- | --- |
| Glen Canyon Dam Adaptive Management Program | Glen Canyon Dam Adaptive Management Work Group (Utah is an advisor) | Formed to ensure that Glen Canyon Dam is operated in an adaptive manner consistent with the 1992 Grand Canyon Protection Act. Identifies hourly, daily and monthly dam operations and experimental and management actions that may be conducted at Glen Canyon Dam to meet downstream resource goals. |
| Colorado River Authority of Utah Management Plan | Colorado River Authority of Utah | A strategy designed to protect and conserve the state's allocated share of the Colorado River system. The plan prioritizes engagement with other basin states to develop a collaborative, consensus-based framework for managing the shrinking river by prioritizing hydrologic measurement, hydrologic modeling and drought mitigation. |

| Program | Program Lead | Program Description |
|---|---|---|
| [Utah Demand Management Pilot Program] | Colorado River Authority of Utah | A two-year pilot program (2025-2026) to evaluate reduced water depletion (consumptive use) through temporary, voluntary, compensated and protected water conservation actions and to test delivery of the enrolled water to a reservoir in the Colorado River system. |
| [System Conservation Pilot Program] | Upper Colorado River Commission | A voluntary, temporary and compensated initiative financed by the U.S. Bureau of Reclamation and other entities for activities in the Upper Basin states from 2015-2018 and 2023-2024. In 2024, Utah water users participated in the program with 31 different projects, resulting in an estimated reduction of consumptive use of 22,400, acre-feet. |

## Bear River

The Bear River is 350 miles long and is the largest river, by volume, in North America that does not flow to the ocean.[9] It originates in Utah's Uinta Mountains, flows north into Wyoming and Idaho, and returns south into Utah, where it ultimately terminates in Great Salt Lake (Figure 4-5).

Spanning three states, the Bear River is vital to northern Utah's agricultural economy, M&I water supply and regional planning efforts. Water from the Bear River supports irrigation for more than 150,000 acres of farmland across the three states.[10] It is also increasingly important as a potential supply of water for M&I uses, particularly as populations grow along the Wasatch Front. The river's natural flow is highly variable, and much of its water is stored and regulated through reservoirs and measurement infrastructure.

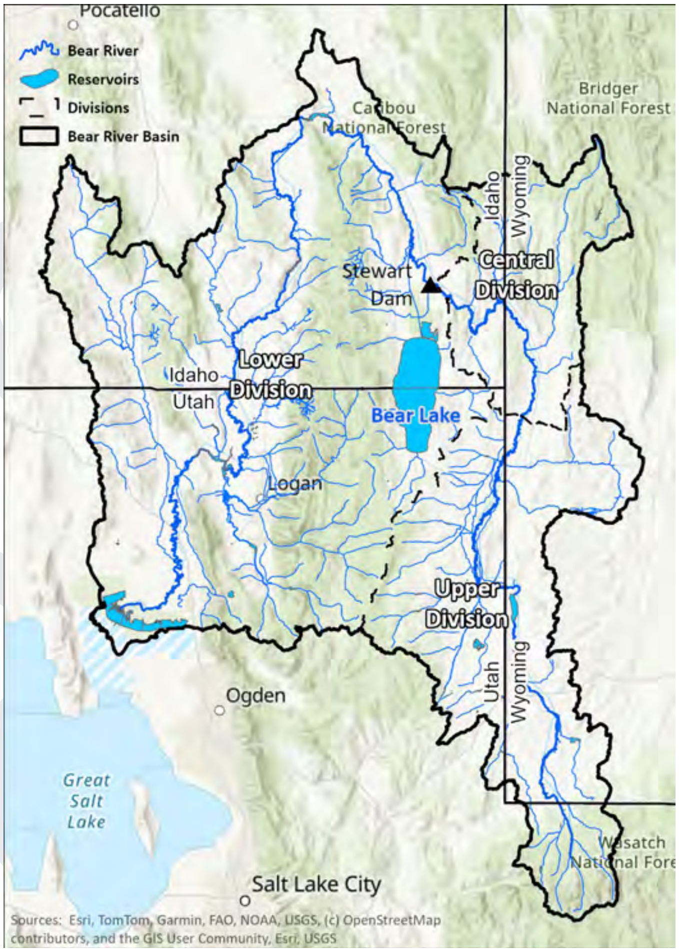
The Bear River is also the single largest source of surface water inflow to Great Salt Lake, providing roughly 50% of the lake's total annual natural inflow in an average year.[11] Its contribution is essential to maintaining the lake's elevation, salinity balance and ecological health, which in turn supports critical migratory bird habitat, mineral industries and brine shrimping operations.

Two early 20th century court decrees—known as the Dietrich and Kimball decrees—helped define water rights to Bear Lake and the Bear River. The 1920 Dietrich Decree granted Utah Power & Light Company (predecessor to PacifiCorp) the right to release stored water from Bear Lake for power generation, irrigation and other beneficial uses. The 1922 Kimball Decree reaffirmed these rights within Utah and extended them to diversions from Bear River tributaries.

The Bear River Compact, ratified in 1958 and amended in 1980, governs water allocation among Utah, Idaho and Wyoming. The compact defines how much post-1976 water each state can develop and use from the river and establishes rules in the scenario of limited water situations. It establishes priorities for irrigation and reservoir storage and provides for future development under specified conditions.

The Bear River Commission, established by the compact, is responsible for administering the compact and ensuring compliance. The commission is composed of nine commissioners, three from each signatory state, and a commissioner, appointed by the president to represent the U.S., who serves as chair. Utah's membership on the commission is represented by the State Engineer, who serves as chair of Utah's delegation, and two other commissioners appointed by the Board of Water Resources with the consent of the governor. The commission meets regularly to coordinate river operations, monitor water use and plan for future demands. It also plays a key role in promoting collaborative solutions among upstream and downstream users. During dry years, the commission oversees reductions across state lines based on priority and compact terms.

**Figure 4-5. Bear River system and compact division boundaries.**




## Sovereign lands

Sovereign lands are those submerged below the ordinary high water mark of navigable lakes and rivers at the time of statehood.[12] Sovereign lands are held in trust for the citizens of Utah and are managed by the Division of Forestry, Fire and State Lands.[13] The state holds title to these lands by virtue of the Equal Footing Doctrine. Upon statehood, Utah gained title within its borders to the beds and banks of water bodies, then navigable,[14] so as to be on equal footing with other states. Presently, in Utah, these sovereign lands include the beds of Great Salt Lake, Utah

Lake, Bear Lake, Bear River, Jordan River and portions of the Green and Colorado rivers.

The Division of Forestry, Fire and State Lands manages sovereign lands in accordance with public interest statutory authority[15] while also preserving public access under the Public Trust Doctrine, under which the state acts as trustee and the public as the beneficiary. Although the division does not control water quality or quantity, it regulates activities on, above or below the beds of navigable waters to serve specified public interests. The division collaborates with agencies, businesses and other interested parties to ensure sovereign lands are used in a manner consistent with public interest statutory authority and are available for public access and enjoyment under the Public Trust Doctrine. For example, in relation to Great Salt Lake, the division balances the public interests in wetlands, wildlife habitat, brine shrimp harvesting, protection of recreational facilities and search and rescue with its public trust responsibilities to protect water quality and habitat and preserve public access to fishing, navigation and commerce on sovereign lands.

## Water quality protection

The quality of Utah's surface water and groundwater affects how water resources can be utilized throughout the state. Good water quality is key for protecting drinking water sources and public health, supporting agricultural activities, maintaining healthy environments for terrestrial and aquatic wildlife and supporting communities and growth statewide. Keeping Utah's water clean requires a coordinated effort because pollution can originate from a variety of sources.

The Utah Department of Environmental Quality implements water quality rules and programs through its divisions of Water Quality and Drinking Water. These divisions establish standards that limit the type and amount of contaminants in water; monitor water quality; issue permits; provide compliance and technical assistance; and investigate incidents that release contaminants into Utah's waters. Reporting, inspections and monitoring efforts help the divisions evaluate and assess water quality throughout the state. In addition, these divisions set requirements for how water and wastewater are treated to ensure removal of harmful substances. Rules and regulations are open for public comment and ultimately approved by the Water Quality Board and Drinking Water Board. This oversight is intended to protect the quality of Utah's waters for beneficial uses including drinking water, fish and aquatic life, wildlife, agricultural, industrial and recreational uses.[16] In this context, "beneficial use" differs from its meaning in water rights administration (see the Prior Appropriation section).

*Bear Lake. Photo credit Steph McGinnis.*

## Water Quality Act

The Water Quality Act is the state's main legal framework for protecting and improving water quality in Utah's lakes, streams, reservoirs and groundwater. It was enacted to safeguard public health and to regulate discharges of pollutants to surface waters and groundwater. The act outlines how rules are established, permits are issued and spills or other unlawful discharges to surface or ground water are addressed.

The Division of Water Quality is responsible for the following activities: developing water quality standards; assessing Utah's surface waters; developing best practices and programs that prevent and control water pollution; issuing discharge permits to wastewater treatment facilities, local governments and industry; issuing construction permits for wastewater treatment facilities; investigating and overseeing cleanup of spills that affect Utah's waters.

## Safe Drinking Water Act

The Safe Drinking Water Act is Utah's legal framework to ensure that public water systems in Utah provide clean and safe drinking water. The act focuses on several layers of protection for drinking water. This means protecting water sources from pollution, effectively treating water to remove harmful substances and keeping the water delivery system safe. It does this by setting rules limiting contaminants in water, requiring water systems to regularly monitor and report their water quality and enforcing these rules if they are violated. The act also helps control how public water systems are built and operated, including protecting water sources and making sure water is treated properly to protect health. The Division of Drinking Water is charged with managing and enforcing the act, which includes permitting, inspecting water systems, providing technical support to water systems and responding to emergencies.

Many small water systems throughout Utah face operational vulnerabilities because they lack the funding and rate-payer base needed to upgrade aging infrastructure and maintain regulatory compliance. This fragmentation leaves communities vulnerable to water quality failures, staffing shortages and supply disruptions. The Division of Drinking Water encourages these systems to consolidate or regionalize water services with neighboring systems in order to pool resources, distribute costs and diversify water sources.

**Consolidation of water systems in Kane County**

Many small private systems throughout Kane County were originally constructed to limited standards and lacked the financial or technical capacity to comply with modern drinking water regulations. In response, Kane County Water Conservancy District has systematically assumed ownership and operation of failing or noncompliant systems to protect public health and preserve reliable service to rural communities.

The district has taken over approximately twenty-five separate culinary water systems throughout Kane County, including systems in Duck Creek Village, Swains Creek, Strawberry Valley, Long Valley, Meadow View Heights, Zion View, Johnson Canyon, East Kanab and other rural areas. Most recently, the district assumed operation of the New Paria Water Company and Clark Bench Water Company in East Kane County. These systems are currently undergoing major infrastructure upgrades with assistance from the Utah Division of Drinking Water.

In addition to culinary water service, the district expanded into limited wastewater service in the Duck Creek Village area to help protect groundwater resources and support coordinated planning in heavily used recreational communities.

# Data and innovation

Data collection and sharing is necessary to effectively administer and manage water resources across the state. Accurate measurements of streamflow, reservoir volume, groundwater level, aquifer storage, diversions and depletions help state water officials, water managers and other water users know when and where water is available and what has been used. Water quality monitoring determines whether water is suitable for intended uses. Flexible procedures can allow easier movement of water when and where it is needed.

## Improved data collection and management

Management is based on measurement. To measure surface water flow, water managers employ streamgages, flumes, weirs, meters and other measurement devices. Advancing technology has made better tools available to monitor and manage water in real time. Additionally, advances in the way data is stored and shared are enhancing data usability. For example, the Division of Water Rights is actively working on upgrading its data systems and is implementing a data governance plan to support more efficient data access and informed decision-making across the state.

### Streamgages

Streamgages measure water flow in rivers and streams. There are nearly 200 streamgages across the state managed by the U.S. Geological Survey, the Division of Water Rights and other water agencies. However, many small streams are ungauged and would benefit from a streamgage to measure flow. To reduce the uncertainty of estimating ungauged streamflow, recent studies are investigating where the state should prioritize installing new streamgages. These include the *Metering and Gaging Gap Analysis* for Utah's portion of the Colorado River Basin[17] and the *Measurement and Infrastructure Gap Analysis in Utah's Great Salt Lake Basin.*[18] Colorado River Authority of Utah and Division of Water Rights are using these studies to decide where to install new streamgages over the next few years.

### Points of Diversion

Points of diversion are locations where water is removed from its source. The structures that divert water vary in design and technological sophistication. Many diversion structures are still manually operated, while others have been modernized with automated control and metering. Modern diversions play a critical role in improving water management by increasing accuracy, efficiency and accountability. For example, Emery Water Conservancy District has transitioned to fully remote-operated diversions, allowing staff to remotely manage water conveyance across hundreds of square miles. The district also publishes metered data online, improving operational transparency and minimizing disputes.

Olmstead Diversion. Photo credit Stephen Van De Graff.

## Innovative management tools

The state continues to pursue innovative management tools to improve water-use efficiency and support informed decision making. While some of the tools described below were developed in response to declining water levels in Great Salt Lake, many have broader applications statewide. These tools help promote more flexible water management, improve system performance and address human and environmental water needs.

### Water markets

Water marketing has a long history in Utah, allowing water right holders to voluntarily and flexibly sell or lease their water for other beneficial uses. These markets operate under free-market principles to distribute water to where it is needed, while respecting individual water rights and allowing water right holders to benefit financially. Two emerging strategies, water banking and split-season leasing, are being used across the state to expand opportunities for flexible and temporary water transfers.

### Water banking

Water banking is a formal water leasing arrangement that facilitates voluntary, temporary water transfers. The water right holder, or lessor, may choose when to place their water in the bank. Lessees, people who need water, can access water through the bank to meet their specific needs.

Applications for water banks are overseen by the Division of Water Resources and the Board of Water Resources. Once approved, water banks work with participating users to prepare required change applications for review and approval by the Division of Water Rights, ensuring that transfers occur in a legal, transparent and orderly manner.

### Split-season leasing

Split-season leasing allows farmers to forego irrigation during part of the season and lease that portion of their water right for other beneficial uses. This approach was developed for crops such as alfalfa, which can be harvested early in the growing season and then tolerate reduced irrigation later in the summer without harming the crop's long-term viability. Water made available through split-season leasing may support a range of beneficial uses and can be particularly valuable for maintaining late-season instream flows to improve water quality and support wildlife. Split-season leasing can be managed within a water bank or through other agreements.

## Water rights change applications for saved water

Introduced by statute in recent years, farmers can now participate in agricultural optimization by completing a water rights change application for saved water. Saved water is defined by statute as the net decrease in depletion or diversion for an established water right resulting from an agricultural optimization project.[19] A change application for saved water is optional in agricultural optimization projects, but if desired, must be approved by the State Engineer before the project is implemented. If approved, the saved water remains in the control of the owner of the water right and can be applied towards other uses, including expanding acreage of less consumptive crops, leasing to other users or environmental beneficial uses.

## Water management and delivery

Because river systems and the water rights along them are complex, careful management is essential to ensure water that is set aside for a specific purpose reaches its intended destination. Recent legislative changes allowing water to be leased or sold for environmental beneficial uses have increased the need for clear, reliable evidence showing that water is reaching its target location. Proven delivery for specific needs will increase confidence and encourage more water right holders to lease water for priority uses, including Great Salt Lake.

# Recommendations

4-1. The Legislature should continue to support Utah's Colorado River Commissioner in reaching creative solutions and consensus with Basin State agreements and representing Utah's rights in the event of Colorado River litigation.

4-2. The Legislature should support continued development for water distribution and accounting processes (e.g., streamgages, metered diversions, evapotranspiration models) to demonstrate water delivery for approved uses and interstate reporting, especially within the Colorado River and Great Salt Lake systems.

4-3. The Legislature should continue prioritizing investment in conservation and storage in Utah's portion of the Colorado River and Great Salt Lake systems, including in the agricultural sector where voluntary, temporary and compensated reductions in water use have been shown effective to mitigate potential mandatory reductions in use.

4-4. State water funding boards should require state-funded water projects to install permanent metering systems and report the data to the Division of Water Rights.

4-5. State, regional and local entities should expand communication capacity to improve coordination, information sharing and public understanding of water management.

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# 5

# Healthy Watersheds and Ecosystems

In this chapter:

- Key points
- Natural systems and wildlife
  - Forests and rangeland
  - Wetlands, riparian areas and aquatic systems
  - Wildlife
- Threats to watershed and ecosystem health
  - More extreme drought and flooding
  - Groundwater mining
  - Impaired water quality
  - Wildfire
  - Invasive species
- Action plans and tools to promote watershed and ecosystem health
  - Watershed Restoration Initaitve
  - Invasive species management
  - Utah Wetland Program
  - Water quality monitoring and studies
  - Large natural lake management
  - Wildlife plans and programs
- Recommendations
- References

Photo credit Paula Martin

## Key points

- Healthy natural systems (such as forests, rangelands and wetlands) are critical for maintaining the quantity and quality of Utah's water supply.
- Aquatic and terrestrial wildlife depend on healthy watersheds and ecosystems to survive. Avoiding federal listing of water-dependent species and efforts to delist and downlist these species under the Endangered Species Act is key to maintaining local control in water and wildlife management.
- Aquatic invasive species can wreak havoc on watersheds and require vigilant effort and resources to control.
- Climate variability is affecting watersheds by increasing hydrologic extremes and catastrophic wildfire, with implications for wildlife, water quality and supply reliability.
- Comprehensive and coordinated efforts are needed to protect and preserve healthy watersheds and ecosystems, particularly for Utah's large natural lakes: Bear Lake, Great Salt Lake and Utah Lake.

A watershed is an area where rainfall and snowmelt drain to a shared outlet such as a river, lake or wetland. Watersheds are shaped by the natural contours of hills, ridges and mountains, guiding water downhill and connecting headwaters to downstream environments. Each watershed is a mosaic of ecosystems, including forests, rangeland, wetlands, riparian corridors, rivers and lakes.

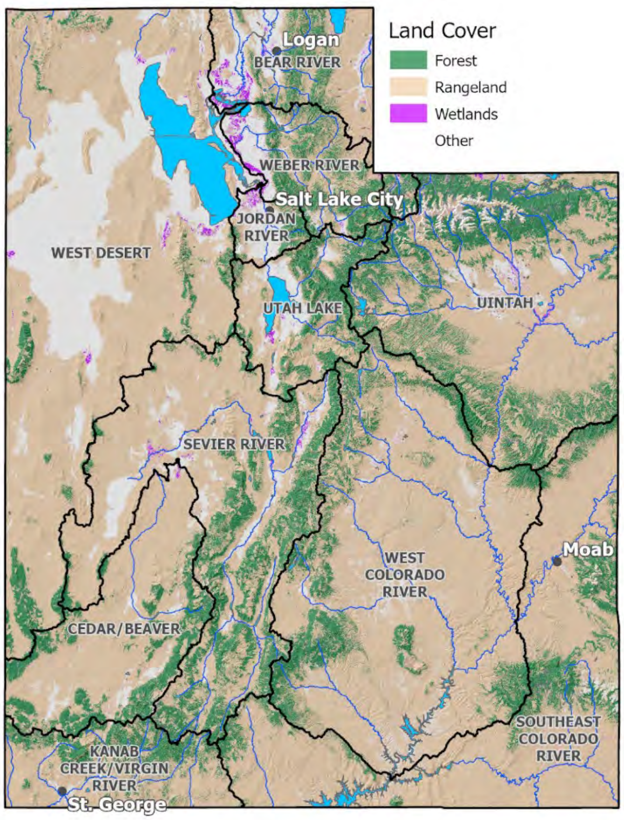
The condition of a watershed affects both the quality and quantity of surface and groundwater. Healthy watersheds support vegetation and soils that resist erosion, filter pollutants and allow rain and snowmelt to soak into the ground to recharge aquifers and sustain rivers, streams and wetlands. Healthy watersheds are also resilient – meaning they are able to better adapt to changing conditions and disturbances such as floods, droughts and wildfires while still maintaining their ecosystem services. Thus, the state must protect and enhance the health of watersheds and ecosystems to support a resilient water supply for communities, agriculture and recreation. The state can also reduce regulatory and economic uncertainty by addressing ecosystem stressors before they escalate into more complex and costly management challenges, such as an endangered species listing.

This chapter outlines essential services that healthy watersheds and ecosystems provide, threats they face and some of the programs, plans and tools available at state and local levels to help maintain and improve watershed and ecosystem health.

# Natural systems and wildlife

A watershed and its ecosystems support diverse plant and animal communities. This section describes Utah’s primary natural systems and their ecosystem services, with a specific focus on those most relevant to water resources.

**Figure 5-1. Forest, rangeland and wetland distribution across Utah.**




## Forests and rangeland

Forests and rangeland cover most of the state (Figure 5-1). Utah's forests range from high-elevation conifer stands to mixed woodlands, covering an estimated 10.6 million acres.[1] Rangelands span desert canyons, shrublands and mountain meadows, covering an estimated 35.4 million acres.[1] Healthy forests and rangelands provide essential ecosystem services such as recreation opportunities, food and fiber, water and air filtration, erosion control, carbon sequestration, wildlife habitat and biodiversity.

Forests in particular play a crucial role in regulating the water cycle. Most of Utah’s water supply originates as snow in or near Utah’s forests, and forests act as natural water regulators. Forest floors allow water to seep into the ground and sustain steady streamflow while reducing flood risks. Although forests lose water to the atmosphere through evapotranspiration, they also shade the ground and trap snow, which preserves the snowpack and reduces evaporation. The impact of forest management is nuanced: while forest thinning can boost streamflow in some areas of the U.S., it may actually decrease it in semi-arid environments.[2,3]

## Wetlands, riparian areas and aquatic systems

Wetlands, riparian areas and aquatic systems are all defined by the presence or proximity of water and share many ecological functions. Wetlands have three defining features that distinguish them from riparian and aquatic systems: the presence of water, oxygen-poor soils and vegetation adapted to saturated conditions.[4] Water can be deep, shallow or seasonal, depending on the wetland type and location. Riparian areas occur as long bands of dense vegetation along rivers and streams. Aquatic systems include lakes, ponds, rivers, streams and springs. Combined, they form the natural conveyance network of a watershed, transporting water, sediment and nutrients from mountains to valley bottoms.

Utah has an estimated 1.5 million acres of wetlands and 67,000 acres of riparian habitat, respectively (see Table C-1).[5] Though only a small proportion of the landscape, accounting for less than 3% of the state's area, the ecosystem functions that wetlands and riparian areas provide are vital to protecting watershed health. Wetlands and riparian areas buffer communities from floods by soaking up floodwaters like a sponge and delaying the onset of drought by slowly releasing stored water.[6] They also filter pollutants and trap sediment. Wetlands and riparian areas provide essential habitat for wetland-dependent species including birds, amphibians, fish, mammals, plants and insects.[7] In the West, an estimated 75% of all terrestrial species rely on riparian habitats to sustain life.[4]

**Figure 5-2. Select wetland and riparian habitats in Utah.**

*Top left: impounded wetland near north Bear River Bay. Middle left: Riparian wetland near Moab, Mill Creek. Bottom left: Playa at Harold Crane Waterfowl Management Area. Right: Hemimarsh near Farmington Bay. Photo Credit: Becka Downard.*

Aquatic systems are the lifeblood for our communities. Utah has approximately 82,000 miles of rivers and streams and more than 1.5 million acres of natural lakes.[8] In Utah's snow-dominated hydrology, rivers and streams swell during spring snowmelt, delivering the majority of their annual water during this period. In late summer and fall, streamflow is maintained by groundwater or managed dam releases, supporting human and ecosystem needs. Melting ice from rock glaciers – ice buried under layers of rock in the mountains – also contributes to streamflow in some Utah mountain ranges.[9] Aquatic systems support a dynamic web of life from plants and algae to invertebrates, amphibians, reptiles, birds, fish and mammals that all depend on specific habitat conditions. Aquatic systems also provide significant recreation value and supply water for Utah's communities and agriculture, discussed in more depth in Chapter 6 and Chapter 7.

Because aquatic systems receive the water, sediment and nutrients transported across a watershed, their health reflects the cumulative impact of climate shifts and land management. To support the ecological functions of these wetlands, riparian areas and aquatic systems, researchers are focusing on functional flows[10] – the specific seasonal hydrologic patterns that sustain native species. Mimicking the natural hydrograph helps maintain critical baseflows and reconnect rivers to their floodplains and nearby habitats. It also helps keep water temperatures suitable for aquatic life and flushes sediment in ways that maintain healthy spawning habitat for fish. A new functional flow framework is currently being developed for the Great Salt Lake Basin by Utah State University and the divisions of Water Quality, Wildlife Resources and Water Resources. This framework will help decision-makers evaluate tradeoffs among ecological and societal needs to support the requisite flows, temperature and nutrient levels for fish and aquatic life.

## Wildlife

Utah is home to diverse wildlife, from black bears to brine shrimp, that depend on healthy watersheds for food, habitat and reliable water.

On land, the availability of water determines where species can live and migrate, even in areas with abundant food and shelter. Riparian corridors serve as important movement and foraging routes, particularly during periods of drought when water is scarce in surrounding landscapes.

Wetlands and aquatic systems support sport fisheries, native fish populations and the broader food webs that rely on them. For example, the humpback chub, a native species of the Colorado River, relies on the river and its tributaries for migration and habitat. Along Great Salt Lake, wetlands and open-water habitats provide essential food resources such as brine shrimp, brine flies and wetland vegetation for millions of migratory birds each year.[11] The greatest concentration of wetland habitat is along the lake's eastern side and is actively managed to maintain adequate water at the right times of the year to ensure optimal habitat conditions for a wide diversity of birds.

## Threats to watershed and ecosystem health

Watersheds across Utah face a range of threats that degrade the quality, quantity and reliability of surface water and groundwater and harm wildlife habitat, human health and the economy. Threats are interconnected: a single watershed can experience multiple threats at once, such as drought, wildfire and impaired water quality (Figure 5-3). Current threats stem primarily from land and water management decisions, as well as a changing climate.

**Figure 5-3. Common threats to Utah watersheds and ecosystems.**

## More extreme drought and flooding

The southwestern U.S. is in the midst of a historic megadrought, one of the most severe dry periods in more than a millennium.[12] Along with more frequent and extreme drought, increasing temperatures, declining snowpack, earlier melt and shifts from snow to rain have begun to alter the timing, intensity and reliability of seasonal runoff. These changing climatic conditions are negatively affecting ecosystems, communities and agricultural producers, through reduced late-season water supplies, degraded water quality, loss of aquatic habitat; intensified heat stress on aquatic life and vegetation and increased soil compaction that reduces its ability to absorb moisture. Extreme precipitation events that follow prolonged drought, an increasingly common occurrence in a warming climate, cause increased erosion, rapid runoff and sudden flooding that can damage infrastructure, degrade water quality and disrupt ecosystems. If these patterns continue as predicted, Utah's watersheds will face increasingly frequent transitions between water scarcity and destructive flooding, which could leave insufficient recovery time between historic events. Furthermore, these changes will compromise Utah's most critical natural water reservoir, its mountain snowpack.

## Groundwater mining

Groundwater is a key part of natural systems, sustaining streams, rivers, wetlands and riparian areas. It is also an essential source of water for communities, industry and agriculture. To manage the needs of both natural systems and human use, groundwater pumping within a basin subject to a groundwater management plan is limited by the basin's safe yield, which is determined by the State Engineer (see Chapter 4).[13]

Pumping beyond safe yield, known as groundwater mining, causes groundwater levels to continually decline. As aquifers drop, springs, streams, lakes and wetlands may lose the water they rely on,[14] leading to degraded ecosystems and potential conflicts with existing water rights. Pumping beyond safe yield can also compact pore spaces in the aquifer, resulting in land subsidence, surface cracking[15] and a permanent reduction in aquifer storage capacity.

## Impaired water quality

Utah's waterbodies must meet specific quality standards, which determine if the water is suitable for its designated beneficial use,[16] such as drinking water, recreation, aquatic habitat and agriculture. In this context, "beneficial use" differs from its meaning in water rights administration (see Chapter 4, Prior Appropriation). When water fails to meet the water quality standards required for these uses, it is considered to be impaired.

### Major pollutant types

Pollutants range from naturally occurring elements to complex synthetic compounds.

These generally fall into three categories: (1) nutrients and minerals, (2) biological contaminants and (3) synthetic and toxic chemicals.

Nutrients include elements like nitrogen and phosphorus that are essential for life but at high concentrations can cause harmful algal blooms and excessive bacterial growth that deplete dissolved oxygen levels. Similarly, minerals, salts and sediment can be present naturally but become pollutants when concentrations become elevated.

Biological contaminants include microorganisms such as bacteria, viruses and protozoa that can cause illness in humans, pets and livestock. Common examples include *E. coli* and other pathogens introduced through untreated wastewater, agricultural runoff, pet waste and failing septic systems. Monitoring and treatment help reduce the risk of waterborne disease and protect public health.

Toxic and synthetic chemicals include heavy metals and "forever chemicals" like per- and polyfluoroalkyl substances (PFAS) and microplastics. These chemicals are often resistant to environmental degradation and can bioaccumulate in the food chain. Regulatory agencies establish water quality thresholds to manage these risks, using consistent monitoring to identify both acute spikes and chronic, long-term impairment.

## Pollutant pathways: point vs. nonpoint sources

Understanding how pollutants enter a watershed is critical for regulation and remediation. These pathways are divided into two categories: point sources and nonpoint sources. Point sources originate from a single, identifiable source, such as an industrial outfall or a municipal wastewater treatment plant. In Utah, these are managed through Utah Pollutant Discharge Elimination System permits. These permits set specific limits on the volume and concentration of pollutants allowed to enter the water based on the health of the receiving waterbody.

Nonpoint source pollution comes from multiple sources scattered across the landscape. Common sources include fertilizer and pesticide runoff from lawns or farms; bacteria and nutrients from livestock, pet waste and septic systems; oil and salt from city streets; and sediment from areas prone to erosion. Because these sources are widespread, they cannot be regulated through traditional permits. Instead, the Division of Water Quality's Nonpoint Source Management Program relies on voluntary partnerships, public education and grants to implement best management practices across the landscape.

## Physical conditions: water temperature, oxygen and flow

Physical conditions – specifically water temperature, dissolved oxygen and streamflow – are important components of an aquatic ecosystem. These factors are interconnected and often occur simultaneously, affecting habitat suitability for aquatic wildlife. Warmer water holds less oxygen, increasing metabolic stress on fish and other aquatic life. Warmer water can also speed the growth of algae and microbes, which further deplete oxygen as they decay, and can lead to harmful algal blooms. Low-flow conditions, typical during late summer or drought, intensify these issues by slowing water movement, shrinking habitat and concentrating pollutants.

Shifts in the physical conditions for aquatic habitat ripple through entire food webs, influencing the ability of wildlife to feed, breed and migrate successfully. Many native fish species need specific flows or inundated habitats for movement and spawning in streams and rivers, making altered hydrology a major constraint on reproduction and survival. Additionally, shifts in temperature and streamflow challenge both managed fisheries and native species that evolved under more natural hydrologic conditions. Cold-water fisheries such as trout are increasingly in jeopardy as waters warm, prompting managers to consider stocking more temperature-resilient species in some locations to ensure that the state can continue to provide high-quality angling opportunities for years to come.

## Wildfire

While fire is a natural disturbance in Utah's ecosystems, the increasing frequency and severity of catastrophic wildfires pose a threat to watershed function. Driven by prolonged drought, shifting climatic conditions and fuel accumulation from disease and mismanagement, high-intensity fires fundamentally alter the ability of a watershed to provide clean, reliable water.

A severe wildfire transforms a forest from a natural filter into a source of impairment. Intense heat can create a water-repellant layer on the ground surface, reducing water infiltration into the soil and aquifers. When it rains, water rushes over the soil surface, increasing the risk of debris flows and flash floods. Because most of the vegetation burns away, there is little to stabilize the soil, often resulting in high concentrations of sediment, ash, heavy metals and nutrients flowing into waterbodies. This sudden influx can overwhelm infrastructure and impair water quality.

Wildfires can impact downstream aquatic habitat far beyond their burn perimeter, and the effects can persist for years. The loss of forest canopy across the landscape can accelerate spring snowmelt and reduce shading in riparian areas, resulting in increased water temperatures. Flash floods and debris flows can also scour stream channels, destroying fish spawning habitat and killing macroinvertebrates important to the aquatic food web.

Protecting watershed health requires proactive forest management to prevent catastrophic wildfire. Key strategies include invasive species management, selective forest thinning and the use of prescribed fire to reduce fuels loads and promote a more fire-resilient landscape.

### Invasive species

Invasive species are non-native plants and animals that pose both an ecological and economic threat to the state. Invasive species can outcompete native species and alter the ecosystem services that a healthy watershed provides. Economic losses from invasive species are estimated to cost more than $20 billion per year in the U.S.[17] Preventing the spread of invasive species is the best defense because once established, they are often difficult or impossible to eradicate.

Species like quagga mussels can clog water pipes, hydropower facilities and irrigation systems, disrupting reliable water deliveries and increasing maintenance costs. Invasive fish species or illegally introduced predators, can devastate local ecosystems. Common carp, invasive to Utah, stir up bottom sediments, increasing turbidity and releasing sequestered nutrients that can impair water quality. Predatory invasive fish, such as burbot and northern pike, outcompete and prey on native fish and managed game fish, resulting in the decline of ecologically and economically important fisheries.

Invasive plant species are also a biological drain on a watershed by shifting the water balance and altering habitat for wildlife. Phragmites are pervasive wetland plants that exacerbate water loss through high rates of evapotranspiration.[18] In the Great Salt Lake and Utah Lake ecosystems, these plants reduce the volume of water reaching the lakes and encroach on open water and wetland habitat. Tamarisk, also called salt cedar, grows along riparian corridors and can deplete local water tables and alter river dynamics, changing natural biological and physical processes in rivers and streams and concentrating salts in the soil.[19] These invasive plants transform resilient, biodiverse ecosystems into monocultures, displacing critical shelter and food sources for millions of migratory birds and other wildlife.

## Action plans and tools to promote watershed and ecosystem health

State agencies manage programs to protect and improve Utah's watersheds and ecosystems. State agencies work with federal agencies to ensure compliance with national law and policy. Local and regional partners are essential to the success of these programs by helping to develop water and land management strategies. This section outlines the major water-related programs, plans and tools overseen by state agencies.

### Watershed Restoration Initiative

Utah's Watershed Restoration Initiative is a partnership-based program that began in 2006 to improve high-priority watersheds throughout the state. The initiative focuses on improving watershed health and biological diversity, water quality and yield and opportunities for sustainable uses of natural resources. Key success metrics for the initiative are shown in Figure 5-4.

The Watershed Restoration Initiative is a bottom-up initiative where project planning, review and ranking occur at a local level. Five regional teams elect their own leaders; establish focus areas; review, score and rank project proposals using a project prioritization score sheet; and assist their members in implementing projects.

**Figure 5-4. Select Watershed Restoration Initiative accomplishments (2006-2025 fiscal year).**


## Invasive species management

Managing water-related invasive species is a priority that requires coordination across multiple entities. To prevent the spread of aquatic invaders like quagga mussels, the Division of Law Enforcement leads the STD of the Sea program,[20] which focuses on public education and watercraft inspection and decontamination. The Division of Wildlife Resources continues to address the spread of quagga mussels and other aquatic invasive species through their early detection and rapid response program.

The divisions of Forestry, Fire and State Lands and Wildlife Resources work together on large-scale invasive phragmites and tamarisk removal projects. Many cities and counties also implement smaller-scale removal projects within their jurisdiction. Phragmites removal has accelerated in the last 20 years, eliminating more than three-quarters of invasive phragmites coverage on Utah Lake and tens of thousands of acres around Great Salt Lake.[21] Additionally, Utah state agencies and universities are studying how to best map and manage invasive plant populations using remote sensing. This research will allow state agencies to demonstrate treatment effectiveness and strategically deploy resources at the right time and place.

## Utah Wetland Program Plan

Utah's Wetland Program Plan, led by the Utah Geological Survey, increases the availability of scientific data on Utah's wetlands. The plan prioritizes research goals and collaborative efforts between the survey and partners at all levels of government, as well as academic and non-governmental partners.

Since 2011, the program has monitored more than 500 wetlands and tracked baseline conditions; updated wetland maps in priority areas, including around Great Salt Lake, Utah Valley, Cache Valley and the Wasatch Back; produced wetland identification guides and apps; and established the Utah Wetland Working Group. Established in 2013, the working group meets twice a year and is a structured space for Utah's wetland professionals to share information, identify needs and coordinate efforts.

The 2026-2031 Wetland Program Plan will advance wetland science and information by:

- Monitoring and studying wetlands in the Central Basin and Range, Wasatch Mountain and Colorado Plateau ecoregions.
- Continuing mapping wetlands to build planning and management tools for interested parties.
- Establishing Utah-specific restoration goals and best management practices in collaboration with practitioners to improve wetland restoration outcomes.
- Developing outreach materials and resources to help interested parties protect Utah's wetlands.

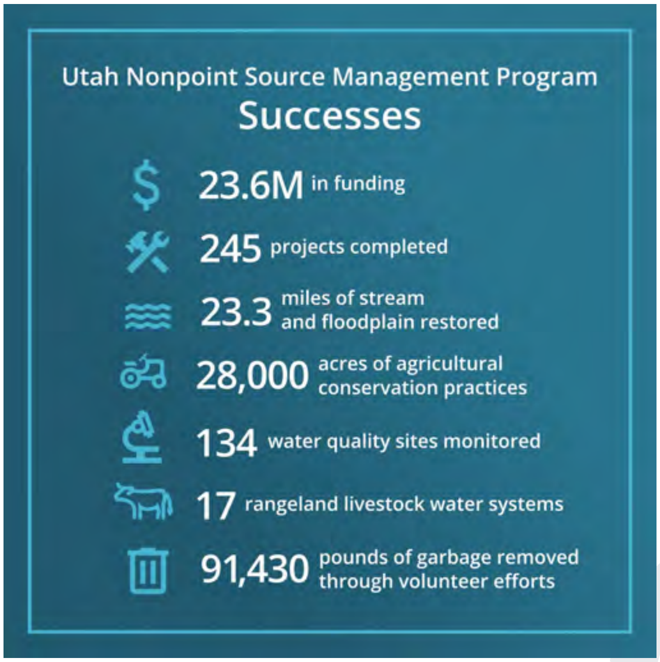
## Water quality monitoring and studies

To manage Utah's water quality, the Division of Water Quality regularly monitors the health of surface waters in the state. These findings are published every two years in the Integrated Report on Water Quality which identifies whether or not water bodies are meeting the water quality standards needed to support their designated beneficial use(s). For the 2026 report, 78% of waterbodies were assessed. Of those assessed waterbodies, 56% were considered impaired.

When a water body does not meet required water quality standards, the division may require further investigation. A Total Maximum Daily Load study may be conducted to determine the sources and amounts of pollution that are entering a water body and establish the load reductions needed to return the water body to required water quality standards.

Additionally, the division's Nonpoint Source Management program takes a voluntary and incentive-based approach to improve water quality with willing partners. The program provides state and federal funding to projects that reduce nonpoint source pollution in priority watersheds throughout the state. These projects use best management practices and follow the watershed-based planning strategy detailed in the division's Nonpoint Source Management Plan. Key success metrics for the Nonpoint Source Management program are shown in Figure 5-5.

**Figure 5-5. Nonpoint Source Management Program successes (2021-2025).**




## Large natural lake management

### Bear Lake

Bear Lake straddles the Utah-Idaho border, and its ecosystem supports unique wildlife, world-class recreation, water for agriculture, power generation and the local economy. The lake and associated wetlands provide food and refuge for migratory birds and act as nurseries for fish and other aquatic species. Four fish species found in Bear Lake are found nowhere else in the world: the Bonneville Cisco, Bonneville Whitefish, Bear Lake Whitefish and the Bear Lake Sculpin. Bear River Cutthroat Trout are also an important native species that is carefully monitored and managed by Utah Division of Wildlife Resources and Idaho Fish and Game. Major threats to the lake include invasive species, such as Eurasian watermilfoil, and nonpoint source nutrient pollution. Entities, such as the Bear Lake Regional Commission, help guide growing development and competing interests for land and water for the sustainability of the lake and its residents (Figure 5-5).

**Figure 5-6. Key plans supporting Bear Lake watershed management.**


### Great Salt Lake

Great Salt Lake is one of the largest saline terminal lakes in the western hemisphere. The lake and its surrounding 580 square miles of wetlands are a vital stopover on the Pacific Flyway, a major north-south migratory route that extends from the Arctic to the tip of South America. Up to twelve million birds from over 330 species, including the American avocet, black-necked stilt and eared grebe, depend on the lake for nesting, breeding and feeding.

*Heron on Great Salt Lake. Photo credit Chris Carlson.*

In recent decades, water levels in Great Salt Lake have declined, threatening the ecosystems, industries and nearby communities that depend on it. Drought, a changing climate and human water use have all contributed to the lake's declining elevations.[22]

The Office of the Great Salt Lake Commissioner, created in 2023 by the Utah Legislature, has been tasked with developing and maintaining the Great Salt Lake Strategic Plan. The plan coordinates work among the many interested parties who work on lake issues and aims to:

- Use the best available science and data, adjusting as new information is discovered
- Get more water to the lake, ensuring a sustainable water supply while balancing competing needs
- Conserve water across different sectors (M&I and agricultural), and ensure saved water is delivered to the lake
- Protect air and water quality

Other state agencies also have plans related to the lake, and the relationship of some of those plans to the Strategic Plan are shown in Figure 5-6 (see also Appendix C, Table C-2).

Great Salt Lake is a top priority of Governor Spencer Cox, who is committed to restoring the lake to healthier level by the 2034 Olympics. Federal partners, universities, nonprofits and advocacy groups have all joined together to help the lake. It will take the entire community working together for the lake to thrive for generations to come.

**Figure 5-7. Key plans supporting Great Salt Lake watershed management.**

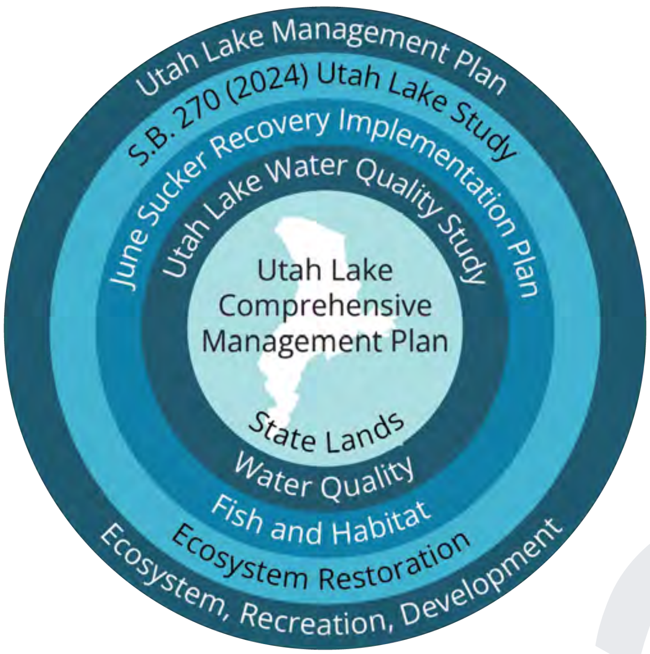

## Utah Lake

Utah Lake is the third largest freshwater lake by surface area in the western United States. The lake is shallow and turbid, supporting wetland complexes, migratory birds and a warmwater fishery. The lake is located in a rapidly urbanizing area with competing interests for water and land use. Key challenges include the need to balance water use, mitigate invasive species such as carp and phragmites and address nutrient loading that fuels harmful algal blooms. Recent restoration efforts have aided the recovery of a native fish species, the June sucker, which was downlisted from endangered to threatened in 2021. Ongoing efforts emphasize improving habitat, reducing nutrients, enhancing water clarity and increasing the resilience of the June sucker population through strategic water management and habitat restoration (Figure 5-8).

*Male June sucker. Photo credit Division of Wildlife Resources.*

The Utah Lake Authority, created in 2022 by the Utah Legislature, is an independent nonprofit that works with government entities, local property owners and community members to enhance the lake's natural beauty, environmental health and recreational opportunities. The authority develops and maintains the Utah Lake Management Plan and participates in related Utah Lake plans across state agencies (Figure 5-8).

**Figure 5-8. Key plans supporting Utah Lake watershed management.**




## Wildlife plans and programs

The Utah Wildlife Action Plan, developed by the Division of Wildlife Resources with state, federal, tribal and nonprofit partners, provides a comprehensive statewide framework for conserving species and habitats most at risk by identifying species of greatest conservation need, the threats they face and the strategies required to conserve or restore their populations. The 2025 plan identified 53 aquatic species of concern – 22 fishes, four amphibians and 27 mollusks – that are threatened by natural system modifications (water diversions and dams that fragment habitats) and climate-driven stressors such as increasing stream temperatures and prolonged droughts.[7] By aligning partners around shared goals, the plan advances proactive conservation and reduces the likelihood that species will require federal listing under the Endangered Species Act. Though species listings help rehabilitate wildlife and ecosystems, they can jeopardize local control of water resource management and harm the local economy. Therefore, the state seeks a proactive and balanced approach to manage land and water to maintain the watersheds and ecosystems that support these organisms and help listed species recover.

Federally listed endangered fish require coordinated water and habitat management to improve conditions and support long-term population stability. These species depend on specific flow conditions, water temperatures and habitat features that have been altered over time by dams, diversions, channel modifications, changing hydrology and competition and predation by nonnative fish species. To address these challenges, cooperative recovery programs coordinate water management, habitat restoration, scientific monitoring, nonnative fish population control and partner collaboration (Table 5-1). These programs work across jurisdictions and watersheds to improve ecological conditions while balancing human water use needs. Together, these programs demonstrate how water management, habitat restoration and species recovery are closely linked across Utah's watersheds.

**Table 5-1. Cooperative Recovery Programs for Federally Listed Native Fish.**

| Recovery Program Name | Species Supported | Management Focus Areas |
|---|---|---|
| Upper Colorado and San Juan River Basin Endangered Fish Recovery Programs | Colorado pikeminnow, razorback sucker, bonytail chub, humpback chub | Support spawning and seasonal habitat needs with timed reservoir releases to mimic natural flow regimes |
| June Sucker Recovery Implementation Program | June sucker (Utah Lake), reclassified from endangered to threatened in 2021 | Secure permanent water rights and temporary water leases to provide additional flow during spring spawning; create nursery habitat along Provo River and Hobble Creek |
| Virgin River Resource Management and Recovery Program | Woundfin, Virgin River chub | Increase streamflow using an innovative pump-back system to reuse water in the drainage |
| Glen Canyon Dam Adaptive Management Program | Colorado River native fish downstream of Glen Canyon Dam, including populations influencing upstream recovery efforts | Adjustments to dam releases to improve downstream habitat conditions, support ecological processes, and inform recovery efforts in the Upper Colorado and San Juan Rivers |

# Recommendations

5-1. The Legislature should expand ongoing funding to implement the Great Salt Lake Strategic Plan.

5-2. State and federal sources should continue to support and fund the development and execution of the Integrated Report on Water Quality and Utah Wildlife Action Plan and support the Nonpoint Source Management Plan and the Utah Wetland Program Plan.

5-3. The Legislature should expand ongoing funding and support for invasive species management programs, specifically phragmites, tamarisk, Russian olive, Eurasian watermilfoil and quagga mussels.

5-4. The Legislature should continue support for Utah's Watershed Restoration Initiative to improve high priority watersheds throughout the state.

5-5. Division of Wildlife Resources should lead a collaborative effort to develop a functional flows strategy in Utah's watersheds to meet conservation, management and recovery needs for aquatic and wetland-dependent species.

5-6. The Legislature should provide funding for more coordinated public outreach and education on the importance of healthy watersheds and ecosystems.

5-7. The Legislature should continue to support a stabilized source of funding for fuels mitigation work that allows for cross-boundary work with a landscape scale approach focusing on watersheds, the wildland-urban interface and high fire prone areas.

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# 6

# Vibrant communities

In this chapter:

- Key points
- Challenges to sustaining vibrant communities
  - Increasing water demand
  - Limited and variable supplies
  - Aging and strained water infrastructure
  - Risks to water quality
- Strategies to sustain vibrant communities
  - Manage demand through conservation and effiicency
  - Expand and optimize water supplies
  - Enhance infrastructure capacity and resilience
  - Protect and improve water quality
  - Preserve and enhance water recreation opportunities
- Recommendations
- References

Photo credit Destination Sports/NeuView Photography

## Key Points

- Shifts in industry and energy demand will affect water demand for the M&I sector.
- Managing demand is key to living within our water means.
- Water infrastructure is aging and under strain, leading to a large and growing list of needed projects across the state.
- Expanding and optimizing supply requires both traditional and innovative tools.
- Water-related recreation is a major economic driver and enhances the vibrancy of our communities.
- Strategic investment is needed to support programs and proactive planning to protect community access to clean drinking water and recreation opportunities.

Clean, reliable and affordable water is vital for Utah's communities to thrive. It sustains the people who live here; supports tourism, businesses and industries that drive the state's economy; and shapes the landscapes that residents and visitors use to recreate. As population growth, expanding energy needs, emerging industries and climate variability place greater demand on limited water supplies, thoughtful planning and responsible stewardship are more important than ever.

A strong economy is one of the primary reasons people choose Utah. Water supports a diverse industrial and commercial base that contributes billions of dollars in economic output and thousands of jobs. From agriculture and mining to manufacturing and the technology sector, a dependable water supply is essential for cooling and operational stability. By integrating water planning early into developmental decisions, Utah can foster long-term economic growth while balancing community and environmental needs.

Utah's snow-capped mountains, expansive reservoirs and lakes, flowing rivers and abundant wildlife create world-class recreation opportunities that are vital to our identity. In 2023, Utah's outdoor recreation economy reached a record $9.5 billion in value-added, contributing 3.4% to the state's gross domestic product.[1] While not all outdoor recreation is water-based, boating, fishing, hunting, wildlife viewing and winter sports represent a significant portion of this activity. Beyond the numbers, access to these spaces supports physical and mental health, community connections and cultural traditions.

Utah's selection as host of the 2034 Winter Olympic and Paralympic Games further highlights the importance of watershed health to world-class winter recreation. Many venues will be located in the Wasatch Mountains where lake-effect snow from Great Salt Lake contributes up to 8% of the total snowfall.[2] The Games will draw global attention and significant visitation, presenting an opportunity to demonstrate long-term water stewardship.

By protecting its water resources, Utah can preserve the landscapes and economic vitality that make communities vibrant. This chapter explores the challenges facing both urban and rural communities and strategies to ensure reliable water supplies.

# Challenges to sustaining vibrant communities

Utah faces several challenges that will require future water management to adapt to the pressures that accompany growth and change in the state. Based on the Division of Water Resources' most recent water budget, the M&I sector diverts about 1.3 million acre-feet of water annually and depletes approximately 0.8 million acre-feet annually, accounting for 25% of total diversions and 21% of depletions statewide (2020-2024 average, see Chapter 2).[3] Sustaining vibrant communities requires addressing pressures on both demand and supply, while modernizing infrastructure, protecting public health and expanding opportunities for outdoor recreation.

## Increasing water demand

As communities, industries and energy needs grow, the demand for water increases. Climate uncertainty adds further complexity, as shifting drought patterns, higher temperatures and increased evapotranspiration stress water supplies and drive up water demand, making long-term planning more difficult. These pressures create tension among competing interests, as the state must balance water needs of a strong economy with the necessity of protecting the recreational and environmental resources that define Utah's quality of life.

Outdoor landscape irrigation remains the largest driver of M&I water depletion statewide, particularly during summer months when demand is highest. In many communities, inefficient irrigation systems, aging meters and pricing structures that do not incentivize water conservation contribute to unnecessary use. Simultaneously, the rise of water-intensive industries, such as large-scale data centers, increases demand year-round. Without synchronized planning among water utilities, energy providers and developers, these facilities risk straining local resources and compromising community resilience.

## Limited and variable supplies

Utah's water supplies are finite and shaped by hydrologic variability. Most of the state's developed water is already allocated, leaving limited opportunity for new large-scale water diversion and storage projects. As communities grow, water managers must operate within the constraints of existing rights, storage capacity and basin-level availability.

Climate variability adds further uncertainty. Increased temperatures, prolonged drought and reduced snowpack affect both the quantity and timing of water available for use. Earlier snowmelt can shift the timing of spring runoff and reduce late-season streamflows, increasing reliance on reservoir storage and groundwater during the hottest months of the year. In dry years, reservoirs may not fully refill, limiting carryover storage and reducing operational flexibility.

Groundwater systems face similar constraints. While many areas turn to groundwater during drought, decades of withdrawals exceeding natural recharge have depleted many aquifers and diminished their resilience. Careful groundwater management and monitoring are needed to ensure groundwater is available for future use.

Addressing water needs for all uses adds another layer of complexity. For example, reservoirs in Utah serve multiple purposes, including M&I supply, agricultural irrigation and recreation. Releases that support downstream communities or agricultural production may lower reservoir elevations that reduce boating access and shoreline recreation opportunities. Similarly, diversions within the Great Salt Lake Basin influence lake elevation, affecting wildlife habitat, air quality and industries that depend on healthy lake levels. Managing these interconnected systems requires careful coordination to align water use with available supply.

## Aging and strained water infrastructure

M&I water systems rely on an extensive network of dams, wells, treatment plants, pumping stations, storage tanks and distribution pipelines (Figure 6-1). Much of this infrastructure was constructed decades ago and is approaching or exceeding its original design life. Deferred maintenance and funding limitations have contributed to a growing backlog of needed repairs, replacements and upgrades.

**Figure 6-1. Examples of water infrastructure.**


As water distribution systems (including customer meters) age, they are increasingly prone to leaks and tend to underestimate the volume of water delivered. While leakage increases the cost of water delivery, underestimating deliveries results in lost revenue to the entity managing the water system. Both conditions result in inefficient water management. Nationally, 16% of treated water is lost in delivery systems on average.[4]

Dams require ongoing inspection, maintenance and sometimes structural upgrades to meet safety standards. With a typical design life of about 50 years, critical components of dams will need to be replaced or upgraded to maintain their integrity. Additionally, development near dams can increase a dam's hazard classification over time as homes and businesses are built within the dam's flood zone. The elevated risk for potential damage from dam failure increases a dam's prioritization for maintenance and rehabilitation. Because of these risk factors, an estimated $464 million is needed to upgrade high-hazard dams in Utah to meet safety standards. At current funding levels, it would take 44 years to complete those projects.[5] Beyond structural integrity, sediment accumulation, if left unmanaged, is projected to reduce Utah's reservoir storage capacity by 25% by 2100.[6]

M&I infrastructure also faces increasing physical and cyber security threats. Vulnerabilities to unauthorized access or cyber intrusions could disrupt operations, impair service or compromise public safety. Because many systems rely on automated monitoring and control technologies, protecting them from intrusion is an increasingly important part of infrastructure management.

Maintaining reliable infrastructure is essential not only for delivering water but also for protecting public health, supporting economic activity and ensuring resilience during drought and emergency conditions. Without sustained investment and careful asset management, aging systems may limit flexibility and increase long-term costs for communities across the state.

## Risks to water quality

Maintaining safe and reliable water quality is increasingly complex as population growth, aging infrastructure and changing environmental conditions intersect. These factors increase operational costs and require continued investment to safeguard public health.

Drinking water systems must manage contaminants that can enter water sources through a variety of pathways, including industrial discharge, agricultural runoff, stormwater runoff and wastewater effluent. Pollutants such as bacteria and nutrients are common challenges, particularly where agricultural and residential runoff affect source waters. Emerging contaminants, such as per- and polyfluoroalkyl substances (PFAS), pharmaceuticals and microplastics present new challenges. Detecting and removing these substances often requires advanced monitoring technologies and innovative treatment methods, increasing operational and capital costs for water providers.

Additionally, wildfires pose a large risk to water treatment. Post-fire runoff can transport significant amounts of sediment, ash and nutrients into streams and reservoirs, potentially overwhelming treatment facilities and forcing expensive emergency operational adjustments. As Utah's urban areas expand into wildland areas, it is important for property owners to understand the risk of fire and share the responsibility for implementing mitigation strategies.

Wastewater management is equally critical to protecting public health and the environment. Sanitary sewer systems, pumping stations and centralized treatment facilities prevent the spread of waterborne disease by removing pathogens, organic matter and excess nutrients before treated effluent is returned to rivers and lakes. Both urban and rural communities face wastewater treatment challenges related to population growth, expanding development and aging infrastructure. Inadequate treatment or failing infrastructure can impair aquatic ecosystems, limit recreational use and increase treatment costs for downstream users.

Stormwater runoff presents another growing water quality concern. Rain and snowmelt flowing across roads, parking lots, rooftops and other impervious surfaces can transport sediment, chemicals, oil, trash and pathogens rapidly to nearby waterways. Unlike sanitary sewer systems, which treat wastewater, storm sewer systems are often designed to convey runoff directly into nearby waterways without treatment. As development and impervious surfaces expand, the potential for these pollutants to degrade water quality, threaten aquatic ecosystems and pose risks to recreational users increases. Elevated levels of *E. coli* and more frequent harmful algal blooms in the state's waterways highlight the need for improved management practices and public awareness.

# Strategies to sustain vibrant communities

Sustaining vibrant communities depends on managing water to support human needs while maintaining the robust streamflows and healthy lake levels that drive Utah's world-class outdoor recreation. M&I sectors must manage water to ensure that demand does not exceed available supplies, ensure reliable infrastructure and protect water quality. No single tool can resolve these challenges alone. Long-term resilience depends on integrating conservation, thoughtful planning, strategic supply development, infrastructure investment and watershed protection across state and local entities.

## Manage demand through conservation and efficiency

Reducing M&I demand is one of the most cost-effective strategies for maintaining reliable water supplies. By reducing unnecessary use and improving efficiency, communities can stretch existing supplies, delay or even avoid the need for costly new infrastructure and protect watersheds and ecosystems. Demand management strategies include public education, financial incentives for efficiency upgrades, meaningful tiered water rates, secondary metering and proactive planning.

### Education and financial incentives

Education fosters behavioral change, empowering residents and businesses to adopt waterwise practices. Various entities are involved in water education and incentive programs (Table 6-1). Because over 90% of M&I water depletion is associated with outdoor use,[3] many programs focus on outdoor irrigation efficiency and waterwise landscaping.

**Table 6-1. State-sponsored water education resources and financial incentives.**

| Entity | Educational Resources | Grants, Incentives and Rebates |
|---|---|---|
| **Utah Division of Water Resources** – state agency in charge of planning, conserving, developing and protecting Utah's water resources | • Water planning workshop for municipalities (**Utah Growing Water Smart Workshop)**<br>• Webinars for DIY Landscapers<br>• Localscapes classes (outside of water district areas)<br>• Public education and outreach, including events and programs for K-12 and university students | **For individuals:**<br>• Rebates for replacing old toilets with new water-efficient models and installing smart irrigation controllers<br>• **Landscape Incentive Program** for areas outside water conservancy district boundaries that have adopted landscape ordinances for new development ($2 per square-feet of grass converted to waterwise plants)<br>**For water providers:**<br>• **Transparent Water Billing Grant Program** to implement easy-to-understand customer billing and increase conservation messaging |
| **Utah State University Extension** – program tasked with bringing research-based education and resources to Utahns | • Demonstration gardens<br>• **Water Check Program** to customize pressurized sprinkler irrigation schedules<br>• Research-based gardening resources | Not applicable |
| **Utah Water Ways** – nonprofit agency in charge of statewide water conservation education and public awareness campaigns | • Statewide public awareness campaigns (**Slow the Flow**, etc.)<br>• K-12 water education curriculum | Not applicable |

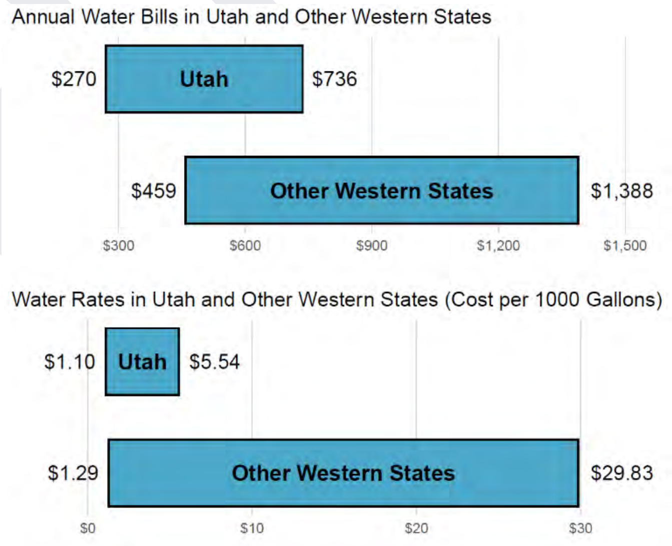
| Entity | Educational Resources | Grants, Incentives and Rebates |
|---|---|---|
| **Water conservancy districts** – water wholesalers tasked with conserving water to meet future needs | • Localscapes classes<br>• Demonstration gardens<br>• Local awareness campaigns | • **Landscape Incentive Program** within service area (rebate up to $3 per square-foot of grass converted to waterwise plants, including division 50% match in cities with adopted landscape ordinances)<br>• Rebates to plant trees and replace spray irrigation with drip |

## Tiered water rates and secondary metering

Meaningful, tiered pricing structures for drinking and secondary water is a powerful conservation tool. Under tiered water rates, the cost per unit of water increases along several price steps as a customer's water use increases, ensuring that meeting basic needs remains affordable while discouraging excessive use.

Utah's drinking and secondary water connections must be metered and billed under a tiered rate structure. Non-exempt secondary systems have until 2030 to implement these requirements.[7] Research shows that well-designed tiered rates are instrumental in reducing residential water consumption.[8,9] With water rates roughly half as much as surrounding states, Utah communities have room to implement pricing structures that better incentivize conservation (Figure 6-2).[10] Increasing water rates may also be a requirement to receive state funding in the future. This encourages local entities to collect sufficient revenue and plan for future large infrastructure projects instead of relying on the state.

**Figure 6-2. Annual water bills and rates in Utah compared to other western states.**




*Data Source: LRB Public Finance Advisors. 2024. Water Infrastructure Senate Bill 34 Study.*

## Proactive planning for M&I demand

Thoughtful and forward-looking planning further aligns development with water availability. Water conservation plans, water use elements in general plans and drought response planning support responsible use that reflects conditions at the local level.

### Water conservation plans

Since 1998, water conservancy districts and public water suppliers with more than 500 drinking water connections have been required to have a current water conservation plan approved by the Division of Water Resources.[11] The plans outline how the planning entity and the end water user will conserve water to help ensure adequate future water availability.

### Water in general plans

As of 2025, all counties and municipalities with more than 10,000 residents must include water use and preservation elements in their general plans.[12] A general plan is a long-range (20+ years) planning document for future development and land use in their communities. Water use and preservation elements include (1) analyzing the effect of new development on water demand; (2) planning to reduce water demand on new and existing development; and (3) identifying ways to modify operations to reduce water waste. By considering water in general plans, entities will be able to make informed decisions about their water use and development, rather than assuming there will be adequate water into the future.

### Drought Response Plan

Utah's Drought Response Plan[13] outlines how state agencies monitor and respond to drought by regularly reviewing key water indicators such as precipitation, snowpack, soil moisture, stream flow and reservoir storage. Statewide conditions are summarized and sent to the U.S. Drought Monitor[14] for inclusion in a map of current conditions across the nation. For individuals, the most important conditions are those in their own communities. Residents are encouraged to follow updates from their local water providers and do their part to ensure water use does not exceed recommended usage under drought restrictions.

## Expand and optimize water supplies

Expanding and optimizing water supplies across the state remains a critical strategy to ensure a secure water future. Traditional approaches include building storage and conveyance systems. Non-traditional approaches include expanding opportunities for cloud seeding, reuse and aquifer storage and recovery. These diverse approaches help to ensure that water suppliers can deliver water to their customers now and in the future.

### Traditional supply projects

Traditional water supply management focuses on developing new water supplies to meet growing demands by building storage, diversion and conveyance structures. This was the primary approach in Utah throughout most of the 20th century. New opportunities for large storage, diversion and conveyance projects may emerge but are dependent on numerous factors, including water availability and rights to that water. Two large water projects, Bear River Development[15] and Lake Powell Pipeline,[16] are currently in statute, directing the Division of

Water Resources to continue studying the need and feasibility of these projects.

### Bear River Development

Bear River Development was established in Utah Code in 1991, indicating that up to 220,000 acre-feet could be developed from the Bear River to supply water to growing communities in northern Utah through additional reservoir storage and pipelines.[15] At that time, the expectation was that water developed from the project would be needed by 2015. However, the expected need for the water has been delayed to 2045 or later due to conservation efforts, improvements in efficiency and smaller projects. It is anticipated that Great Salt Lake levels would be impacted by additional development of the Bear River.[17]

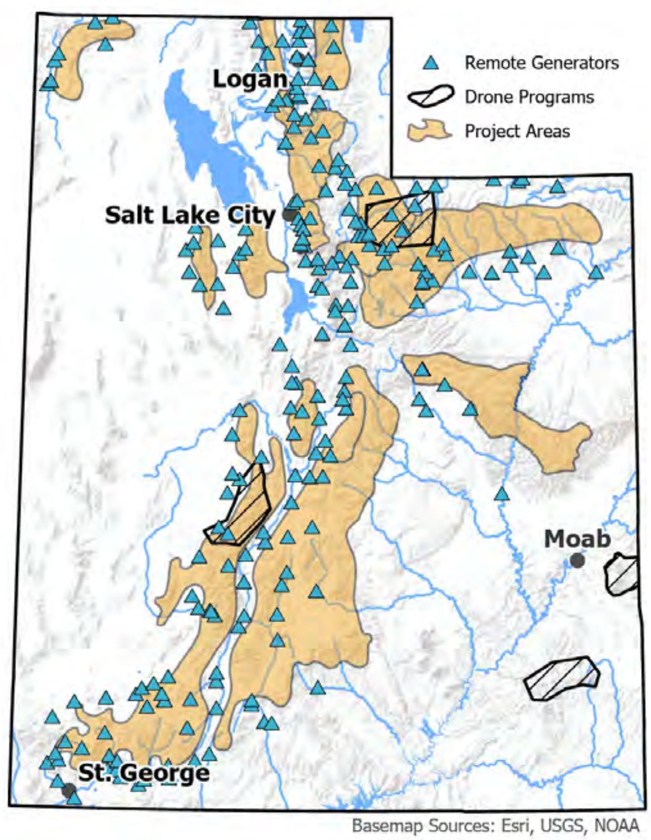
### Lake Powell Pipeline

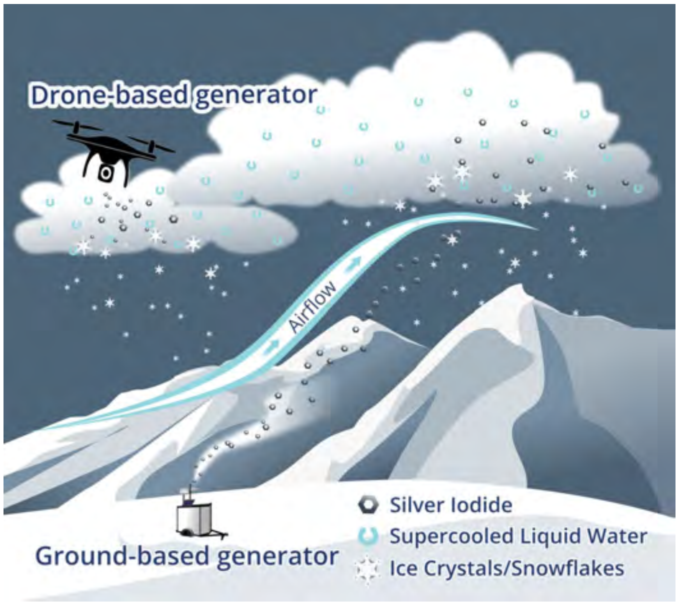
The Lake Powell Pipeline is a potential project to build a 140-mile pipeline to deliver approximately 84,000 acre-feet of water from Lake Powell to Washington County, expanding and diversifying southwestern Utah's water portfolio.[16] Additional permitting would be required before work on the project could move forward.

## Cloud seeding

For over 50 years, Utah's cloud seeding program has been a vital tool in the state's long-term water management strategy for all water uses. Managed by the Division of Water Resources, under strict licensing and permitting standards,[18] the program enhances winter snowpack in key mountain watersheds by using ground-based generators and drones to introduce silver iodide into winter storm systems (Figure 6-3). This process encourages the formation of ice crystals and increases snowfall, ultimately contributing to runoff and reservoir storage that supports M&I, agricultural and ecological needs. Properly executed cloud seeding can increase targeted snowfall by 5-15% annually,[19–21] making it a useful tool to supplement water supplies.

**Figure 6-3. Utah's cloud seeding program area and process.**






*Cloud seeding operations occur across several Utah mountain regions. Silver iodide is released into storm clouds, promoting ice crystal formation and increased snowfall over targeted watersheds.*

## Water reuse

Water reuse involves treating wastewater for purposes such as irrigating agriculture, golf courses and landscapes; supporting industrial processes; or, with advanced treatment, supplying drinking water. Water providers throughout the state are strategically investing in water reuse to maximize the utility of existing water rights, particularly in high-growth areas (list of currently permitted water reuse projects in Appendix D, Table D-1).

Reuse projects require multi-agency oversight to ensure they are implemented appropriately. The State Engineer verifies that the project proponent is authorized to utilize the underlying water rights and that the proposed water reuse is consistent with the underlying water rights.

The Division of Water Quality enforces water quality standards for two types of reuse:

- Type I: suitable for uses with potential human contact and requiring higher levels of treatment.
- Type II: generally intended for agricultural irrigation with lower contact risk.

With interest from several entities in purifying water to meet drinking water standards, the Division of Drinking Water is also involved to draft new rules that would regulate this type of reuse.

Utah's reuse strategy is also defined by local water resource constraints. Because reuse increases overall water depletion within a watershed, the Legislature restricted most reuse projects within the Great Salt Lake Basin to help support lake recovery to a healthy level. In other basins, reuse is an important tool for water supply development. Many regional providers are working on new projects to meet their projected demand, including Cedar City, Zion Mountain Special Service District and Washington County Water Conservancy District.

**Project spotlight: Water reuse in Washington County**

Washington County Water Conservancy District is planning the state's most expansive reuse project to help secure long-term water reliability for a growing region. The project will be implemented in two phases.

- Phase 1: expand the region's wastewater treatment for outdoor irrigation.
- Phase 2: implement advanced water purification to meet strict water quality standards for drinking water.

The total cost of the project is estimated to be approximately $2 billion and will be funded through federal, state and local sources. The Board of Water Resources has already committed a $195 million loan to the district's reuse project.

## Aquifer storage and recovery

Aquifer storage and recovery allows excess surface water to be stored underground and recovered during dry periods. This approach improves seasonal flexibility and enhances drought resilience. When surface water is available, aquifer storage and recovery projects recharge the aquifer by spreading water over the land to let it percolate into the receiving aquifer or by injecting the water directly into the aquifer through an injection well. The water is typically retrieved when surface water is insufficient to meet demands, such as in late summer or during drought. When properly designed, aquifer storage and recovery can significantly increase effective system storage.

Aquifer storage and recovery projects can be implemented by regional or local water providers that have surface water rights. Permits are required for storage as well as recovery, and projects must demonstrate adequate protection of groundwater quality and neighboring water rights (see the list of permitted projects in Appendix D, Table D-2). The Division of Water Rights conducts an assessment of aquifer characteristics and may reduce the amount of water that can be recovered based on how quickly the recharged water moves through the aquifer and beyond the location of recovery wells. The Division of Water Quality ensures that groundwater quality will not be degraded by the project.

## Water converted from agricultural use to M&I use

As agricultural land in developing areas transitions to urban use, the associated water rights are often converted to M&I use through voluntary market transactions. These transfers occur as a result of private land-use decisions and market demand for developable property. When managed intentionally, these transactions can increase the water supply for growing communities. The Division of Water Resources models the projected volume of water converted from the agriculture sector to M&I sector to support long-term planning at the basin and state levels (see Chapter 3).

## Enhance infrastructure capacity and resilience

Reliable water service depends on infrastructure that is well-designed, properly maintained and adequately funded. Utah's strategy for infrastructure resilience focuses on improving the operational efficiency of existing systems while proactively planning for future growth.

### Strategic infrastructure management

#### Sound engineering and system design

Modern infrastructure must be built for efficiency, capacity and safety. Project proponents must evaluate multiple solutions, aiming to minimize environmental and social impacts while maximizing efficiency and cost-effectiveness. For example, the Division of Drinking Water manages the System Specific Sizing program, which allows public water systems to size their water systems based on their specific customer base, water usage patterns and future growth projections instead of using generic state-mandated sizing requirements. This tailored approach promotes efficient water resource management by optimizing infrastructure investments, reducing unnecessary expenditures and ensuring that water systems can adequately meet current and future demand.

#### Proactive maintenance and asset management

Proactive maintenance and proper asset management prolong the life of infrastructure, protect investments and reduce water waste. Maintenance and upgrades are needed for all infrastructure to ensure reliable water supply and delivery as well as public safety. Capital asset management plans and reserve analyses are tools for managing water infrastructure maintenance and financing and are required to receive most state funding.

*Water loss control*

Water audits help distributors determine their loss rate and know when and where to focus water loss control activities. In some cases, reducing system losses could avoid the need to invest in new infrastructure or water supply projects. Regular water audits are essential to help water delivery systems save money and reduce water loss.

*Dam safety*

Dams require regulatory oversight to prevent catastrophic failure, safeguarding Utah's water supply and protecting downstream communities. The Division of Water Rights oversees the state's Dam Safety Program, which includes regular inspections of approximately 700 dams, as well as regulatory involvement in the construction of new dams and rehabilitation of existing dams, not overseen by the Bureau of Reclamation.

*Reservoir sedimentation*

Managing sediment accumulation in existing reservoirs is crucial to maintaining maximum storage capacity. Managing sediment is accomplished through a variety of nature-based and engineering solutions to reduce watershed erosion as well as to trap, flush and dredge sediments from reservoir basins. However, if sedimentation becomes a persistent issue, it may be necessary to raise the dam if possible or accept reduced storage capacity and look for new storage opportunities.

*Physical and cybersecurity*

Protecting water infrastructure from physical and cyber threats is an increasingly important component of maintaining reliable water services and protecting public health. Strengthening physical security measures, improving access controls and enhancing cybersecurity protections help safeguard treatment processes, storage facilities, distribution systems and dams. Coordination with state and federal partners, along with regular system assessments and emergency response planning, helps water providers prepare for and respond to potential disruptions while protecting public health and maintaining service continuity.

## Protect and improve water quality

Protecting water quality and safeguarding public health require coordinated management across source watersheds, drinking water systems, wastewater treatment facilities and stormwater infrastructure. Preventing contamination at its source, maintaining effective treatment systems and strengthening watershed resilience all play important roles in sustaining safe and reliable water supplies for Utah's communities.

Protecting drinking water begins with safeguarding source waters and maintaining effective treatment systems. Monitoring programs, proactive regulatory measures and continued research help identify contaminants of concern and support the development of treatment strategies. These efforts help ensure that drinking water systems continue to maintain safe, reliable drinking water for communities across the state.

Upgrading wastewater treatment facilities and continued improvements in treatment technologies help ensure that wastewater discharged to rivers, lakes and reservoirs meets regulatory standards. Advanced nutrient removal reduces ecological damage to receiving waters while expanded treatment capacity supports growing communities. Wastewater treatment also focuses on supporting water reuse opportunities to allow treated wastewater to be used for irrigation, industrial processes and other beneficial uses while protecting ecosystem health.

Stormwater pollution is mitigated through regulation, infrastructure improvements and public education. Permitted municipalities and industries are required to implement best management practices to control pollution and reduce the volume of runoff entering their storm sewers by installing features such as infiltration basins, vegetated swales and other green infrastructure that slow runoff, promote infiltration and evapotranspiration. Harvesting and reuse of stormwater is also a strategy to manage stormwater. When managed properly, stormwater can recharge groundwater, provide water for outdoor irrigation and enhance wetlands and other aquatic habitats. The public plays a vital role in protecting water resources through simple steps like cleaning up after pets, properly disposing of wastes and not over-fertilizing lawns.

*Riverside garbage cleanup. Photo credit Dawna Zukirmi*

## Preserve and enhance water recreation opportunities

Water-based recreation is at the core of Utah's identity, acting as a powerful driver for the state's economy and the physical and mental well-being of its residents. State agencies – such as the divisions of Outdoor Recreation, State Parks and Wildlife Resources – work with federal and local partners to ensure that water resources are not only preserved but are accessible and safe for public use.

### Preserving public access to waterways

As Utah's population continues to grow, providing recreation near population centers is essential for community health. Close to home, urban waterways are unique community amenities that encourage outdoor recreation in our own backyards. Many cities were built by necessity near streams and rivers for their water supply, but many waterways have been abused and neglected. The cities of Logan, Helper and Ogden are examples of communities that have invested in restoration projects to revitalize their river corridors. These multi-million dollar projects have installed miles of urban trails, removed trash and hazardous debris, improved aquatic habitat and reduced flood risk.

Utah's vast federally managed public lands comprise approximately 64% of the state, with an additional 10% managed by state entities such as the divisions of State Parks, Wildlife Resources and Forestry, Fire and State Lands. These expansive areas are not just vital for recreation, they support many industries such as tourism, energy development, agriculture, mining and timber; all requiring extensive access for operations and public use. Beyond economic drivers, well-maintained roads, trails and waterways on these lands are critical for law enforcement and emergency services, safeguarding both residents and visitors.

In areas with significant private land ownership, land easements and "walk-in" programs help secure public access to waterways. These balance private property rights with the public's need for recreational space, allowing miles of river to remain open for angling and exploration.

## Enhance the recreation experience

Water management strategies increasingly must support outdoor recreation. Winter sports are a cultural hallmark of Utah and an important economic driver. Strategies to support the state's snowpack, such as cloud seeding and preserving Great Salt Lake, also benefit skiers, snowshoers and snowmobilers. Hunting, fishing and wildlife viewing foster deep stewardship of land, water and wildlife. Revenue from hunting and fishing licenses is reinvested into watershed restoration, ensuring that aquatic ecosystems support wildlife for future generations.

*Fishing at Rockport State Park. Photo credit Steph McGinnis.*

Reservoirs, in addition to providing essential water storage, are also important for recreation. Fluctuations in upstream supply and downstream demand cause substantial changes in reservoir elevations, which necessitates resilient infrastructure such as boat ramp extensions and adaptable fishing piers to keep them usable for the public. Additionally, the Division of Water Quality monitors recreational waters for threats like harmful algal blooms and

*E. coli*. These actions support recreationists to enjoy the outdoors with confidence.

Ultimately, fostering vibrant communities requires a balance between meeting the state's functional water needs and protecting the natural beauty that defines the Utah way of life. By integrating thoughtful infrastructure design with a commitment to accessible, healthy waterways, state and local leaders can ensure that water remains a source of both security and vibrancy. These strategies ensure that as Utah grows, its communities continue to thrive in harmony with the natural resources that sustain them.

# Recommendations

6-1. The Legislature should fund a study on the water-energy nexus for water-intensive industries and emerging technologies.

6-2. The Legislature should expand funding for education and technical training programs to build and sustain a skilled water workforce, including essential trades such as dam, drinking water and wastewater operators.

6-3. The Legislature should continue to support integrated land and water planning, adoption of waterwise landscape ordinances and improving water and energy efficiency across sectors.

6-4. The Division of Water Quality should expand coordination among state, regional and local entities to educate the public on stormwater and non-point source pollution.

6-5. The divisions of Wildlife Resources and Outdoor Recreation should convene reservoir management teams to incorporate recreational access with reservoir elevation and waterway management plans and coordinate drought messaging.

6-6. The Division of Drinking Water should continue to collect data and monitor for PFAS and other emerging contaminants and provide assistance to help local entities comply with federal and state regulations.

6-7. The Legislature should allocate additional resources to support cybersecurity for water systems and continue ongoing funding for the Division of Drinking Water's Source Protection program to preserve drinking water sources.

6-8. Water providers should conduct regular water loss audits, maintain updated capital asset management plans that dedicate funding to replace and modernize aging infrastructure and implement tiered water rates with appropriate increases between tiers to discourage excessive use and reinvest revenue from higher tiers into water conservation programs and public education.

6-9. The Legislature should ensure ongoing support and funding for the Dam Safety Minimum Standards Program through the divisions of Water Rights and Water Resources.

6-10. The Legislature should continue support for cloud seeding so that the Division of Water Resources can modernize equipment and validate outcomes through independent research.

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# 7

# Productive Agriculture

In this chapter:

- Key points
- Challenges for producers
- Agriculture's role in preserving healthy watersheds and ecosystems
- Recent legislation
  - 2020 Water Banking Act
  - 2023 Water Conservation and Augmentation Amendments and 2024 Water Modifications bill
  - 2024 Fallow Land Amendments
  - 2024 Great Salt Lake split-season leasing pilot project and 2026 Great Salt Lake Preservation Program
  - 2026 Dedicated Water Amendments
- Programs
  - Agricultural Optimization Program
  - Agricultural Voluntary Incentive Program
  - Conservation Easement Program
- Recommendations
- References


Photo credit Paul Monroe

## Key points

- Agriculture provides vital products and services but faces mounting pressure to change and adapt, requiring significant investment.
- Agriculture is a major land and water user in Utah and a vital component of many rural communities throughout the state.
- Recent changes to Utah water law give agricultural water rights holders more flexibility to sell, lease or otherwise conserve water.
- Programs are available to help producers implement best management practices to better steward land and water.
- Strategic investment is needed to strengthen programs and planning to support agricultural producers and system water resilience.

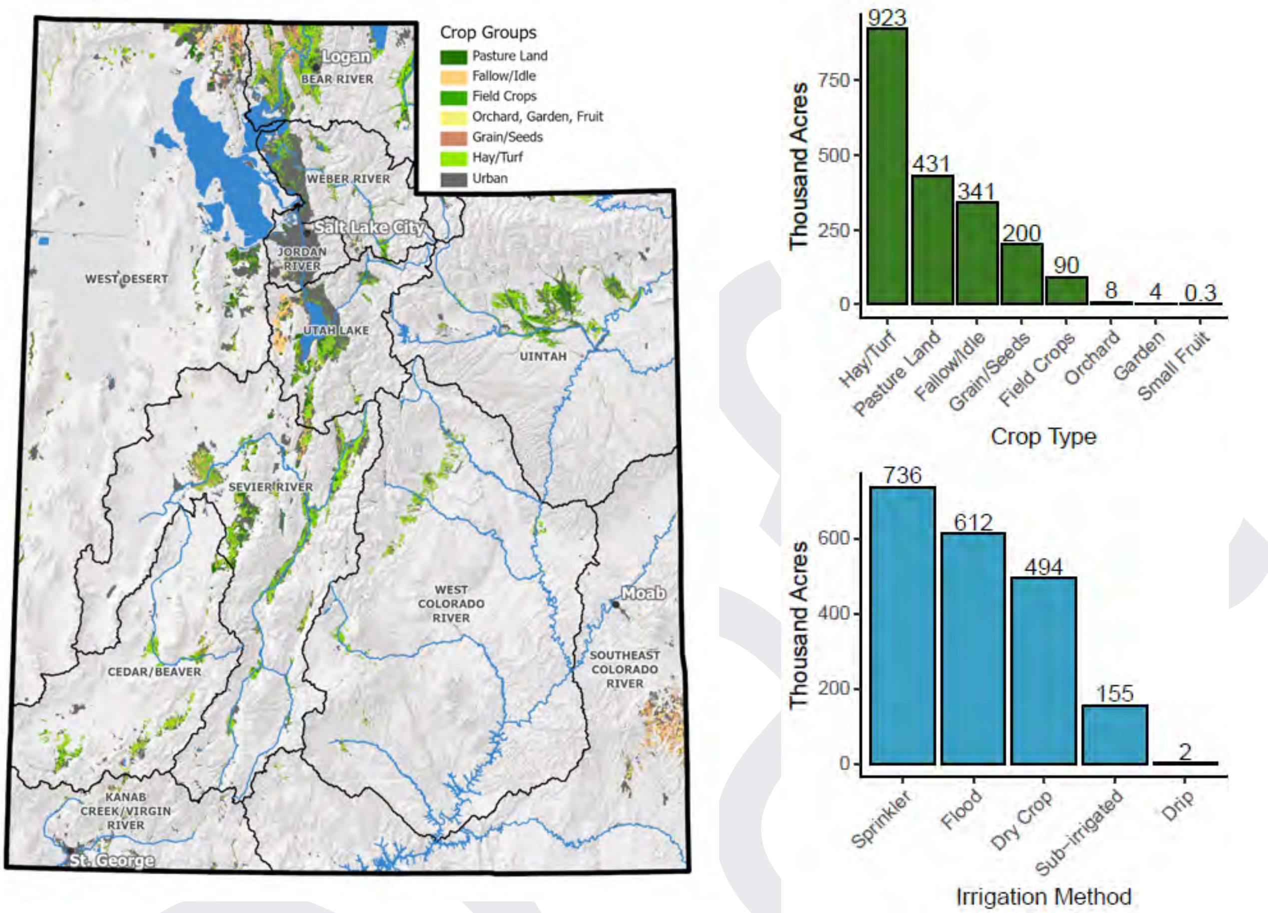
Agriculture has long shaped Utah's economy, communities and landscapes. Crop production, livestock operations and aquaculture activities produce food, fiber and fuel; support rural livelihoods; and help sustain the state's food security, cultural heritage and traditions.[1] Many agricultural lands also provide important wildlife habitat and play a role in maintaining the health of Utah's watersheds and ecosystems.

Agriculture is an important economic driver in the state, particularly in rural communities where farming and ranching support local jobs, businesses and tax bases.[1] In 2026, it is estimated that agriculture in Utah contributed $98.7 billion in direct and indirect economic output.[2]

Aquaculture also contributes to Utah's agricultural economy, including the globally significant brine shrimp industry associated with Great Salt Lake.

Agriculture accounts for a substantial share of Utah's overall land and water use. In 2024, approximately 2.7 million acres were used for crop production and managed pasture, with about 1.9 million of those acres actively irrigated (Figure 7-1).[3] Based on the Division of Water Resources' most recent water budget, agriculture diverts about 3.8 million acre-feet of water annually and depletes approximately 2.5 million acre-feet, accounting for 75% of total diversions and 70% of depletions statewide.[4]

**Figure 7-1. Agricultural land use and irrigation methods in Utah.**




*Distribution of agricultural crop types across Utah hydrologic basins in 2024. Bar charts summarize average acreage by crop type and irrigation method from 2019 to 2024. Data source: Division of Water Resources water-related land use dataset.*

As the state's population grows and demands on land and water increase, agriculture will continue to evolve. Agricultural operations balance economic realities, market conditions and water availability, requiring thoughtful management of water and land to navigate competing needs. This chapter explores the challenges for producers as well as the legislation and programs in place to support them.

## Challenges for producers

Agricultural producers operate on narrow profit margins while facing increasing economic, social and environmental pressures. Since 1989, the amount of land in Utah used for crop production and managed pasture has declined by approximately 213,000 acres,[3] largely due to urban expansion and development near growing population centers. As communities grow, market pressures to convert agricultural land and associated water resources to M&I uses continue to increase. In some areas, this has resulted in a troubling trend of the loss of highly productive agricultural lands.

There are also growing public expectations related to water conservation and crop selection. Crops such as alfalfa are often identified as water intensive, yet strong demand for dairy and meat products continues to drive demand for forage crops used as livestock feed. Although alfalfa uses more water than most other crops,[5] it is particularly well suited for Utah's climate and is drought resilient. Utah farmers may be able to switch to other crops, but doing so requires a market, necessary infrastructure and reliable demand. Switching crop types also tends to have large upfront costs that make it difficult and sometimes unrealistic for many farmers. Therefore, switching crop types at scale is typically a multi-year process, not an overnight solution.

*Photo credit Utah Department of Agriculture and Food.*

As producers seek to improve irrigation efficiency and modernize water delivery systems, these changes can alter historic return flows that previously contributed to groundwater recharge or downstream supplies. Ensuring that agricultural optimization projects produce measurable reductions in overall depletion requires careful planning, monitoring and transparent accounting of water savings.

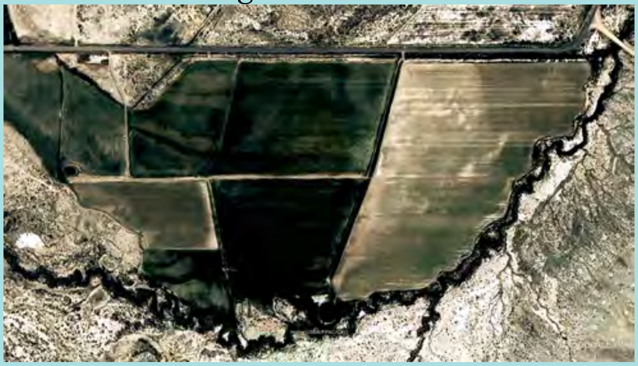
Broader environmental changes are also affecting agricultural operations, compounding challenges related to water management. Rising temperatures, variable precipitation patterns and shifts in runoff timing are projected to increase crop water demand and extend growing seasons in many parts of the state.[6] In the Colorado River Basin, Great Salt Lake Basin and elsewhere, long-term declines in runoff may further constrain water supplies.[7,8]

These pressures occur alongside another responsibility producers carry: maintaining the health of the watersheds and ecosystems that support their operations. Addressing these interconnected challenges will require policies and programs[9] that support agricultural viability while sustaining Utah's water resources.

### Improving Water Quality and Crop Yield

West Colorado River Basin producers actively participate in the Colorado River Salinity Control Program, which funds transitions from flood to sprinkler irrigation. By reducing return flows through salty soils, this shift decreases salt loading in the Colorado River system. Beyond improving downstream water quality, participants report significantly higher crop yields using the same amount of water. One producer noted that before installing a sprinkler pivot, much of their land was marginal. Now, their cropland is highly productive across the irrigated area. This transition effectively optimizes water efficiency, boosts agricultural productivity and protects water quality in the Colorado River system.

**Before:** Flood irrigation in 2009



**After:** Sprinkler pivot in 2024

## Agriculture's role in preserving healthy watersheds and ecosystems

Agriculture is closely intertwined with the condition of Utah's watersheds and ecosystems. Because agricultural lands cover large areas of the state and much of Utah's riparian habitat occurs on private land, management decisions made by producers can significantly influence water quality, quantity and the condition of surrounding habitat.

Agricultural best management practices can support watershed health and ecological function. Well-managed cropland and pastures can improve soil stability, reduce erosion and enhance habitat and forage productivity for terrestrial and aquatic wildlife. Irrigated agricultural lands also moderate and cool local air temperatures. Maintaining healthy riparian areas can stabilize streambanks, filter pollutants and provide food, water, shelter and movement corridors for diverse fish, wildlife and plant communities. Conversely, poor management practices can create environmental pressures. For example, improper or excessive application of fertilizers and pesticides can contaminate surface water and groundwater, while unmanaged livestock access to streams can trample riparian vegetation, contributing to higher levels of sediment, nutrients and pathogens in surface waters.

Collaboration between agricultural producers and resource managers is essential for protecting these landscapes. For example, Utah's Wildlife Migration Initiative collects some of the nation's most robust fish and wildlife tracking data to support science-based management.[10] Agricultural partners aid in identifying and protecting the connective corridors that allow wildlife to migrate to food, water and shelter across the state.

Aquaculture also contributes to Utah's ecosystem health and economy. The Division of Wildlife Resources operates 13 fish hatcheries that stock an average of 10 million fish a year in lakes and streams across the state for anglers to enjoy.[11] These facilities also support recovery efforts of threatened and endangered native fish, some of which are found only in Utah. Hatcheries employ protocols that ensure fish health and safety and prohibit the transmission of disease or invasive aquatic species to wild fish populations.

Addressing the interconnected agricultural, water and ecosystem challenges requires legislation, policies and programs that support producers in how they manage land and water, expanding the options available to producers as they adapt to changing conditions.

**Brine shrimp: Utah's link to global aquaculture**

Aquaculture across the globe is supported by commercial brine shrimp harvesting on Great Salt Lake. Brine shrimp cysts are widely used as aquaculture feed, contributing to both Utah's economy and the management of a key ecological resource.

Harvesting operations, closely monitored by the Division of Wildlife Resources' Great Salt Lake Ecosystem Program, help maintain stable brine shrimp populations by preventing large fluctuations in cyst abundance. Too few cysts means there will not be a sufficient food supply for the roughly 12 million migratory birds that stop over each year, many of which rely on brine shrimp as a food source. But if too many cysts hatch, the emerging brine shrimp can exhaust their food supply of algae before reaching adulthood, reducing cyst production in the following season.

This successful partnership between industry and wildlife managers helps to sustain both a reliable harvest and a consistent food source for the birds that depend on the lake.

# Recent legislation

In response to these challenges, recent legislation has expanded the toolbox for producers and state agencies to manage water more flexibly and wisely while supporting agricultural viability. These legislative changes encourage water conservation, improve the efficiency of agricultural water use and create new opportunities for voluntary water leasing and optimization. Many of the programs created through these legislative efforts are still evolving and may need to be refined over time as agencies and producers gain experience implementing them. Furthermore, additional legislation will likely be needed to adapt to changing conditions.

## 2020 Water Banking Act

Utah's Water Banking Act[12] established a framework for a voluntary, temporary and locally managed water leasing system. This is one approach to allow water rights holders to lease water to other users or for environmental purposes while providing protection against forfeiture of their rights.

Although formal water banking hasn't seen widespread adoption, the legislation has increased flexibility within Utah's water laws and encouraged greater collaboration among water users. It also provides an important foundation for future water management strategies that rely on voluntary water transactions.

## 2023 Water Conservation and Augmentation Amendments and 2024 Water Modifications bill

The Water Conservation and Augmentation Amendments[13] and Water Modifications bill[14] modified Utah water law to allow a water right holder to implement and quantify water-saving practices and then lease the water conserved through those efforts. Leasing saved water can help producers offset the cost of completing an agricultural optimization project.

Saved water is defined by statute as the net decrease in depletion or diversion for a perfected water right resulting from an agricultural water optimization project.[15] These bills clarify how saved water can be recognized and subsequently used for other purposes through agricultural optimization projects by defining the responsibilities of the water rights holders and the State Engineer.

## 2024 Fallow Land Amendments

The Fallow Land Amendments modified how fallowed land is assessed for tax purposes.[16] This legislation allows producers to still receive a tax benefit for agricultural land that is intentionally allowed to lay fallow. By maintaining the agricultural tax classification, the law reduces financial pressure on producers who temporarily stop irrigating fields as part of drought response, conservation efforts or voluntary water optimization programs.

## 2024 Great Salt Lake split-season leasing pilot project and 2026 Great Salt Lake Preservation Program

In 2024, the Great Salt Lake Commissioner's Office received a $170,600 appropriation to fund voluntary split-season leasing projects to increase flows to Great Salt Lake.[17] When done in accordance with an approved change application, split-season leasing is a tool that allows farmers to forego irrigation for part of the season to lease that water for other beneficial uses. The appropriation supports developing pilot leasing projects and a handbook for farmers interested in leasing water in the Great Salt Lake Basin.

The 2026 Water Leasing Amendments[18] further support Great Salt Lake by establishing the Great Salt Lake Preservation Program, which enables agricultural water to be leased for the benefit of the lake. Under the program, producers may lease water in no more than two out of five irrigation seasons. The program is set to sunset on July 1, 2030.

## 2026 Dedicated Water Amendments

The 2026 Dedicated Water Amendments[19] create a new "dedicated water application" process that allows water rights to be used more flexibly to support instream flows and sovereign lands. Dedicating water does not permanently change the underlying water right and may be approved for fixed or ongoing periods, including split-season use. The bill also prioritizes these applications in review, helping accelerate water delivery to Great Salt Lake and the Colorado River system.

# Programs

Several programs are available to help agricultural producers address the challenges of managing water, maintaining productive operations and supporting watershed health. These programs provide technical and financial assistance to implement best management practices to optimize water use, enhance soil health and support long-term conservation of agricultural lands.

## Agricultural Water Optimization Program

Much of Utah's agricultural water infrastructure was constructed decades ago and can be inefficient by modern standards. As economic pressures and water demands increase, improving irrigation efficiency and modernizing conveyance systems have become important tools for supporting viable agriculture. In response, the Utah Legislature established the Agricultural Water Optimization Task Force in 2018 to fund local research and demonstration projects. The task force was superseded in 2023 by the Agricultural Water Optimization Committee, which continues to promote, fund and study agricultural optimization efforts throughout the state.

The Agricultural Water Optimization Committee oversees the Agricultural Water Optimization Program, administered by the Utah Department of Agriculture and Food. Since its creation in 2023, the program has received approximately $276 million in appropriations from the Utah Legislature.[20] Since 2019, approximately 900 projects have been funded and of those, over 40% have been completed, totaling over $160 million dollars.[21] The program supports viable agriculture while aiming to avoid increases in overall depletions through the implementation of innovative agricultural practices and the funding of new and updated infrastructure both off and on farm. The estimated total water diversion savings achieved from all completed projects is approximately 126,000 acre-feet per year,[21] calculated as the difference between the estimated diversion pre-project and the annual total diversion recorded using flow meters post-project installation.

### Off-farm best management practices

Off-farm improvements focus on systems that deliver water from diversion points to agricultural fields. Many canal systems were originally constructed as open earthen channels that lose water through seepage, evaporation and uptake from vegetation growth along canal banks. Lining and piping canal systems can reduce these losses and improve delivery reliability. Because large canals can convey thousands of acre-feet of water each year, even small reductions in system loss can significantly increase the amount of water available for irrigation or other downstream uses. Enclosing canals in a pipe can also increase public safety by preventing access to the system by children, pets, livestock or wildlife.

Modern monitoring and control technologies can further improve canal operations by providing real-time oversight of water delivery. A key example is supervisory control and data acquisition systems, a system of sensors and remote controls that allow operators to monitor flows and adjust gates from a central location. By using these tools, flow and water use can be precisely measured and adjusted at diversion points, allowing for accurate accounting of water diverted and returned. Beyond real-time control, these remote management systems help evaluate overall performance by detecting leaks, seepage losses and structural failures within the conveyance network.

## On-farm best management practices

On-farm best management practices seek to optimize agricultural water use through irrigation infrastructure upgrades, refined irrigation water application and improved crop and soil management. Most efficiency gains result from a systematic approach that integrates improvements in both infrastructure and management practices.

LEPA (low-energy precision application) watering method. Photo credit Utah Department of Agriculture and Food.

Irrigation efficiency, defined as the proportion of water used by crops to the amount of water applied,[22] has increased over the years. Historically, irrigated agriculture in Utah has used flood irrigation, which is generally the least efficient irrigation method (Table 7-1). As systems modernize, many producers are adopting more efficient irrigation methods. These upgrades allow producers to increase crop production while reducing the volume of water diverted. While these efficiency gains provide clear advantages at the field level, they can result in increased water depletions at a basin scale. This tradeoff between local efficiency and basin-wide depletion is further explained below.

**Balancing irrigation efficiency with basin-scale hydrology**

Agricultural irrigation systems move water from rivers, reservoirs or aquifers to farms through a network of ditches, canals and pipes. Once applied, water is consumed by crops or returned to the hydrologic system. The application method determines the irrigation efficiency: the proportion of water used by crops relative to the amount of water applied.

**Major pathways of irrigation water:**

- **Crop consumption:** A portion of applied irrigation water is used by crops to grow. When more crops are grown, crop water consumption increases. The amount consumed also varies by crop type, climate conditions and soil characteristics. Some irrigation water is returned to the atmosphere through plant transpiration and evaporation from soil and irrigation delivery systems. Together, these processes are referred to as evapotranspiration.

- **Return flows to surface water:** Water that runs off fields or moves through shallow soils may return to nearby streams or canals, where it can contribute to environmental or other downstream uses.
- **Groundwater recharge**: Some irrigation water percolates deeper into the soil and recharges aquifers.

**Table 7-1. Irrigation efficiency by application method. Data source: Utah Agricultural Experiment Station Research Report No. 233[23]**

| Irrigation method | Reasonable application efficiency |
|---|---|
| Flood | 50-80% |
| Sprinkler | 57-90% |
| Drip | 95-98% |

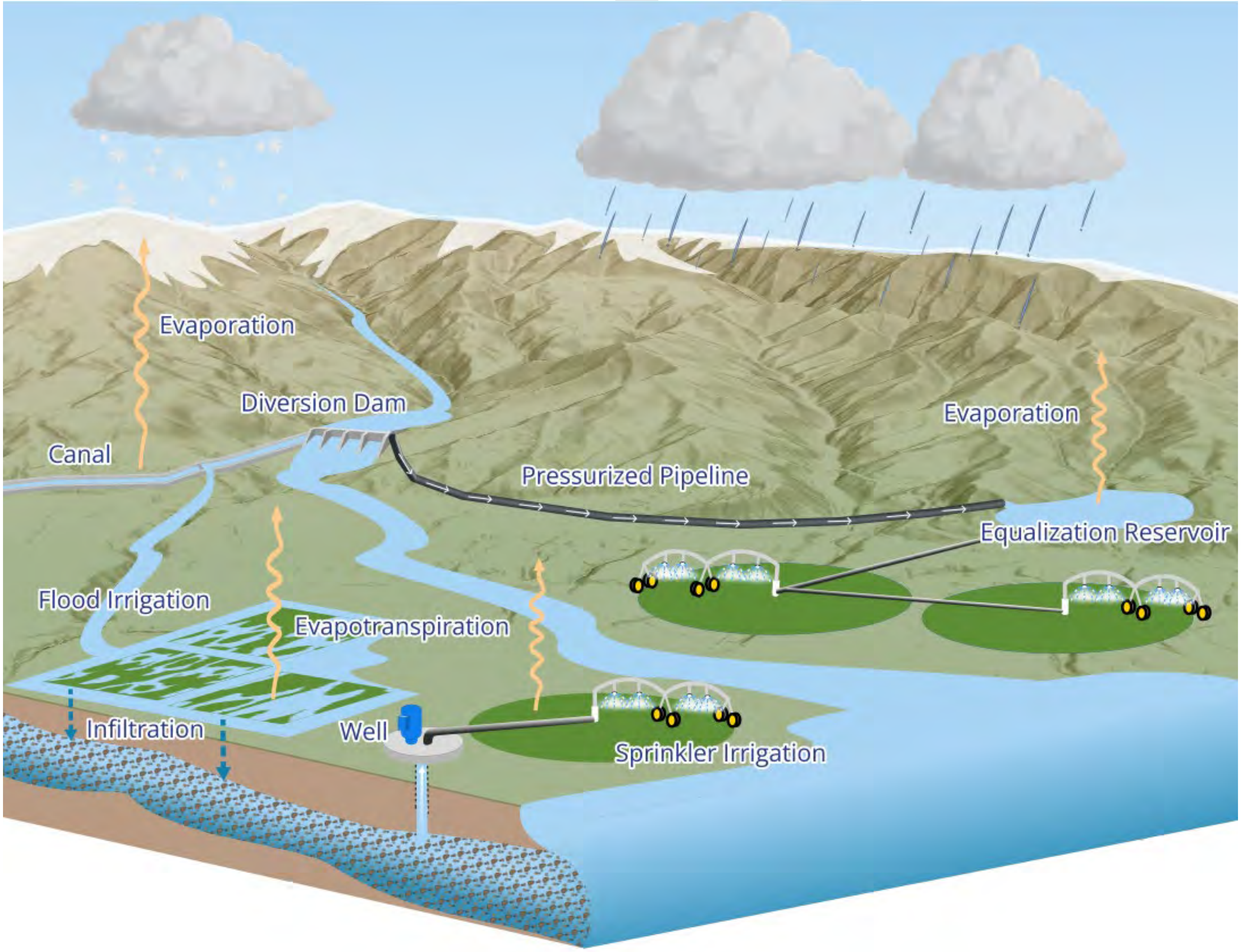
A potential tradeoff for agricultural water optimization is that improving irrigation efficiency can unintentionally increase consumptive use at the basin scale. Increased consumptive use because of improved efficiency leads to increased crop production, which benefits producers and society. However, consumptive use must be balanced with a basin's water supply to avoid unintended consequences. Research shows that groundwater resources are often the most impacted[24] because more efficient canal systems and irrigation methods reduce return flows that historically helped recharge aquifers. At the same time, updating failing infrastructure and keeping water in canals may allow that water to benefit surface waters, such as Great Salt Lake. As we seek to increase irrigation efficiency, careful basin planning and studies are needed to balance agricultural productivity with water resource constraints.

The most effective irrigation method varies by location and farm operation. Factors such as water source, delivery system, land characteristics and energy access influence which irrigation systems are practical. As of 2024, 42% of irrigated agricultural fields in Utah are flood irrigated, 47% are sprinkler irrigated, 10% are sub-irrigated from shallow groundwater and 0.1% are drip irrigated.[3]

Crop and soil management practices also play an important role in optimizing water use. Crop management practices may include rotation, diversification to incorporate drought-tolerant or less water-intensive plants and harvesting practices that shorten irrigation requirements. Soil management practices such as improving soil structure to reduce compaction and enhance water infiltration and water-holding capacity allow crops to make more effective use of available moisture.

These management decisions depend on factors such as market access, commodity prices and equipment availability. As a result, producers are best positioned to evaluate the trade-offs and benefits of different practices for their specific operations, often drawing on expertise from Utah State University Extension, U.S. Department of Agriculture, Utah Department of Agriculture and Food and industry professionals.

**Figure 7-2. How water moves through agricultural systems.**



## Agricultural Voluntary Incentive Program

The Agricultural Voluntary Incentive Program is a voluntary conservation grant program administered by the Utah Department of Agriculture and Food in partnership with the Division of Water Quality. The program provides incentives and technical assistance to help producers implement best management practices that improve water quality and quantity, enhance soil health, improve yields and support long-term agricultural productivity.

*LEPA (low-energy precision application) watering method. Photo credit Utah Department of Agriculture and Food.*

Producers who enroll in the program work with conservation planners to complete on-site assessments that establish a baseline level of conservation practices. Based on this assessment, planners and producers work to develop conservation plans tailored to the specific needs of the farm or ranch. These plans include a comprehensive nutrient management plan and may also incorporate irrigation water management, soil health and integrated pest management elements.

During a three-year contract period, producers implement the practices identified in the conservation plan and maintain records documenting their progress. As practices are implemented, producers may receive regulatory and financial incentives that increase as additional conservation measures are adopted.

The practices supported through the program can improve both the quantity and quality of water throughout the state. For example, irrigation water management plans include decision-making tools to help producers determine when and how much to irrigate, allowing them to more effectively use precipitation and irrigation water. Soil health practices such as implementing cover crops, managing harvest and stubble or reducing tillage limit soil compaction and surface crusting. Nutrient management plans help ensure that livestock grazing and applications of manure, compost and fertilizer are done in an agronomically and environmentally sound manner. When these various practices are implemented in a coordinated way, they can promote increased water infiltration and retention, help mitigate salinity concerns and reduce sediment and nutrient runoff to surface waters. To date, the Utah Department of Agriculture and Food has enrolled over 150,000 acres in the Agricultural Voluntary Incentive Program.

## Conservation Easement Program

A conservation easement is a voluntary legal agreement between a landowner and a qualified organization, such as a land trust or government agency, that permanently restricts certain types of development or land use to protect specific conservation values. These values may include agricultural production, wildlife habitat, water resources or open space.

The restrictions in a conservation easement are tailored to the specific property and reflect the goals of the landowner, the easement holder and funding partners. In Utah, conservation easements are commonly supported through partnerships involving state programs administered by Utah Department of Agriculture and Food, federal programs through the U.S. Department of Agriculture Natural Resources Conservation Service and nonprofit conservation organizations.

Water rights are often central to the conservation values being protected by an easement. Water rights associated with the property are typically identified in the easement deed, which is recorded in the county's property records. In many cases, the easement places restrictions on how those water rights can be used or transferred in the future.

Conservation easements are a powerful tool within Utah's statewide water conservation strategy supporting several objectives related to water management and land stewardship, including:

- **Maintaining agricultural lands and open space.** Easements help limit subdivision and land use conversion, preserving working landscapes that support food production and rural economies.
- **Encouraging water-efficient agricultural practices.** Landowners may participate in cost-share or technical assistance programs to install efficient irrigation systems and adopt soil health practices that improve water retention.
- **Supporting watershed health and groundwater recharge.** Many easements include provisions to maintain riparian buffers, wetlands and wet meadows that slow runoff, reduce erosion, increase infiltration and improve flood resilience
- **Providing greater certainty for water planning.** Because easements are permanent, they help stabilize land and water use patterns over time, allowing water planners to better anticipate long-term demand.

# Recommendations

7-1. The Legislature should support policies that maintain agricultural viability while providing flexibility for producers to adapt to changing water conditions and market demands.

7-2. The Utah Department of Agriculture and Food should expand education on the importance of agriculture to make clear connections between agriculture and food supply.

7-3. The Utah Department of Agriculture and Food should strengthen agricultural resilience by continuing to provide tools and support to help producers manage risk and maintain operations during prolonged drought.

7-4. State and federal sources should continue to support the following programs:

- Conservation easement funding for the LeRay McAllister Fund and other local land trusts to preserve agricultural land.
- Water Optimization Program for agricultural producers to implement best management practices that optimize water use and reduce total consumptive use.
- Agricultural Voluntary Incentive Program to improve opportunities for farmers to implement conservation practices for their operations.
- Future water leasing programs.

7-5. The Legislature should provide statutory authority and funding opportunities to support small irrigation companies with planning, legal, engineering and other project development needs to be eligible for state and federal programs.

7-6. The Department of Agriculture and Food, Division of Water Resources and Division of Water Rights should continue to improve methods to collect data and quantify depletion changes from agricultural optimization projects.

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# 8

# Basin Perspectives

In this chapter:

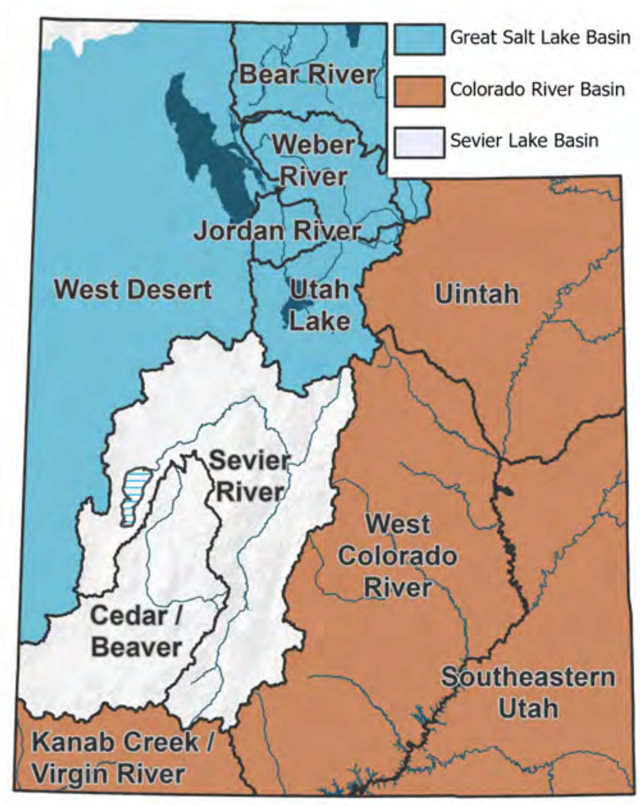
- Bear River
- Cedar/Beaver
- Jordan River
- Kanab Creek/Virgin River
- Sevier River
- Southeastern Utah
- Uintah
- Utah Lake
- Weber River
- West Colorado River
- West Desert
- Recommendations

Photo credit Kane County Water Conservancy District

With a statewide overview established, this chapter shifts focus to basin-specific conditions across Utah. Water availability, demand and management challenges are shaped by local conditions and vary widely across Utah's diverse basins. Factors such as climate, hydrology, land use, population growth and infrastructure influence how water is developed, used and managed in each basin. Understanding these differences is essential for identifying regional priorities, evaluating trade-offs and supporting effective water policy and management. This chapter highlights those basin-specific conditions and perspectives. The basins referenced in this chapter reflect watershed council boundaries, which differ slightly from the hydrologic basin boundaries discussed in Chapter 2 (Figure 2-1); there is also one naming convention that differs, the Southeastern Utah watershed council basin generally corresponds to the Southeast Colorado River basin (Figure 8-1).

To prepare this chapter, the Division of Water Resources consulted with local watershed councils. These councils were established by statute to serve as diverse, balanced forums for discussing water policy and resource issues at the local level. Although these councils are not vested with any regulatory, infrastructure financing, enforcement powers or responsibilities, they play an important role in identifying regional concerns, sharing local knowledge and elevating issues that can inform state planning and decision-making. The following sections outline the needs and challenges identified by watershed councils within their area and highlight examples of collaborative efforts to address specific needs.

**Figure 8-1. Utah's watershed council basins.**



# Bear River Basin


## Basin overview

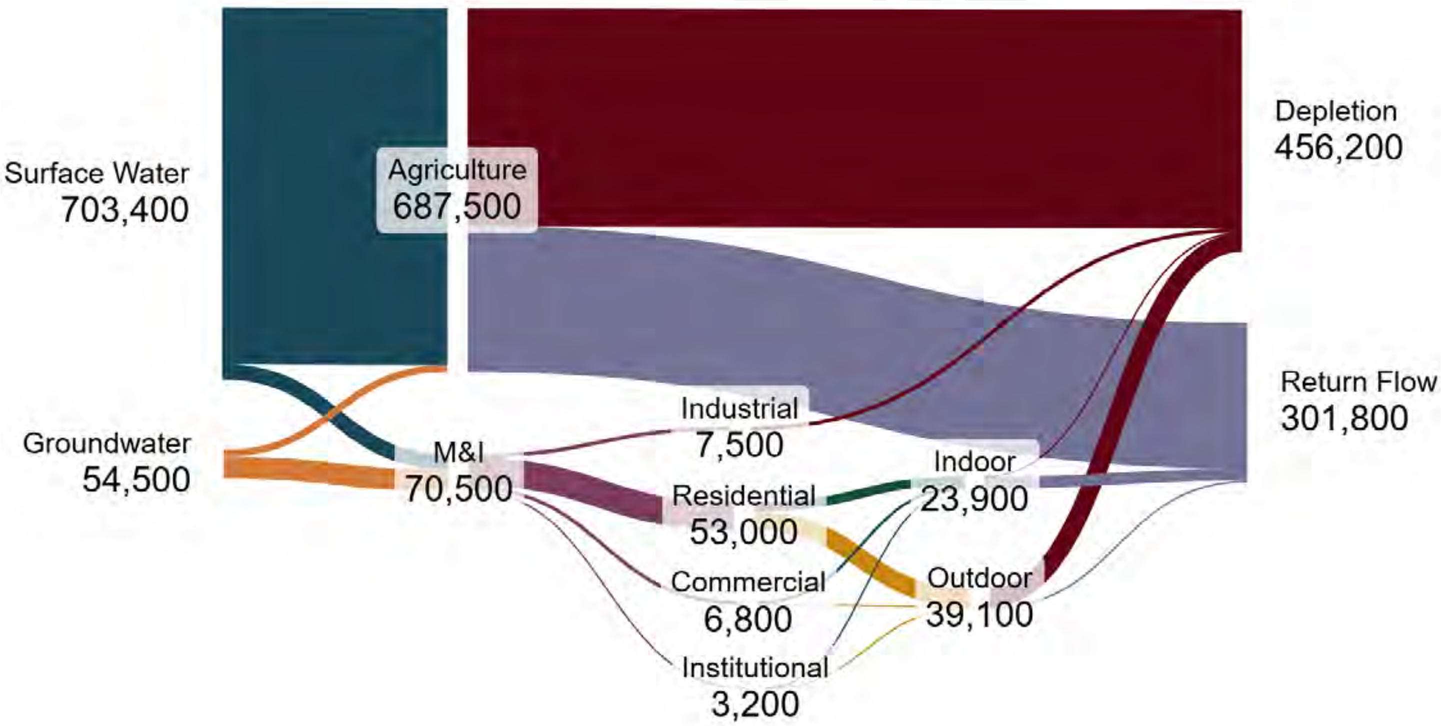
The Bear River Basin includes Cache and Rich counties and portions of Box Elder and Summit counties, spanning 3,300 square miles. The area is characterized by broad valleys separated by mountain ranges. Snowmelt provides the primary source of runoff, which ultimately drains south to Great Salt Lake, with the Bear River being the lake's largest source of inflow. The river flows through Idaho, Wyoming and Utah and is heavily managed. The river is diverted to Bear Lake, a natural water body, which serves as the area's largest storage reservoir for irrigation and flood control. Six hydroelectric dams also operate on the Bear River, adding to the diverse list of water user groups including agriculture, municipal, industrial, recreational and environmental. Water management is shaped by its multi-state nature, extensive infrastructure and the need to balance upstream uses with downstream contributions to Great Salt Lake. The basin is also home of the Northwestern Band of the Shoshone Nation.

## Description of water use

The Bear River Basin water budget (Figure 8-2) highlights the following patterns:

- 93% of diversions are from surface water, and 7% are from groundwater.
- Natural surface water supply is augmented by 6,350 acre-feet per year of water imported from the Weber River Basin.
- 91% of diverted water in the basin is used for agricultural irrigation, and 66% of that is depleted.
- 9% of diverted water is used for M&I purposes, of which 63% is depleted. Outdoor water use accounts for 80% of M&I depletions.

**Figure 8-2. Bear River Basin water budget.**




*Data reported is the average (2020-2024) in acre-feet for diversions, depletions and return flow by sector within the hydrologic basin. Imported water that is diverted within the basin is incorporated into the surface water diversion data. Water exports are not shown. Data source: Division of Water Resources Water Budget Model.*

## Basin challenges

- **Growing demand and competing uses:** population growth and urbanization increase pressure on agricultural, municipal and environmental water needs.
- **Loss of agricultural lands and open space:** development reduces food production capacity, habitat connectivity and agricultural way of life.
- **Changing hydrology:** warmer temperatures and shifting runoff timing increase consumptive use and complicate water management.
- **Water quality degradation**: nonpoint source pollution, watershed disturbances and return flow variability degrade water quality and ecosystem function.
- **Invasive species:** species such as phragmites, carp and Eurasian watermilfoil degrade habitat, outcompete native species and negatively affect water quality and quantity.
- **Conflicting water management objectives:** competing regional priorities, including Great Salt Lake demands, complicate decision-making.

## Basin needs

- **Integrate land use and water planning**: align growth with water availability and community values to maintain agricultural lands and manage demand.
- **Expand water conservation and efficiency:** increase funding and education for agricultural producers to protect agriculture and open space and for residents to understand and reduce M&I use.
- **Improve measurement and data:** expand metering and utilize water use data to inform management decisions.
- **Enhance ecosystem management:** implement invasive species control and maintain functional flows.
- **Strengthen planning tools:** support decision-making with data, modeling and long-term supply analysis of groundwater withdrawal and recharge.
- **Balance competing water uses:** support planning approaches that address agricultural, municipal and environmental needs, including Great Salt Lake.

## Basin success story

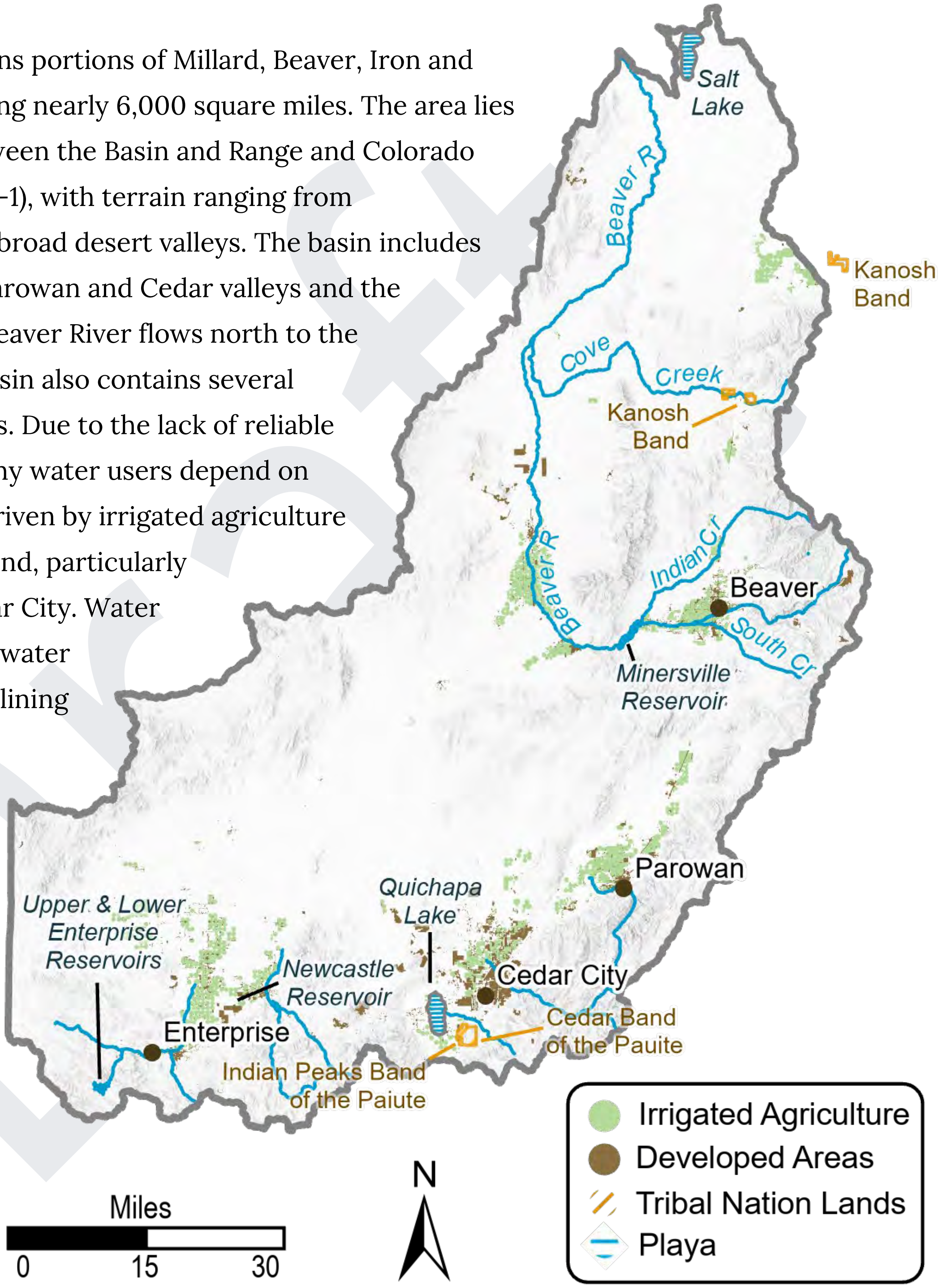
Bear River Basin has the most participation in Utah's agricultural water optimization program. This program modernizes agricultural irrigation within the state by investing in on-farm and canal upgrades to maintain or reduce diversions. Of the 690 projects within the state, the Bear River Basin has 315, highlighting that farmers in the basin are forward-looking, good stewards of the land who invest in better farming practices. Of the $53 million invested on projects, farmers have contributed $20 million. Farmers are spending money and time to increase the resilience of a public resource. These projects have reduced diversions by approximately 50,000 acre-feet per year, freeing up water for other purposes.

*Water optimization in the Bear River Basin. Photo credit Utah Department of Agriculture and Food.*

# Cedar/Beaver Basin

## Basin overview

The Cedar/Beaver Basin spans portions of Millard, Beaver, Iron and Washington counties, covering nearly 6,000 square miles. The area lies within a transition zone between the Basin and Range and Colorado Plateau regions (see Figure 2-1), with terrain ranging from mountainous headwaters to broad desert valleys. The basin includes the Beaver River drainage, Parowan and Cedar valleys and the Beryl-Enterprise area. The Beaver River flows north to the Sevier Lake playa, and the basin also contains several smaller terminal lake systems. Due to the lack of reliable surface water resources, many water users depend on groundwater. Water use is driven by irrigated agriculture and growing municipal demand, particularly in communities such as Cedar City. Water management aims to deliver water to users while stabilizing declining groundwater levels through voluntary arrangements and groundwater management plans in some areas. The basin is also home to the Kanosh Band of the Paiute Tribe.

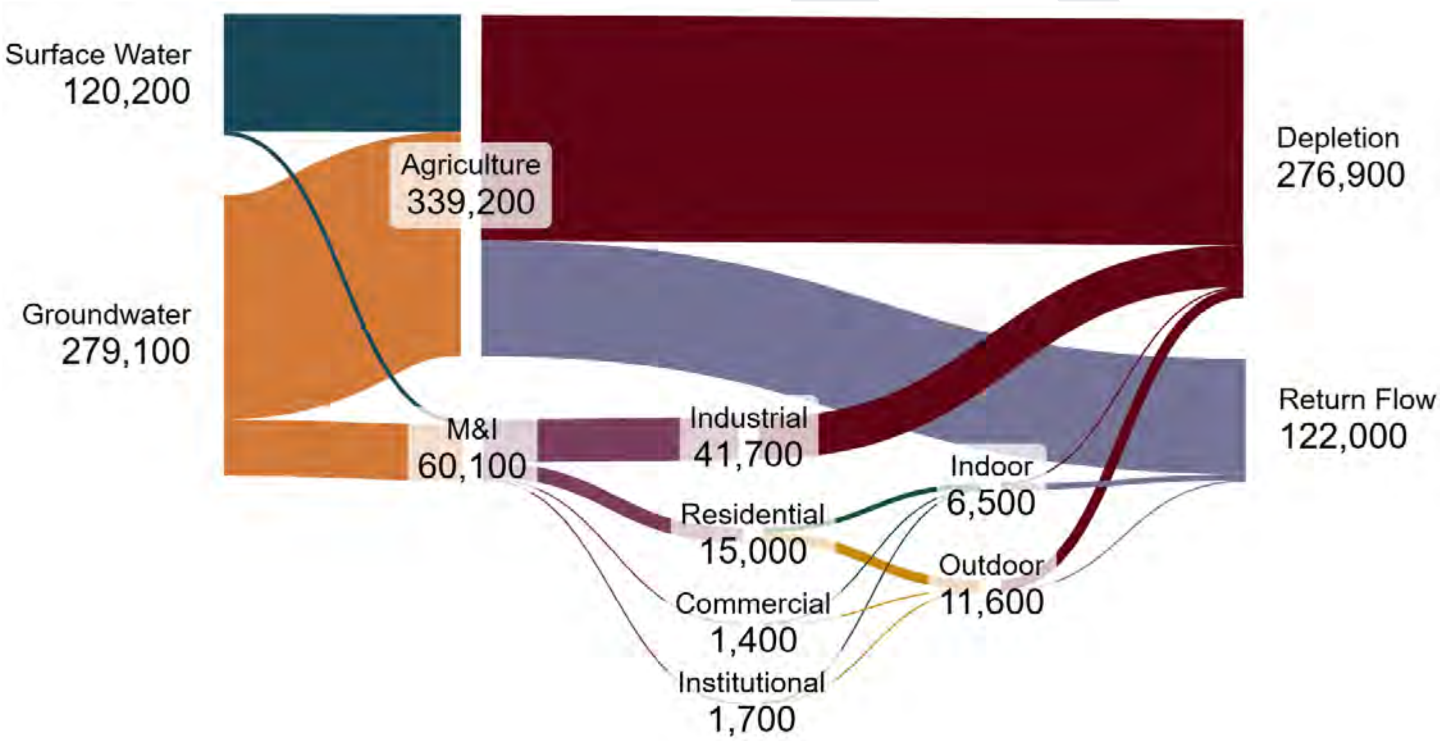


## Description of water use

The Cedar/Beaver Basin water budget (Figure 8-3) highlights the following patterns:

- 30% of diversions are from surface water, and 70% are from groundwater.
- Water supply is augmented by 14,700 acre-feet per year of imported water from the Kanab Creek/Virgin River and Sevier River basins for agriculture.
- 85% of diverted water in the basin is used for agricultural irrigation, and 66% of that gets depleted.
- 15% of diverted water is used for M&I purposes, and 88% of that gets depleted. Industrial water use accounts for 80% of M&I depletions.

**Figure 8-3. Cedar/Beaver Basin water budget.**

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## Basin challenges

- **Groundwater overdraft and declining reliability:** long-term overextraction reduces aquifer storage, contributes to land subsidence and increases uncertainty for agricultural production and municipal supply.
- **Water supply limitations:** prolonged drought and inconsistent runoff limit surface water availability, with insufficient infrastructure to capture and store high-flow events.
- **Aging and limited infrastructure:** existing recharge, storage and delivery systems are inefficient and limit water management flexibility.
- **Wildfire risk and watershed condition:** altered fire regimes have increased fuel loads, elevating the risk of catastrophic wildfire with potential consequences for water quality and quantity.
- **Growing demand and competing uses:** population growth and economic development intensify competition among agricultural, municipal and environmental uses.

## Basin needs

- **Expand water conservation and efficiency:** expand adoption of advanced irrigation technologies, municipal conservation programs and waterwise practices to reduce demand across sectors.
- **Improve groundwater management:** invest in aquifer recharge projects to stabilize groundwater levels and reduce overall groundwater withdrawals through voluntary arrangements and groundwater management plans.
- **Invest in water infrastructure:** upgrade delivery, treatment and monitoring systems to improve system efficiency, reliability and operational flexibility.
- **Restore and manage watersheds:** implement vegetation management, wildfire mitigation and restoration projects to improve infiltration, water quality and ecosystem resilience.
- **Strengthen planning and coordination:** enhance data, modeling and regional collaboration to support balanced water management and long-term supply reliability.
- **Expand water reuse:** explore opportunities to capture and store Type I reuse water (suitable for potential human contact).
- **Preserve agriculture:** protect agricultural water use to preserve food security and rural community vibrancy.

## Basin success story

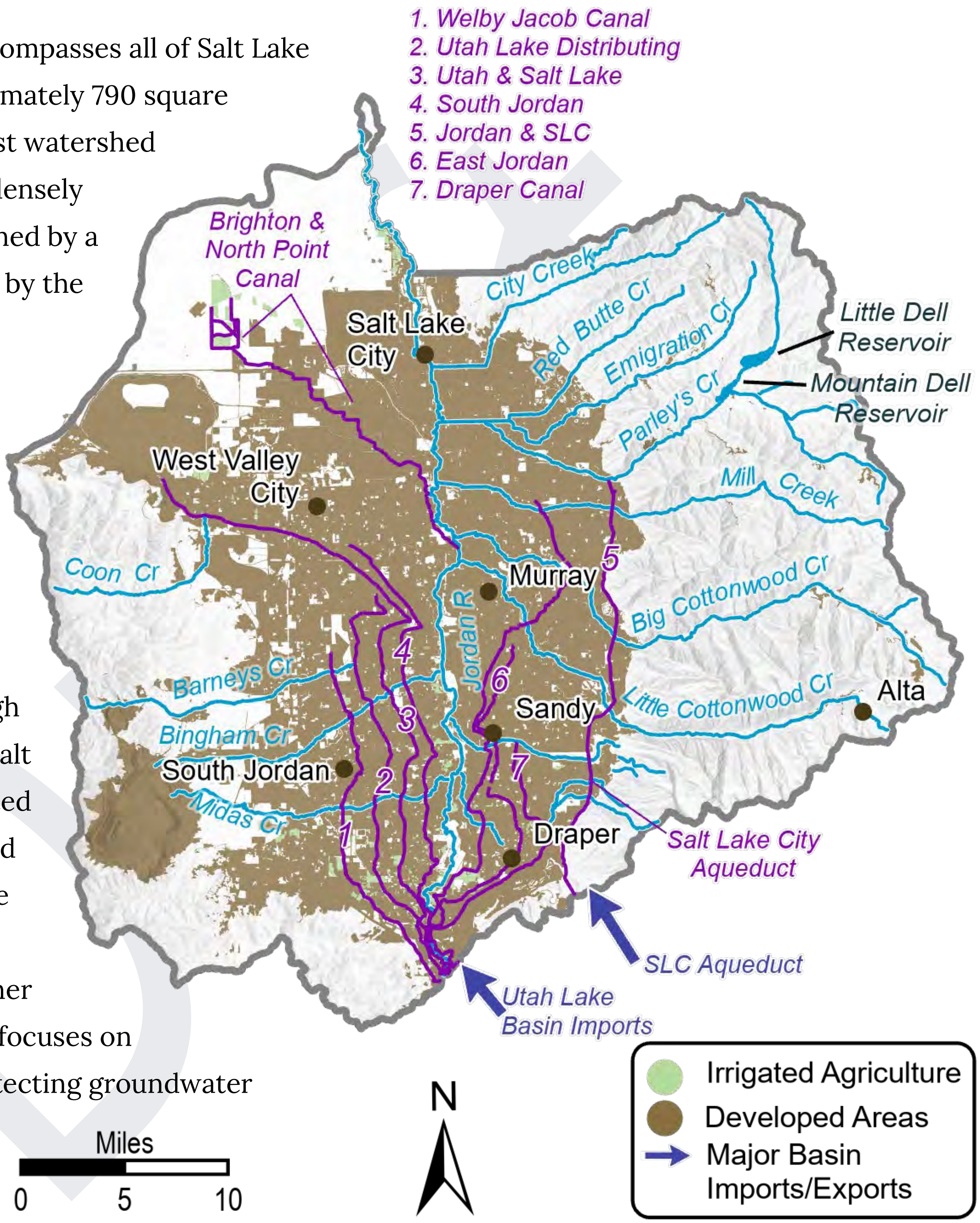
The upper portions of the Beaver River Watershed, located on the Fishlake National Forest, has long been a priority for improving forest health and community resilience. Historically, small-scale vegetation treatments were insufficient to reduce wildfire risk or improve watershed conditions. Through shared stewardship, partners now implement larger-scale projects that modify fire behavior and protect infrastructure and recreation areas. The Beaver River Watershed Improvement Project includes the Tushar Ridge West Project, which mechanically reduces hazardous fuels while providing commercially valuable timber to support the local economy. The Beaver Canyon Infrastructure Project targets treatments near key infrastructure, increasing wildfire management options. Together, these efforts enhance forest and watershed health, reduce wildfire risk, strengthen regional collaboration and provide long-term ecological, community and economic benefits.

*Fuel reduction in the Beaver River Watershed. Photo credit Watershed Restoration Initiative.*

# Jordan River Basin

## Basin overview

The Jordan River Basin encompasses all of Salt Lake County and covers approximately 790 square miles, making it the smallest watershed council area yet the most densely populated. The area is defined by a broad valley floor bounded by the Wasatch and Oquirrh mountains, where snowmelt-fed streams supply surface flows and recharge aquifers. The hydrologic system is highly interconnected and intensively managed, with water flowing north through the Jordan River to Great Salt Lake. Water use is dominated by M&I demands, supported by a combination of surface water, groundwater and imported supplies from other areas. Water management focuses on meeting high demand, protecting groundwater resources and maintaining flows to Great Salt Lake under increasing pressure from population growth and competing demands.

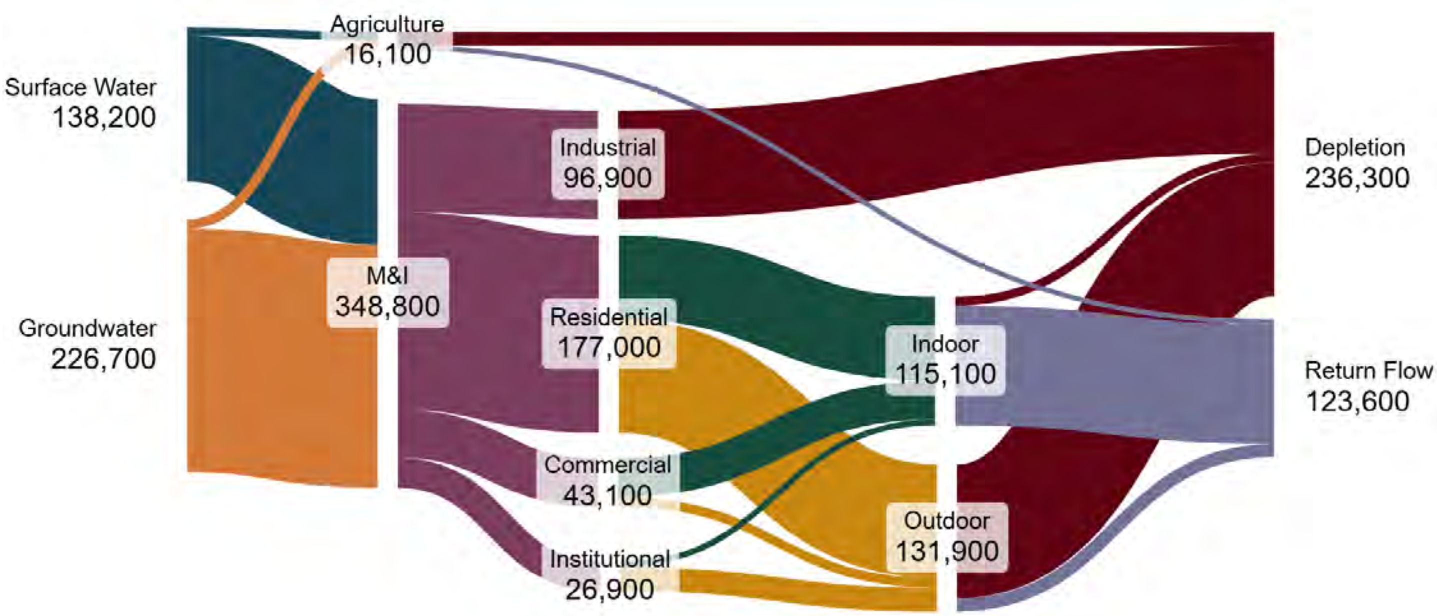


## Description of water use

The Jordan River Basin water budget (Figure 8-4) highlights the following patterns:

- 38% of diversions are from surface water, and 62% are from groundwater.
- Natural surface water supply is augmented by the import of 148,700 acre-feet per year from the Utah Lake Basin, much of which originates from the Uintah Basin.
- 4% of diverted water in the basin is used for agricultural irrigation, and 71% of that gets depleted.
- 96% of diverted water is used for M&I purposes, and 64% of that gets depleted. Outdoor water use accounts for 51% of total depletions, and industrial water use accounts for 41% of total depletions.

**Figure 8-4. Jordan River Basin water budget.**




*Data reported is the average (2020-2024) in acre-feet for diversions, depletions and return flow by sector within the hydrologic basin. Imported water that is diverted within the basin is incorporated into the surface water diversion data. Water exports are not shown. Data source: Division of Water Resources Water Budget Model.*

## Basin challenges

- **Growing demand and competing uses:** population growth increases pressure on water supply for municipal, industrial and environmental water needs, including Great Salt Lake.
- **Water quality degradation:** nonpoint source pollution, insufficient stormwater infrastructure and encroaching development on wetlands and riparian areas is degrading water quality.
- **Invasive species:** Species such as phragmites degrade habitat, outcompete native species and negatively affect water quality and quantity.
- **Source watershed risks:** increased recreation and wildfire risk threaten drinking water sources.
- **Declining groundwater levels:** overextraction reduces aquifer storage, increasing uncertainty for M&I supply.
- **Aging infrastructure:** aqueducts and other infrastructure require modernization and sustained investment to maintain reliability.
- **Potential risks to imported water:** the majority of imported water in this basin originates in the Colorado River system. Colorado River supplies may be subject to curtailment if obligations under the 1922 Compact are not satisfied.

## Basin needs

- **Long-term water planning:** align growth with water sustainability.
- **Expand water conservation:** increase funding, education and outreach to increase landscape conversion to waterwise landscaping.
- **Manage invasive species:** continue funding and coordinated control efforts.
- **Enhance river corridors:** Protect riparian corridors to improve water quality and develop community amenities.
- **Improve storm water management:** increase funding and education to improve storm water infrastructure and implement best management practices.
- **Continue Great Salt Lake efforts:** support planning and restoration efforts to improve wetland health, protect the economy and reduce dust impacts.
- **Improve measurement and data:** fill gaps in drinking water and secondary water metering.

## Basin success story

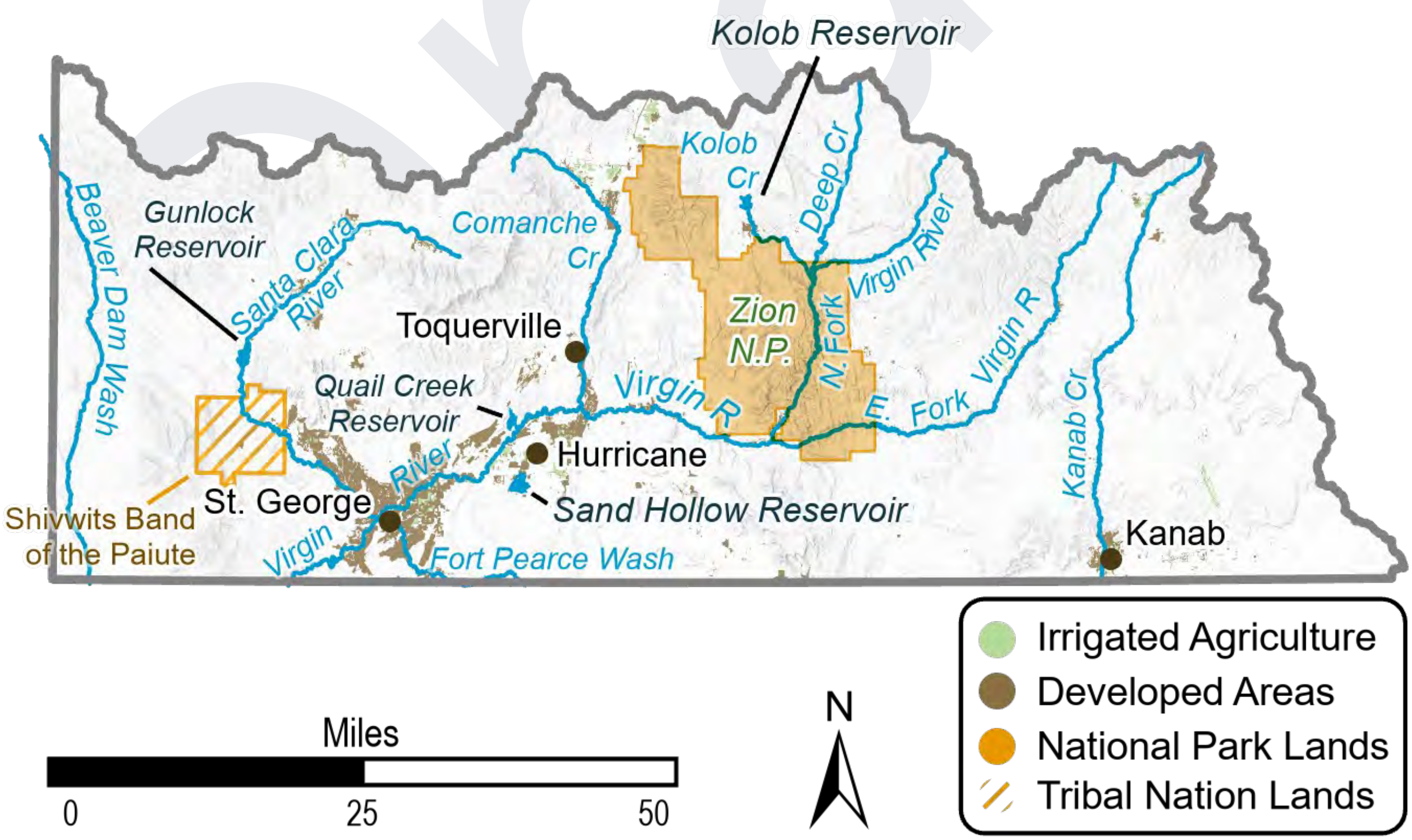
Cities throughout the basin are adopting landscaping ordinances to become more waterwise. One example is the City of West Jordan, which has changed ordinances to reduce water use. Starting with the City of West Jordan General Plan, water is front and center in the city's planning. Growth within the city is driving a steady increase in water use. Realizing that additional water supply is not guaranteed, the landscaping requirements ordinance was changed to require more water efficient landscaping on new development. Grass is limited and is not allowed in areas that cannot be efficiently watered such as park strips. Smart irrigation controllers that have the ability to automatically adjust watering based on weather conditions are required. Drip irrigation and mulch are required in non-grass landscape areas. These changes to new development will have a lasting impact on water use within the city and within the broader basin.

*Planting a waterwise park strip. Photo credit Division of Water Resources.*

# Kanab Creek/Virgin River Basin

## Basin overview

The Kanab Creek/Virgin River Basin includes most of Washington County and portions of Iron and Kane counties, covering roughly 3,500 square miles. The area is located at the intersection of the Colorado Plateau and Basin and Range regions and is home to unique plant and animal communities. The Virgin River and Kanab Creek flow to the Colorado River below Lee Ferry, Arizona. Surface water storage in various reservoirs provide a buffer against variable interannual flows. Water use supports growing municipal populations, irrigated agriculture, recreation and sensitive riparian ecosystems, with more than two-thirds of the land federally managed. The Shivwits Band of the Paiute Tribe also has significant land holdings in the basin. Water management is shaped by rapid population growth, particularly in Washington County, and forward-thinking conservation and water reuse strategies to meet long-term supply and environmental needs.

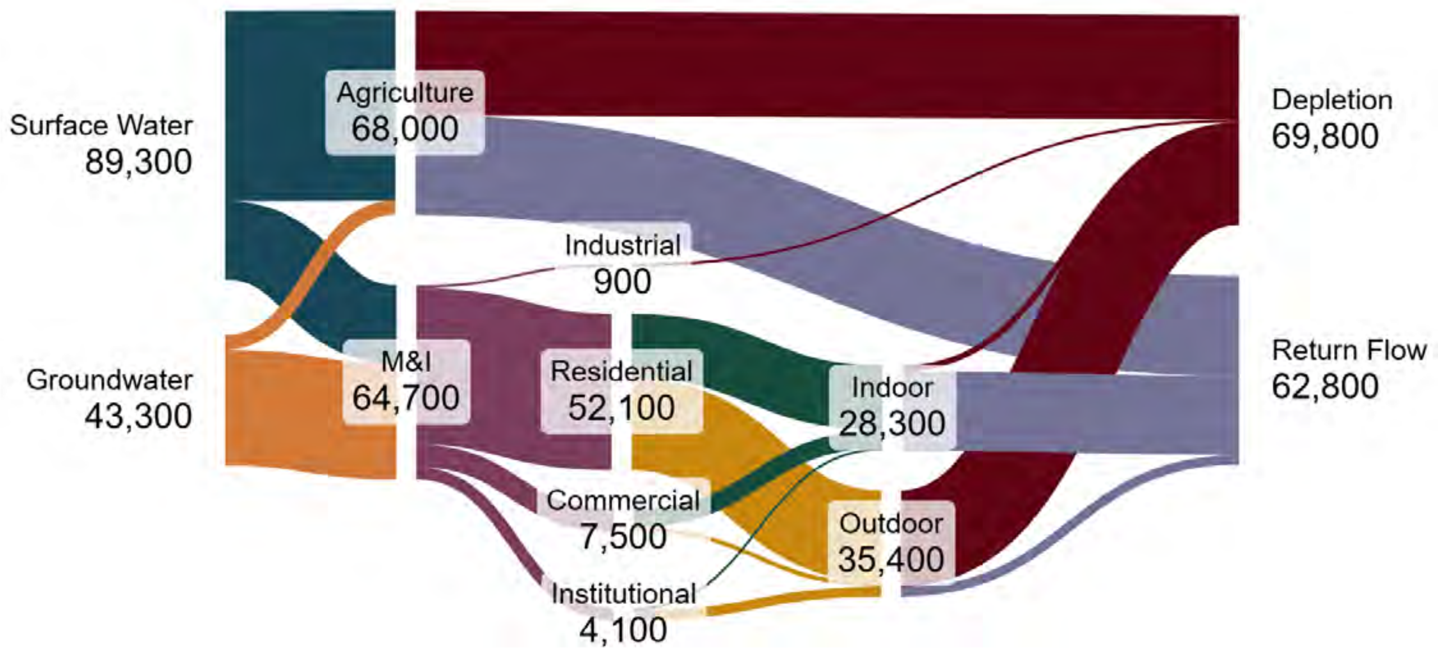


## Description of water use

The Kanab Creek/Virgin River Basin water budget (Figure 8-5) highlights the following patterns:

- 67% of diversions are from surface water, and 33% are from groundwater.
- Natural surface water supply is augmented by 2,200 acre-feet per year of imported water from the Sevier River Basin.
- 51% of diverted water in the basin is used for agricultural irrigation, and 51% of that gets depleted.
- 49% of diverted water is used for M&I purposes, and 54% of that gets depleted. Outdoor water use accounts for 50% of total depletions.

**Figure 8-5. Kanab Creek/Virgin River Basin water budget.**




*Data reported is the average (2020-2024) in acre-feet for diversions, depletions and return flow by sector within the hydrologic basin. Imported water that is diverted within the basin is incorporated into the surface water diversion data. Water exports are not shown. Data source: Division of Water Resources Water Budget Model.*

## Basin challenges

- **Growing demand and competing uses:** population growth and seasonal tourism increase demand across sectors.
- **Changing hydrology:** drought, rising temperatures and hydrologic variability are reducing water supply reliability.
- **Water quality degradation:** waters impaired by elevated temperatures, nutrients, E. coli, harmful algal booms, total dissolved solids and low dissolved oxygen degrade aquatic habitat and limit recreation opportunities.
- **Limited funding:** funding constraints slow infrastructure modernization and watershed restoration efforts.

## Basin needs

- **Strengthen planning and coordination:** align growth with long-term water supply and enhance regional coordination among water providers, agricultural producers, conservation programs and local governments.
- **Invest in water infrastructure and conservation:** expand investment in water reuse, conservation programs, groundwater recharge and infrastructure modernization.
- **Support watershed enhancement:** fund monitoring and technical support for restoration and protection efforts such as the Virgin River Program.
- **Support agricultural water efficiency:** increase irrigation efficiency and drought resilience tools to support viable agricultural operations.
- **Improve communication and data:** create measurable indicators to track progress in water efficiency, watershed health and ecosystem function and educate the public on land and water issues.

## Basin success story

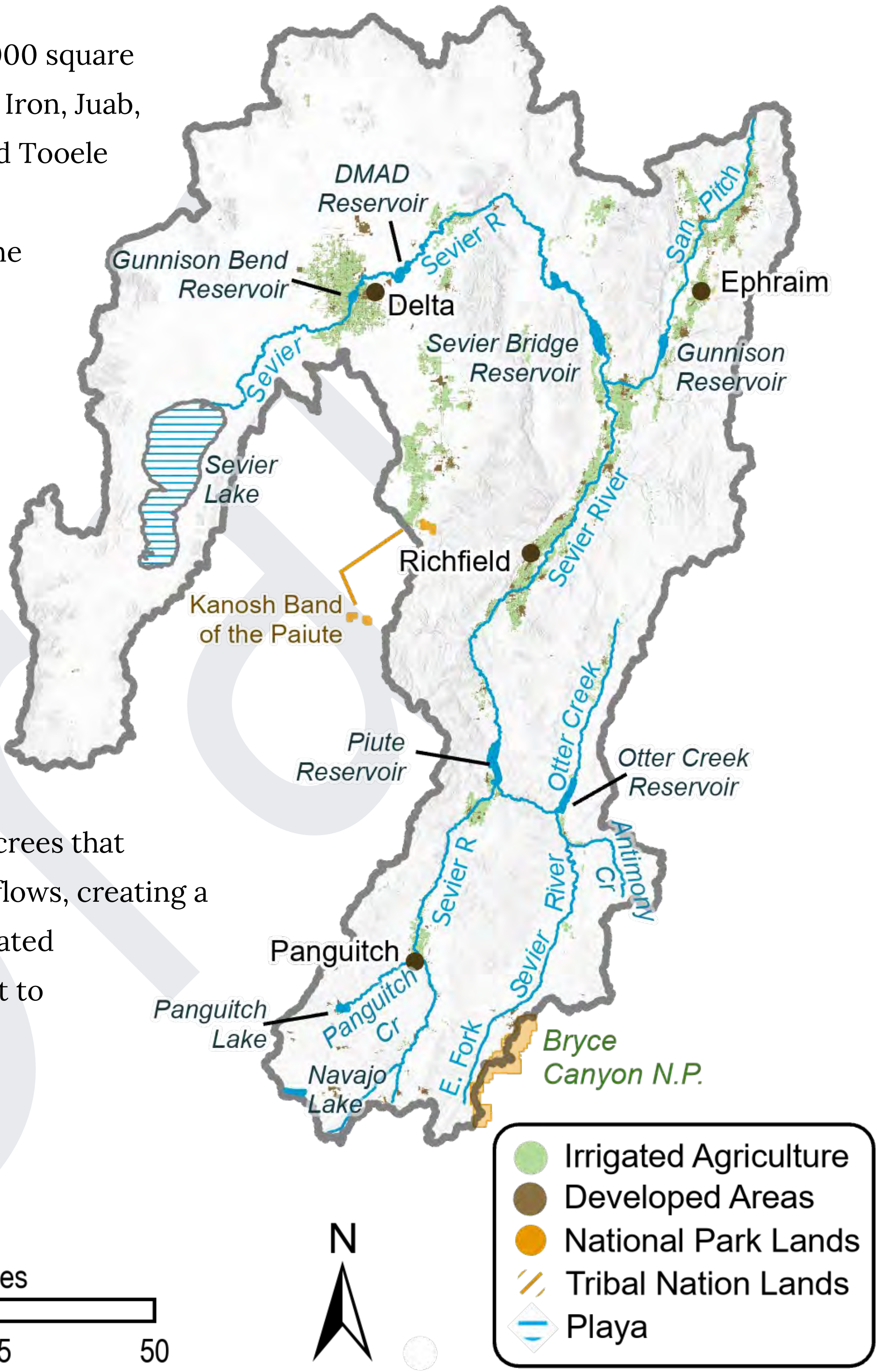
Washington County is leading Utah in landscape transformation, demonstrating how coordinated local efforts can reduce outdoor water use. With just 6% of the state's population, the county accounts for 52% of all landscape incentive participants, replacing more than 3.3 million square feet of grass with water-efficient landscaping as of February 2026. The Washington County Water Conservancy District plays a central role in this effort, including welcoming more than 100,000 visitors each year to the Red Hills Desert Garden, where visitors can learn about native, climate-adapted plants firsthand. In partnership with Conserve Southwest Utah, the annual Parade of Gardens showcases stunning waterwise landscapes through a self-guided tour that educates and inspires residents to rethink desert yards. By pairing practical incentives with real-world examples, local partners are accelerating the shift toward landscapes suited to the region's desert climate, delivering measurable, long-term water savings.

*Waterwise landscaping in Washington County. Photo credit Washington County Water Conservancy District.*

# Sevier River Basin

## Basin overview

The Sevier River Basin covers about 11,000 square miles and includes portions of Garfield, Iron, Juab, Kane, Millard, Piute, Sanpete, Sevier and Tooele counties. The basin is home of the Koosharem Band of the Paiute Tribe. The area includes a mix of mountain headwaters, agricultural valleys and desert. The Sevier River is the primary surface water source, supported by reservoirs along its mainstem and tributaries. Groundwater is another important water source, used by both agriculture and M&I users. Throughout the basin, water use is dominated by agriculture with additional M&I demands. Water management is governed by judicial decrees that protect senior water rights and return flows, creating a tightly interconnected and highly regulated system where little to no water makes it to Sevier Lake.

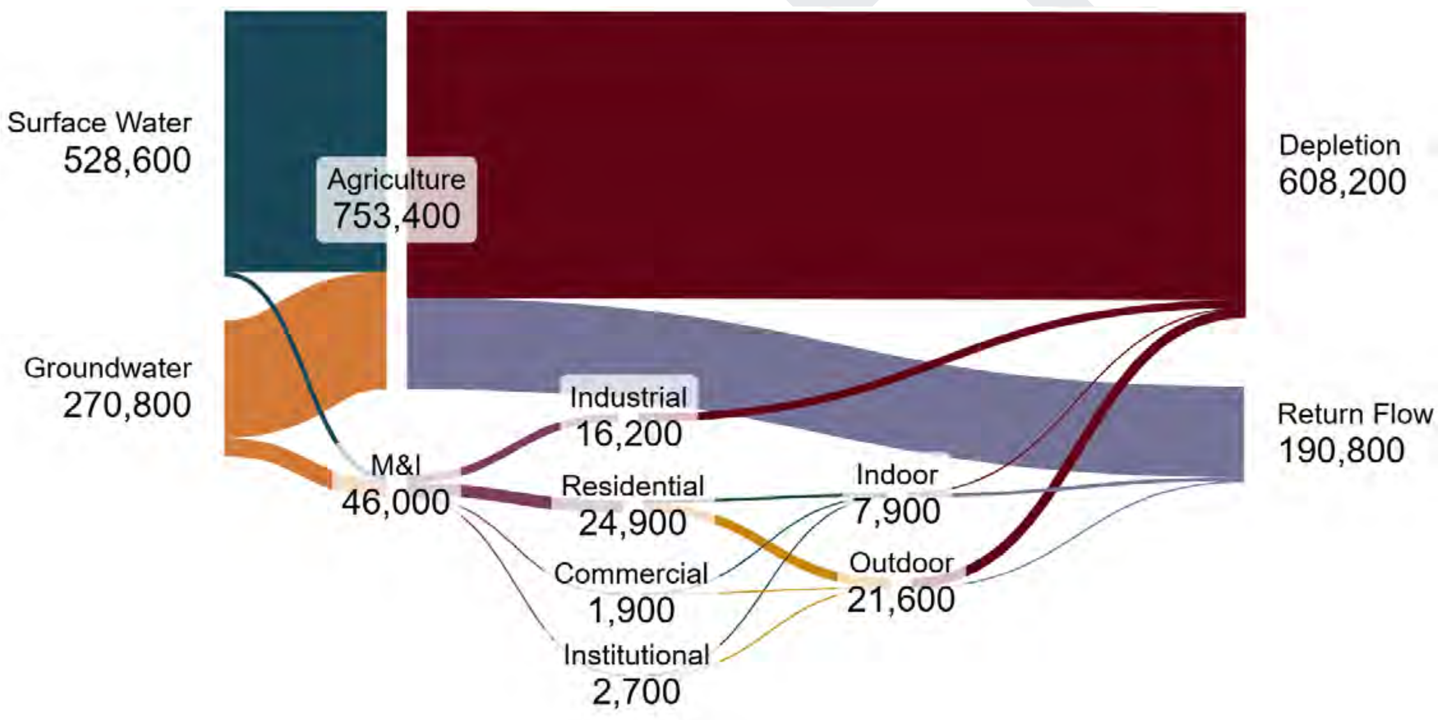


## Description of water use

The Sevier River Basin water budget (Figure 8-6) highlights the following patterns:

- 66% of diversions are from surface water, and 34% are from groundwater.
- Natural surface water supply is augmented by up to 8,800 acre-feet per year of imported water from the West Colorado River Basin.
- 94% of diverted water in the basin is used for agricultural irrigation, of which, 76% is depleted.
- 6% of diverted water is used for M&I purposes, and 79% of that gets depleted. Outdoor water use accounts for 54% of M&I depletions.

**Figure 8-6. Sevier River Basin water budget.**




*Data reported is the average (2020-2024) in acre-feet for diversions, depletions and return flow by sector within the hydrologic basin. Imported water that is diverted within the basin is incorporated into the surface water diversion data. Water exports are not shown. Data source: Division of Water Resources Water Budget Model.*

## Basin challenges

- **Drought and supply variability:** prolonged drought, reduced snowpack and an increasing shift in precipitation from snow to rain limits surface water availability and an increased reliance on stored supplies across the system.
- **Aging infrastructure and sedimentation:** aging infrastructure and sediment accumulation in reservoirs are limiting water supply storage and conveyance.
- **Limited water monitoring:** gaps in real-time measurement and understanding of aquifer conditions create uncertainty in allocation, recharge and long-term planning.
- **Water quality and watershed impacts:** nutrient loading, increased sediment transport and wildfires degrade habitat, watershed function and stream water quality.
- **Competing demands:** increasing pressure across agricultural, industrial and community water use.

## Basin needs

- **Expand water measurement and data systems:** improve real-time measurement, aquifer monitoring and data collection to support accurate allocation and informed decision-making.
- **Invest in water infrastructure:** secure funding to repair, replace and modernize aging reservoirs and delivery systems while addressing sedimentation.
- **Enhance watershed management:** implement restoration, erosion control, invasive species removal and habitat protection efforts to improve water quality, infiltration and ecosystem function.
- **Strengthen long-term planning:** support integrated planning approaches that balance agricultural, industrial and community water needs under changing conditions.
- **Enhance coordination and communication:** expand collaboration among local, regional and state entities to align water management strategies and share information.

## Basin success story

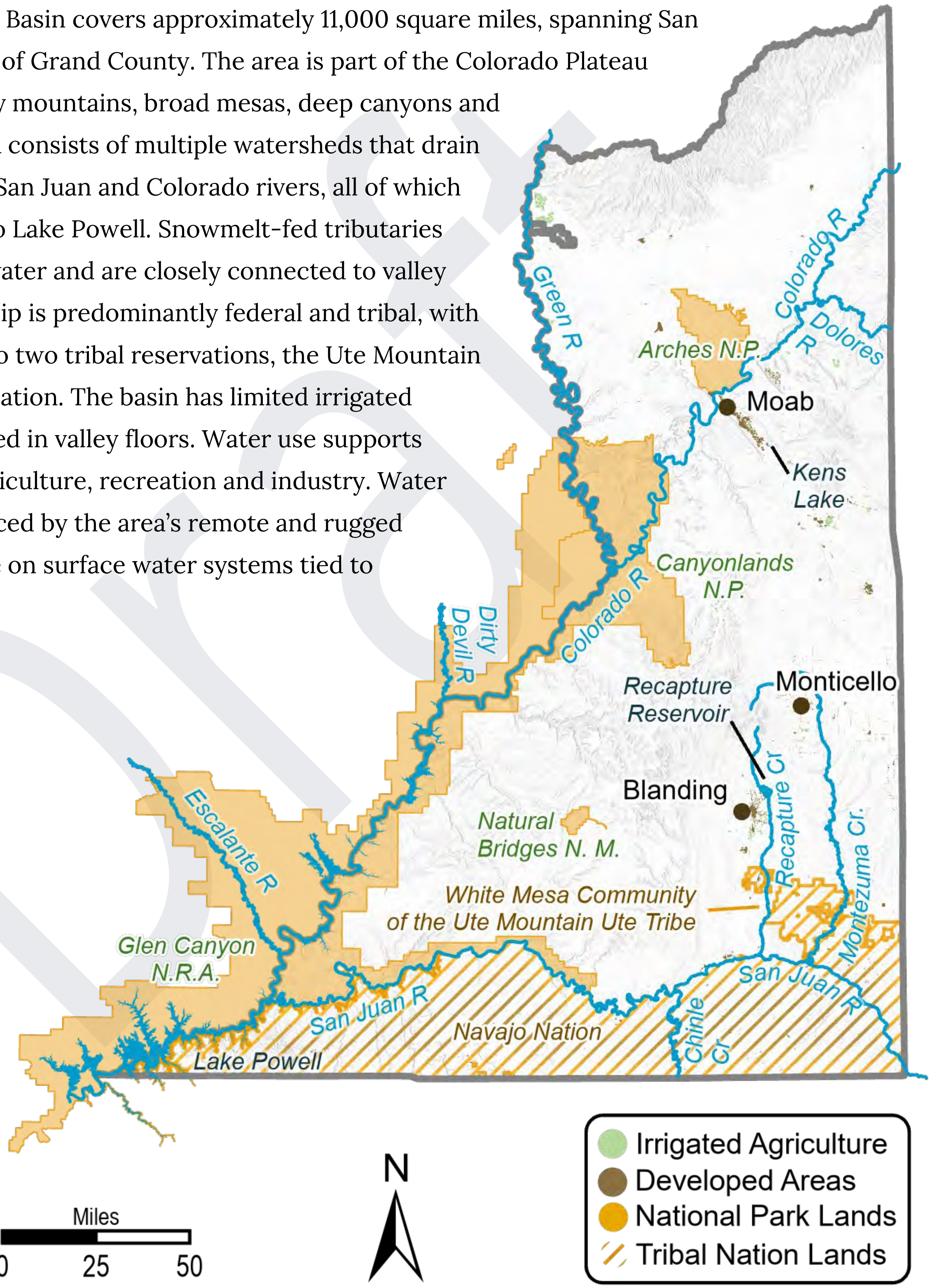
The Sevier Bridge Dam rehabilitation project enhanced the safety and functionality of the 120 year-old, 92 foot-tall dam in Juab County. The dam is vital to regional agriculture, power generation and recreation, storing water from the Sevier River in Yuba Reservoir, which at full capacity can hold approximately 226,000 acre-feet. The project modernized dam infrastructure and delivered critical safety upgrades to improve the dam's capacity to endure more intense earthquakes and floods, all while prioritizing cost effectiveness. The innovative design was honored as the 2025 National Rehabilitation Project of the Year by the Association of State Dam Safety Officials.

*Rehabilitated Sevier Bridge Dam.*

# Southeastern Utah Basin

## Basin overview

The Southeastern Utah Basin covers approximately 11,000 square miles, spanning San Juan County and much of Grand County. The area is part of the Colorado Plateau region characterized by mountains, broad mesas, deep canyons and desert valleys. The area consists of multiple watersheds that drain to the Green, Dolores, San Juan and Colorado rivers, all of which ultimately flow south to Lake Powell. Snowmelt-fed tributaries provide most surface water and are closely connected to valley aquifers. Land ownership is predominantly federal and tribal, with the basin being home to two tribal reservations, the Ute Mountain Ute Tribe and Navajo Nation. The basin has limited irrigated agriculture concentrated in valley floors. Water use supports small communities, agriculture, recreation and industry. Water management is influenced by the area's remote and rugged geography and reliance on surface water systems tied to the Colorado River.

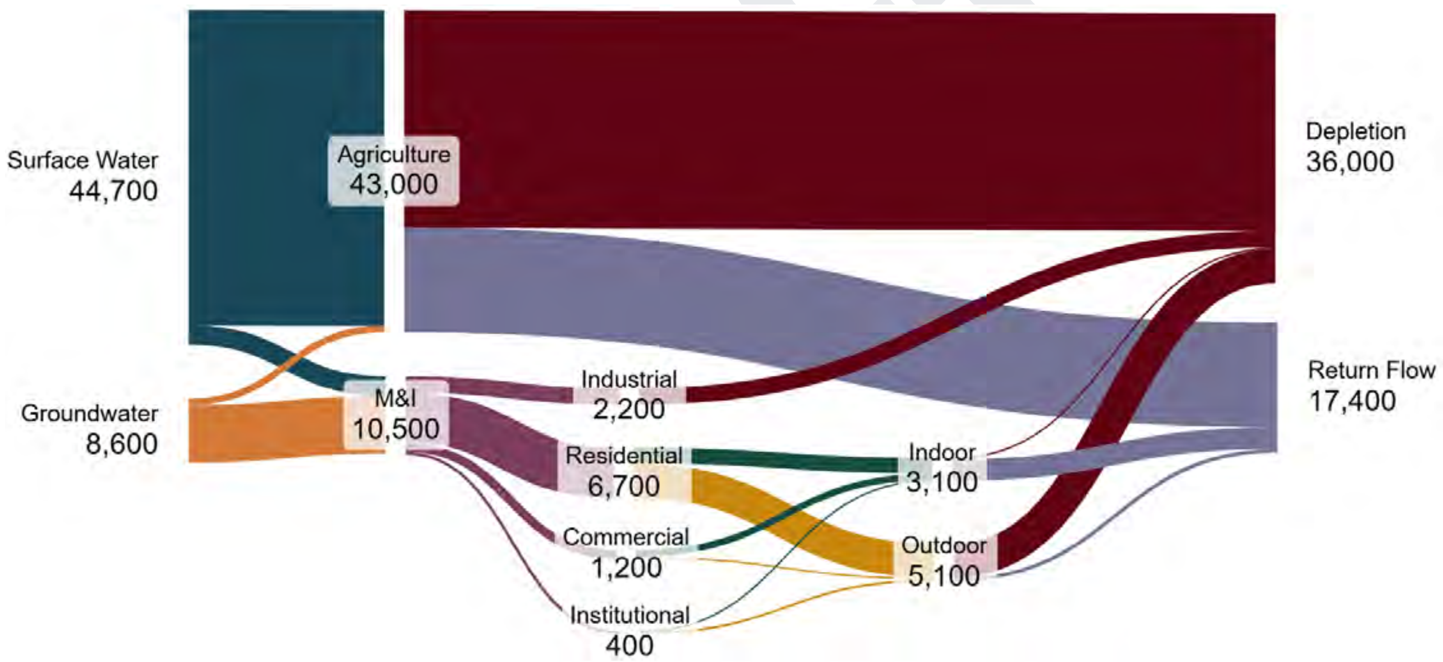


## Description of water use

The Southeastern Utah Basin water budget (Figure 8-7) highlights the following patterns:

- 84% of diversions are from surface water and 16% are from groundwater.
- 80% of diverted water in the basin is used for agricultural irrigation, and 67% of that gets depleted.
- 20% of diverted water is used for M&I purposes, and 67% of that gets depleted. Outdoor water use accounts for 66% of M&I depletions.

**Figure 8-7. Southeastern Utah Basin water budget.**




*Data reported is the average (2020-2024) in acre-feet for diversions, depletions and return flow by sector within the hydrologic basin. Imported water that is diverted within the basin is incorporated into the surface water diversion data. Water exports are not shown. Data source: Division of Water Resources Water Budget Model.*

## Basin challenges

- **Fractured governance:** land and water resources transcend political boundaries, complicating vegetation management, wildfire response and watershed protection.
- **Infrastructure and funding constraints:** small water systems face aging infrastructure, high costs and limited financial capacity
- **Changing hydrology:** rising temperatures and shifting precipitation patterns from snow to rain increase evapotranspiration and reduce water supply reliability.
- **Workforce and capacity limitations:** smaller systems often struggle to retain qualified personnel and maintain operational capacity.
- **Recreation and land use pressures:** increased visitation and development in some areas has placed additional strain on water resources.
- **Potential risks to Colorado River system water:** The water in this basin is part of the Colorado River system. Colorado River supplies may be subject to curtailment if obligations under the 1922 Compact are not satisfied.

## Basin needs

- **Improve coordination across jurisdictions:** strengthen collaboration among local, state, tribal and federal partners to support watershed management, wildfire mitigation and restoration efforts.
- **Invest in water infrastructure:** expand and modernize storage, delivery and treatment systems to improve reliability and reduce system losses.
- **Improve landscape water retention:** invest in strategies to keep water in the system and decrease flooding events such as beaver dam analogs, stormwater retention basins and rainwater harvesting.
- **Enhance groundwater understanding:** support long-term monitoring and modeling to better understand aquifer conditions and recharge.
- **Support agricultural viability:** improve irrigation efficiency and provide tools to sustain agricultural operations under changing conditions.
- **Increase education and outreach:** expand awareness of water conservation, watershed health and the connection between land use and water resources.

## Basin success story

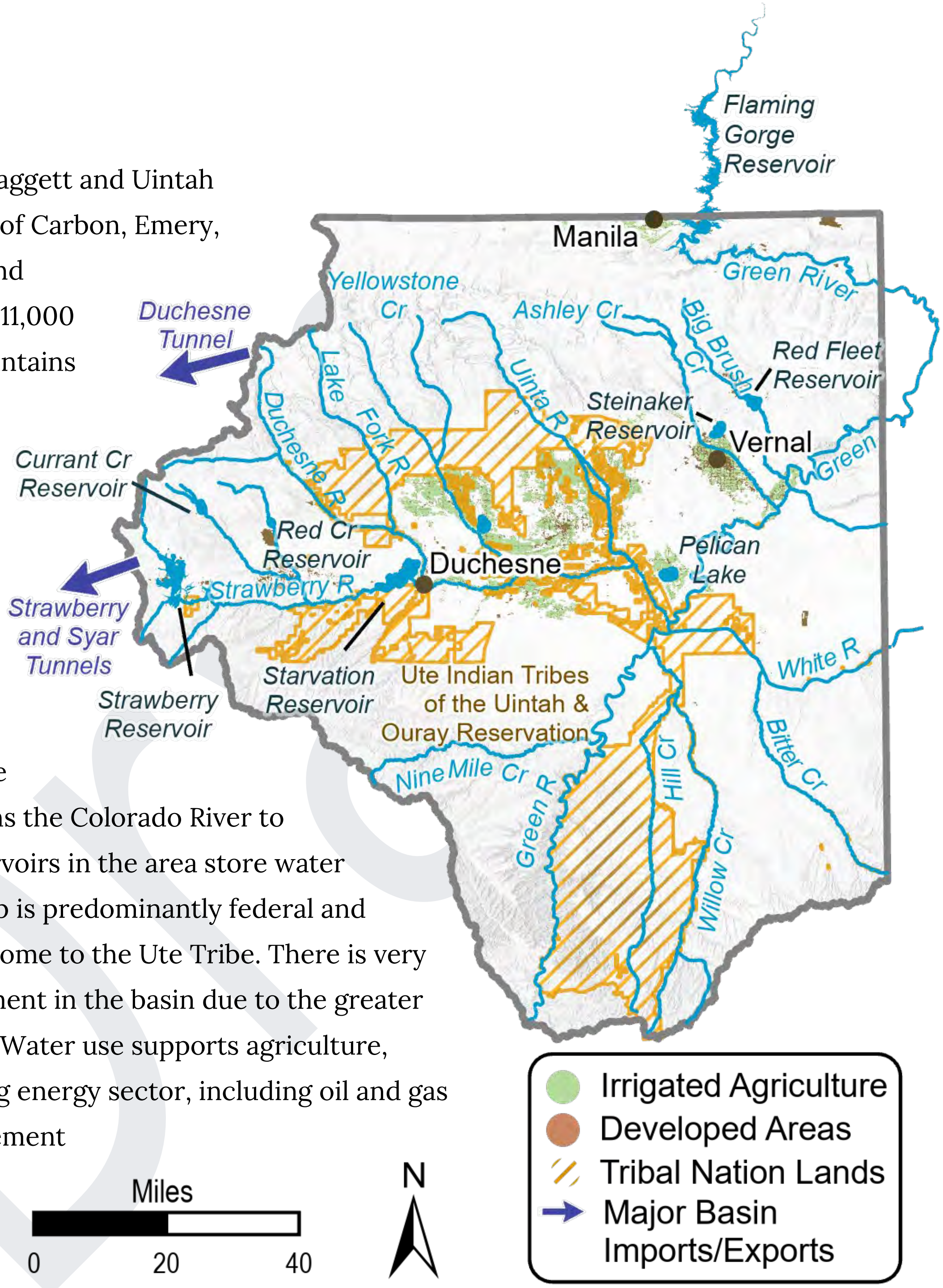
After a series of wildfires and flooding events, Grand County and San Juan County worked together to secure emergency funding for infrastructure repair, debris removal and long-term remediation projects. Collaboration at the county level has improved effectiveness and efficiency, strengthened regional partnerships and improved emergency preparedness for future events. Although significant progress has been achieved through this cooperative model, additional investment and coordinated planning among various levels of government are necessary to further enhance long-term basin resilience. Continued collaboration will remain essential to protecting communities, infrastructure and natural resources against future wildfire and flood impacts.

*Wildfire. Photo credit Watershed Restoration Initiative.*

# Uintah Basin

## Basin overview

The Uintah Basin includes Daggett and Uintah County, along with portions of Carbon, Emery, Duchesne, Grand, Summit and Wasatch counties, spanning 11,000 square miles. The Uinta Mountains are the largest in Utah and are unique in that they run east-west across the area. They generate significant snowmelt runoff that drains to the Green River, the area's central hydrologic feature, that flows through Flaming Gorge Reservoir and eventually joins the Colorado River to the south. Other major reservoirs in the area store water for later use. Land ownership is predominantly federal and tribal, with the basin being home to the Ute Tribe. There is very little ground water development in the basin due to the greater availability of surface water. Water use supports agriculture, municipal needs and a strong energy sector, including oil and gas development. Water management focuses on balancing surface water availability with economic uses while maintaining surface water flows within the larger Colorado River system.

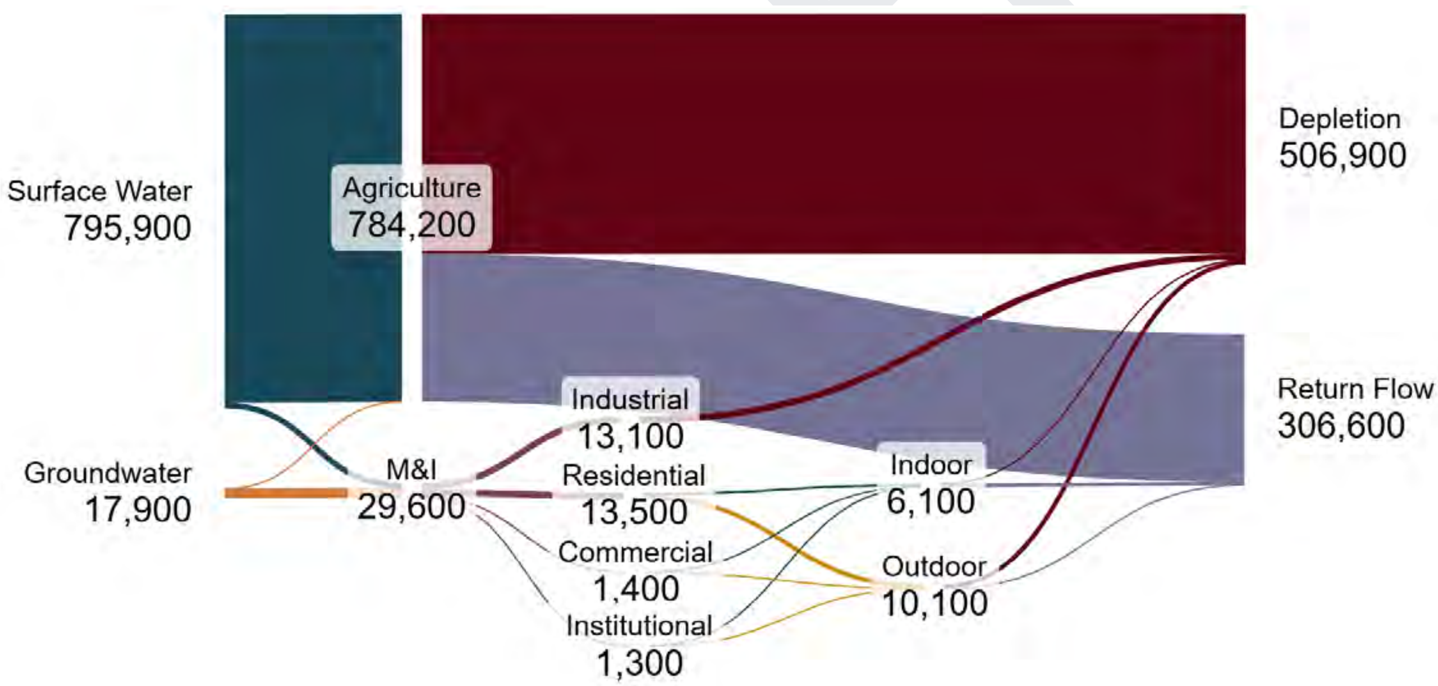


## Description of water use

The Uintah Basin water budget (Figure 8-8) highlights the following patterns:

- 98% of diversions are from surface water, and 2% are from groundwater.
- 96% of diverted water in the basin is used for agricultural irrigation, and 62% of that gets depleted.
- 4% of diverted water is used for M&I purposes, and 77% of that gets depleted. Outdoor water use accounts for 41% of M&I depletions, and industrial use accounts for 58% of M&I depletions.
- An average of 127,000 acre feet of water is exported to the Wasatch Front each year.

**Figure 8-8. Uintah Basin water budget.**




*Data reported is the average (2020-2024) in acre-feet for diversions, depletions and return flow by sector within the hydrologic basin. Imported water that is diverted within the basin is incorporated into the surface water diversion data. Water exports are not shown. Data source: Division of Water Resources Water Budget Model.*

## Basin challenges

- **Water supply variability:** reduced snowpack and variable runoff affect reservoir reliability and increase uncertainty in annual water availability.
- **Competing water uses:** agricultural needs, municipal growth and energy development increase demand and complicate water management decisions.
- **Limited storage capacity:** existing infrastructure limits the ability to capture water during high-flow years.
- **Aging infrastructure:** existing systems require modernization and sustained investment to maintain reliability and reduce system losses.
- **Development and invasive species pressures:** expansion of development into new areas and continued spread of invasive species reduce water availability and negatively influence watershed function.
- **Potential risks to Colorado River system water:** The water in this basin is part of the Colorado River system. Colorado River supplies may be subject to curtailment if obligations under the 1922 Compact are not satisfied.

## Basin needs

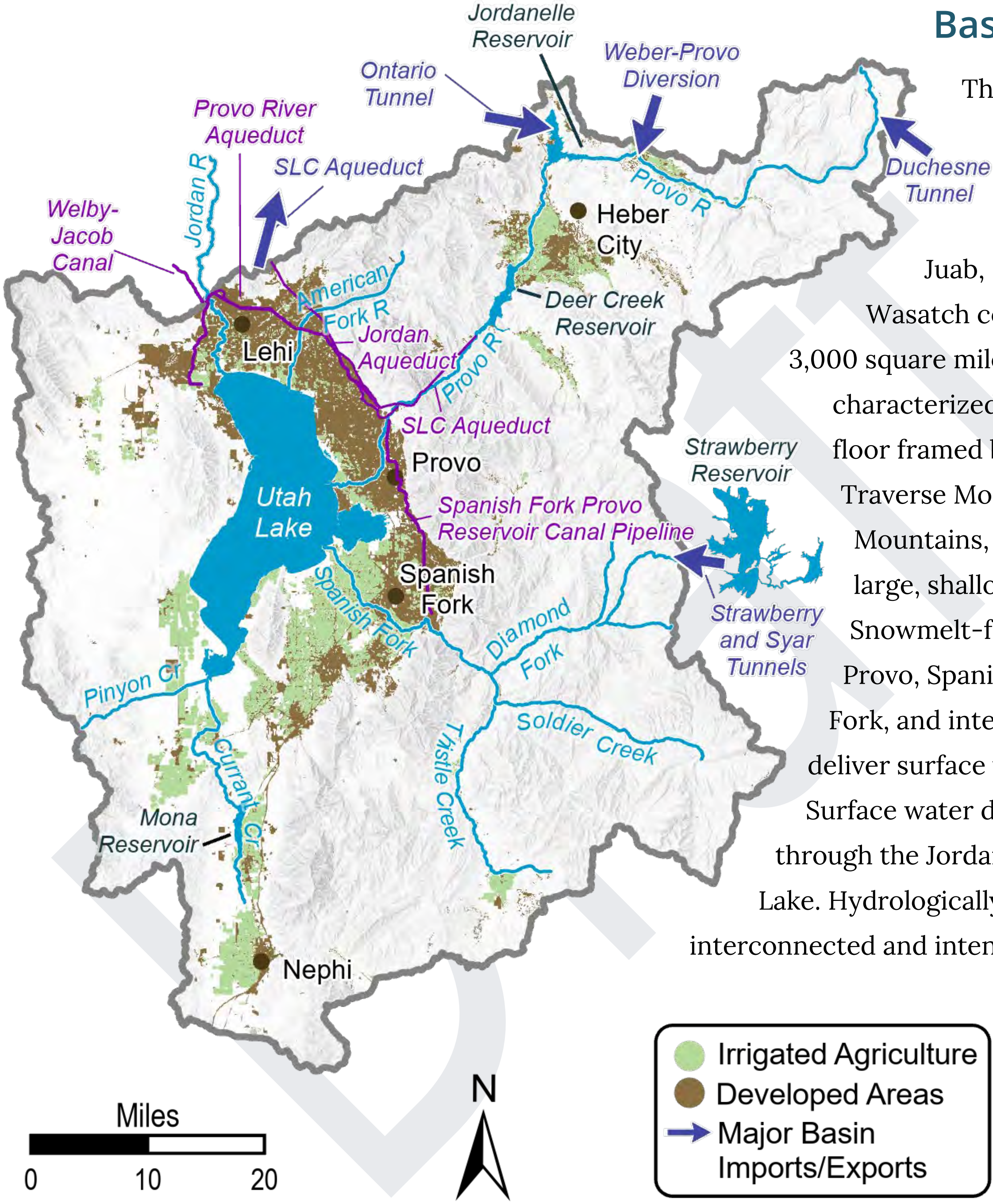
- **Expand storage capacity:** develop additional storage to capture water during wet years and improve system flexibility.
- **Invest in water infrastructure:** upgrade conveyance systems and diversion structures to improve efficiency and reduce losses.
- **Control invasive species:** expand efforts to manage invasive species and protect watershed function.
- **Improve groundwater understanding:** support monitoring and studies to better understand aquifer conditions, including recharge and withdrawal rates.
- **Strengthen planning and coordination:** support long-term planning that balances agricultural and M&I water needs.

## Basin success story

Since the passing of the Colorado River Basin Salinity Control Act in 1974, various entities have completed salinity control projects in the Uintah Basin. These projects include converting flood irrigation to sprinkler or drip to reduce deep percolation through heavy salt sediment layers and piping canals and lining earthen ditches to reduce the introduction of salt into waterways through runoff. Although the primary intent of these projects was to reduce salt loads, they also provided secondary benefits to Uintah Basin communities. These projects have increased water-delivery efficiency, reduced water loss, increased crop yields, preserved water-delivery infrastructure and reduced the cost of treating water for M&I use.

*Sprinkler irrigation of alfalfa field. Photo credit Department of Natural Resources.*

# Utah Lake Basin




## Basin overview

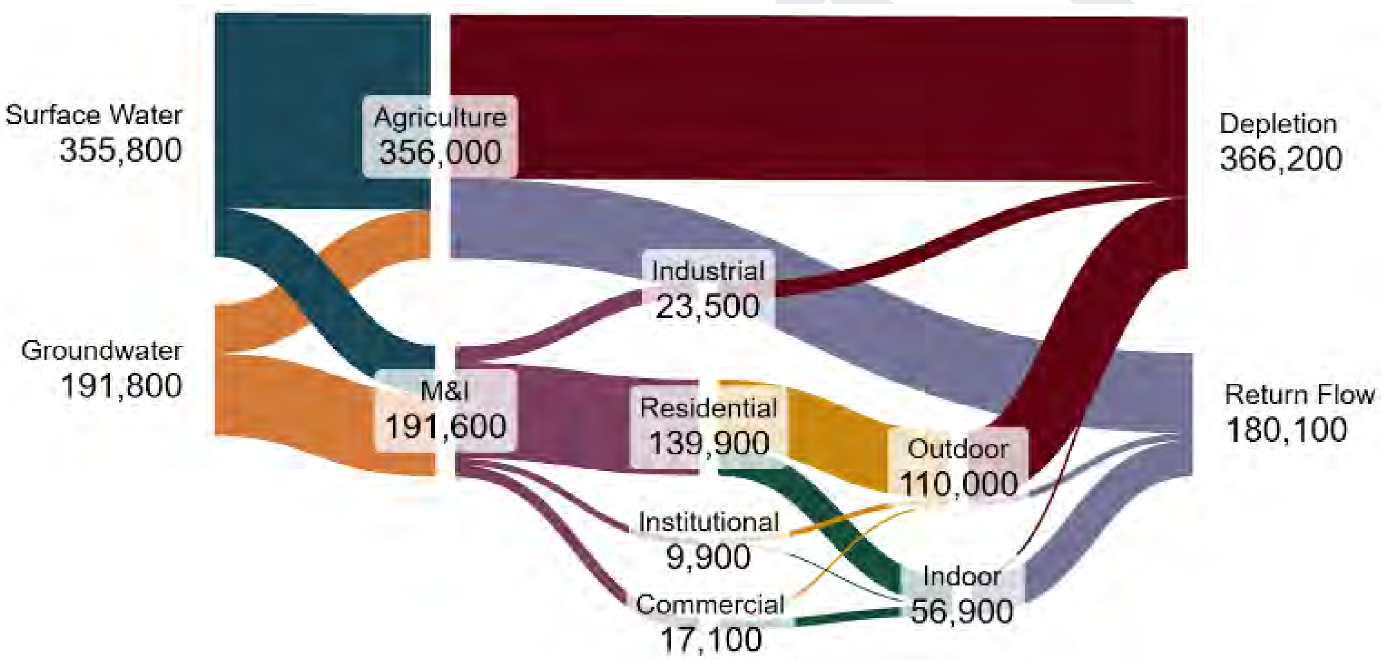
The Utah Lake Basin includes most of Utah County and portions of Carbon, Juab, Sanpete, Summit and Wasatch counties, spanning 3,000 square miles. The area is characterized by a broad valley floor framed by the Wasatch Range, Traverse Mountains and Lake Mountains, with Utah Lake, a large, shallow lake, at its center. Snowmelt-fed rivers, including the Provo, Spanish Fork and American Fork, and interbasin transfers deliver surface water to the lake. Surface water drains to the north through the Jordan River to Great Salt Lake. Hydrologically, the area is highly interconnected and intensively managed. Surface waters interact closely with groundwater in the valley, where aquifers provide a substantial portion of municipal and agricultural supply. Water management is shaped by rapid population growth and development on undeveloped and irrigated agricultural land and maintaining flows to Great Salt Lake.

## Description of water use

The Utah Lake Basin water budget (Figure 8-9) highlights the following patterns:

- Natural surface water supply is augmented by 205,000 acre-feet per year of imported water from Uintah and Weber River basins.
- 65% of diversions are from surface water, and 35% are from groundwater.
- 65% of diverted water in the basin is used for agricultural irrigation, and two-thirds of that gets depleted.
- 35% of diverted water is used for M&I purposes, and two-thirds of that gets depleted. Outdoor water use accounts for 80% of M&I depletions.

**Figure 8-9. Utah Lake Basin water budget.**




*Data reported is the average (2020-2024) in acre-feet for diversions, depletions and return flow by sector within the hydrologic basin. Imported water that is diverted within the basin is incorporated into the surface water diversion data. Water exports are not shown. Data source: Division of Water Resources Water Budget Model.*

## Basin challenges

- **Rapid population growth:** increasing M&I demand in one of Utah's fastest-growing regions places pressure on available water supplies.
- **Climate variability and wildfire risk:** changing conditions increase uncertainty and complicate both operational and long-term planning.
- **Competing water uses:** sustaining the agricultural economy is becoming more challenging as competition for limited water supplies intensifies.
- **Aging infrastructure and inefficiencies:** open conveyance systems, aging infrastructure and traditional irrigation practices reduce efficiency and contribute to water quality concerns.
- **Rising infrastructure costs:** increasing operation, maintenance and replacement costs threaten long-term affordability.
- **Utah Lake ecosystem stressors:** nutrient loading, harmful algal blooms, invasive species and habitat loss complicate water quality management and lake health.
- **Potential risks to imported water:** The majority of imported water in this basin originates in the Colorado River system. Colorado River supplies may be subject to curtailment if obligations under the 1922 Compact are not satisfied.

## Basin needs

- **Invest in infrastructure:** coordinate funding to improve conveyance, irrigation efficiency and municipal systems.
- **Support sustainable agriculture:** provide funding and tools to maintain viable operations while adapting to system constraints.
- **Expand water conservation programs:** expand outreach efforts and continue investment in conservation, with a focus on outdoor water use and waterwise landscaping.
- **Enhance watershed and forest health partnerships:** support long-term collaboration to protect source waters and reduce wildfire risk.
- **Improve lake health:** continue restoration, monitoring and adaptive management to improve water quality and ecosystem function in Utah Lake.
- **Improve system understanding:** advance knowledge of groundwater and surface water interactions to support planning and management.
- **Balance competing water uses:** support planning approaches that address municipal growth, agricultural needs and Great Salt Lake restoration and inflows.

## Basin success story

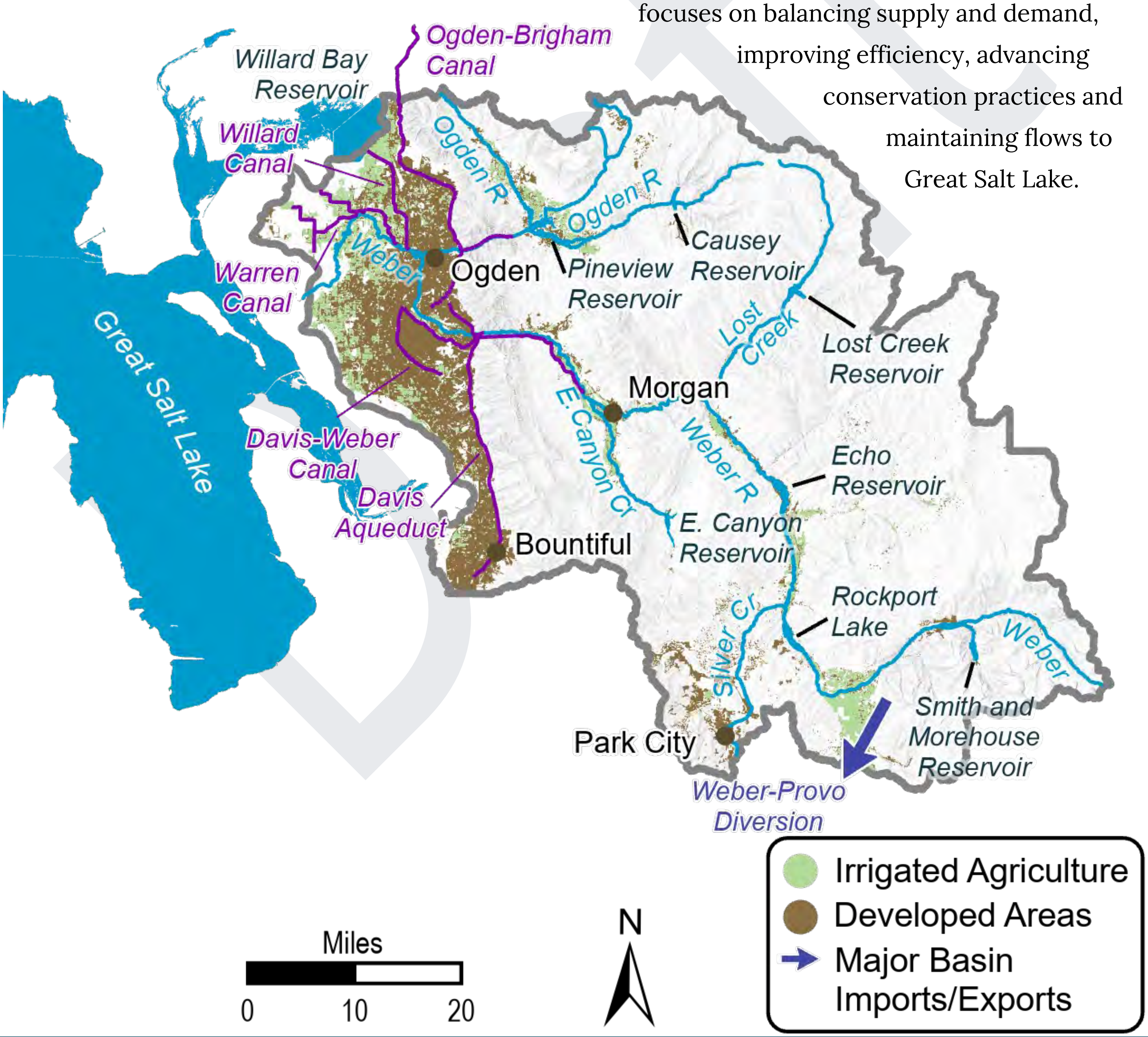
Bateman Mosida Farms, Utah's largest dairy with 12,000 cows and 3,500 acres, operates in a sensitive watershed near Utah Lake where phosphorus and E. coli runoff are primary concerns. To mitigate these risks, the Bateman family has invested in infrastructure and land management practices to protect water quality while maintaining a high-performing dairy operation. With help from Utah Department of Agriculture and Food's Agriculture Voluntary Incentive Program, the farm has implemented certified nutrient management and manure treatment systems to optimize nutrient use and stormwater catchment basins at critical control points like road crossings and pivot corners to reduce agricultural runoff. These practices demonstrate how large-scale agriculture can advance watershed stewardship in one of Utah's most ecologically sensitive landscapes.

*Top: Bateman Farm near Utah Lake. Bottom: Milking parlor at Bateman Farm. Photos credit Utah Department of Agriculture and Food.*

# Weber River Basin

## Basin overview

The Weber River Basin covers 2,500 square miles, extending from the Uinta Mountains to Great Salt Lake and includes Davis, Morgan and Weber counties, along with portions of Box Elder and Summit counties. The area is characterized by mountainous terrain and high-elevation valleys. Snowmelt-fed tributaries supply the Weber and Ogden River systems, which ultimately drain to Great Salt Lake. Surface water is the primary water supply, supplemented by groundwater to meet growing demand. Water supply supports municipal populations, agriculture and recreation. Water management is highly developed and focuses on balancing supply and demand, improving efficiency, advancing conservation practices and maintaining flows to Great Salt Lake.

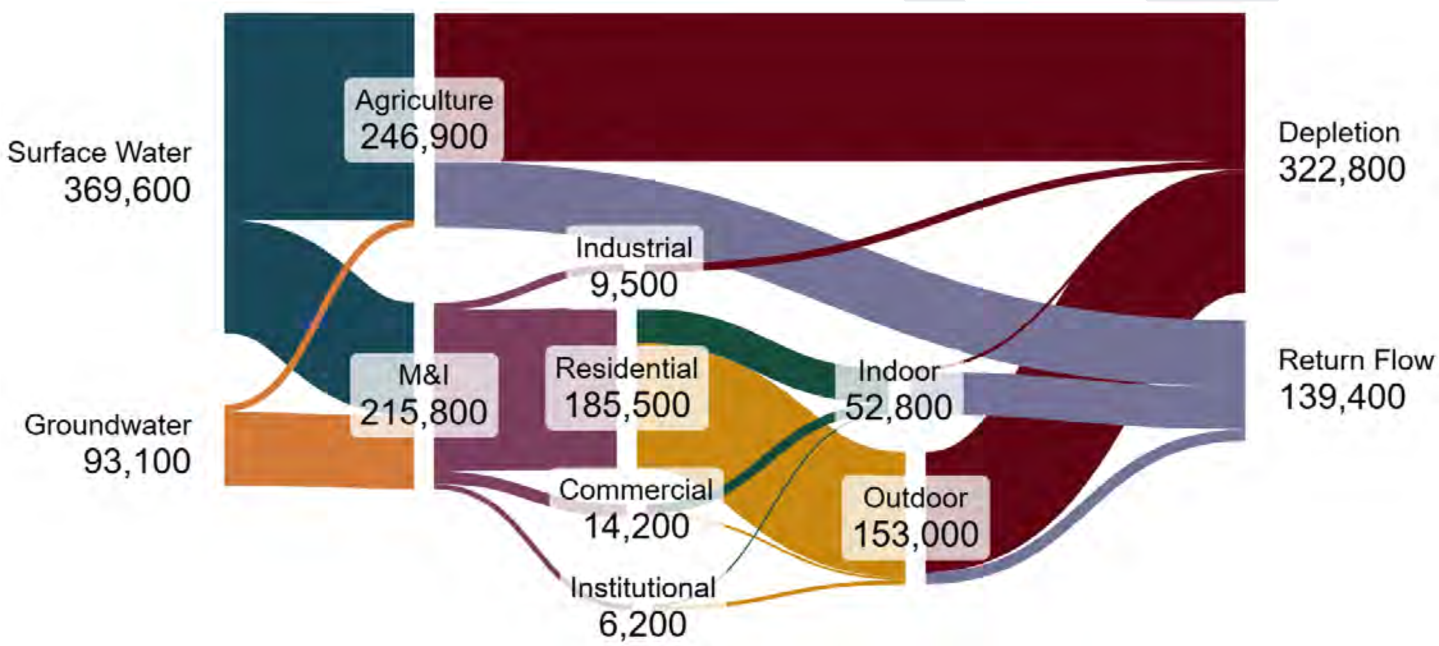


## Description of water use

The Weber River Basin water budget (Figure 8-10) highlights the following patterns:

- 80% of diversions are from surface water, and 20% are from groundwater (not including mineral extraction).
- Natural surface water supply is augmented by 6,200 acre-feet per year of imported water from Jordan River and Utah Lake basins.
- 53% of diverted water in the basin is used for agricultural irrigation, and 69% of that gets depleted.
- 47% of diverted water is used for M&I purposes, and 71% of that gets depleted. Outdoor water use accounts for 91% of M&I depletions.
- An average of 68,600 acre feet of water is exported to the Utah Lake Basin each year.

**Figure 8-10. Weber River Basin water budget.**




*Data reported is the average (2020-2024) in acre-feet for diversions, depletions and return flow by sector within the hydrologic basin. Imported water that is diverted within the basin is incorporated into the surface water diversion data. Water exports are not shown. Data source: Division of Water Resources Water Budget Model.*

## Basin challenges

- **Rapid growth and increasing demand:** population growth increases pressure on water supplies and complicates efforts to balance M&I, agricultural and environmental needs.
- **Changing hydrology:** shifting runoff patterns and drought conditions reduce supply reliability and increase management complexity.
- **Degraded headwaters streams:** many headwaters streams have experienced extreme incision and channelization, which results in higher flows during run-off, earlier peak flows and reduced flows following run-off.
- **Water quality degradation:** nonpoint source pollution from recreation, development and land disturbance degrades stream conditions and affects water quality.
- **Wildfire risk and watershed health**: fuel buildup elevates wildfire risk, threatening watershed function, infrastructure and long-term water supply reliability.
- **Groundwater decline:** declining groundwater levels reduce long-term supply reliability and, in some areas, contribute to land subsidence.
- **Invasive species:** species such as phragmites degrade wetland ecosystems and increase consumption of available water.

## Basin needs

- **Improve coordination across jurisdictions:** strengthen collaboration to address wildfire risk, watershed management and land use impacts.
- **Enhance research and data:** improve understanding of groundwater and surface water interactions to support planning and management.
- **Strengthen water quality practices:** expand implementation of stormwater and land management best practices.
- **Support conservation programs:** reduce barriers and expand participation in water conservation efforts.
- **Continue Great Salt Lake efforts:** support planning and restoration efforts to improve wetland health, protect the economy and reduce dust impacts.
- **Mitigate invasive species and wildfire:** invest in and expand capacity to remove invasive species and reduce wildfire risk.
- **Expand storage capacity:** develop additional storage in the upper basin area to help span multiple drought years.
- **Balance competing water uses:** support planning approaches that address agricultural, municipal and environmental needs, including Great Salt Lake.

## Basin success story

Each January, the Weber River Partnership hosts Confluence, a symposium that brings together organizations and individuals from across the Weber River Basin to share research, discuss ongoing efforts and collaborate on challenges within the basin. This event highlights long-standing partnerships working to balance water demand with supply, improve water quality and support resilient watershed management. Topics range from local agricultural practices to state-level programs, providing a forum for shared learning and coordination across jurisdictions and sectors. Confluence demonstrates how collaboration and information-sharing support informed decision-making, strengthen relationships and guide future planning efforts. Outcomes include stronger coordination among partners, more aligned priorities and continued momentum for basin-scale efforts.

The following partners have been essential in these efforts:

- Municipalities: cities, counties
- Private landowners
- World Resource Institute
- Utah Watershed Restoration Initiative
- Trout Unlimited
- Weber River Watershed Council
- State agencies: Division of Outdoor Recreation, Division of Water Quality, Division of Forestry, Fire and State Lands, Division of Wildlife Resources
- Federal agencies: U.S. Forest Service, Fish and Wildlife,
- Universities: Weber State University, Utah State University
- Sageland Collaborative
- Weber Basin Water Conservancy District
- Conservation Districts
- Weber River Partnership
- Irrigation companies
- National Audubon Society
- Ogden Nature Center
- The Nature Conservancy
- PacifiCorp
- FRIENDS of Great Salt Lake
- Hill Air Force Base/Sentinel Landscape
- Natural Resources Conservation Service
- Summit Land Conservancy
- Utah State University Extension

*Confluence attendees. Photo credit Christine Osborne.*

# West Colorado River Basin

## Basin overview

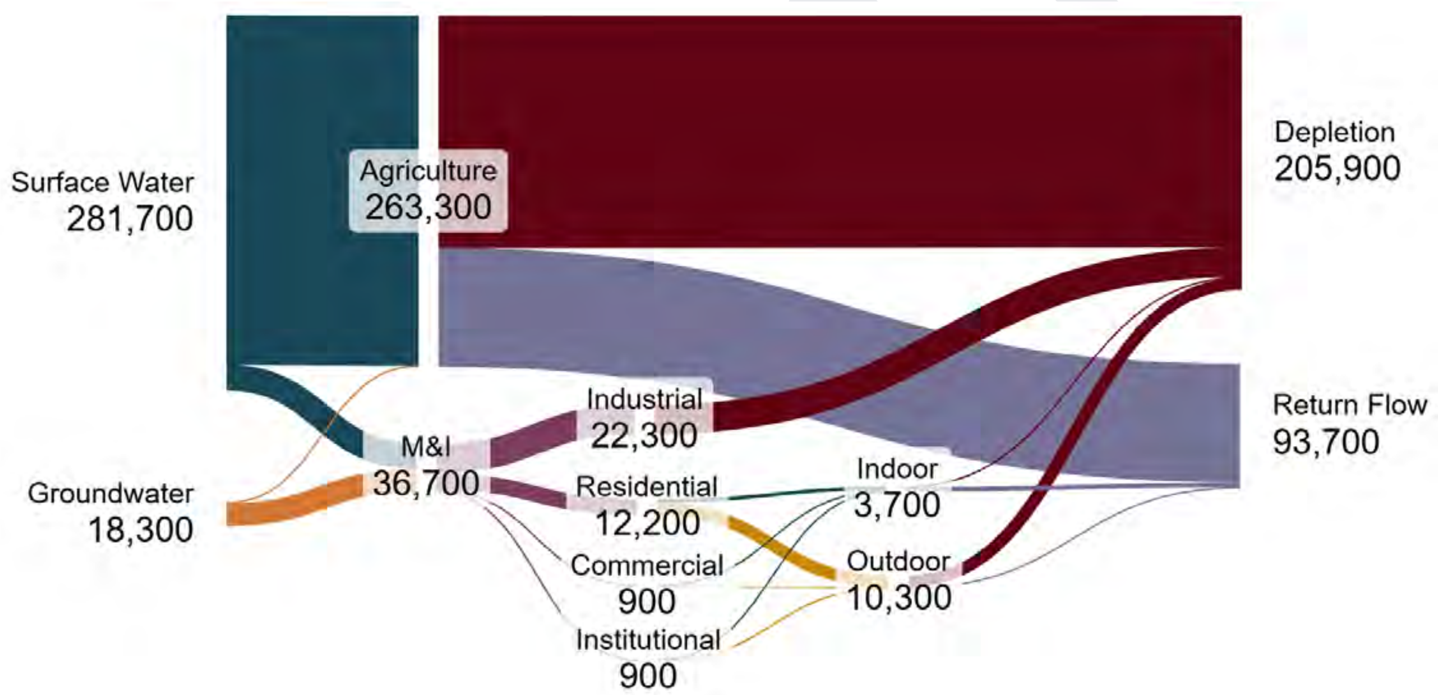
The West Colorado River Basin covers nearly 15,000 square miles, encompassing Wayne County along with portions of Carbon, Duchesne, Emery, Garfield, Kane, Sanpete, Sevier, Utah and Wasatch counties. The area is characterized by high plateaus, canyon systems and mountainous headwaters that generate snowmelt-driven runoff. Five primary river systems - the Price, San Rafael, Dirty Devil, Escalante and Paria rivers - flow south into the Green and Colorado rivers or directly to Lake Powell. Reservoirs in the upper watersheds provide critical storage to regulate flows for downstream uses. Agriculture, energy production and recreation are key economic drivers and water users. Water management focuses on maintaining reliable deliveries in a highly variable hydrologic system to support agricultural and M&I demands.

## Description of water use

The West Colorado River Basin water budget (Figure 8-11) highlights the following patterns:

- 94% of diversions are from surface water, and 6% are from groundwater.
- Natural surface water supply is augmented by 4,800 acre-feet per year of imported water from the Sevier River Basin through the Tropic East Fork Canal to Tropic, Utah.
- 88% of diverted water in the basin is used for agricultural irrigation, and 66% of that gets depleted.
- 12% of diverted water is used for M&I purposes, and 87% of that gets depleted. Outdoor water use accounts for 29% of M&I depletions and industrial water use accounts for 70% of M&I depletions.

**Figure 8-11. West Colorado River Basin water budget.**




*Data reported is the average (2020-2024) in acre-feet for diversions, depletions and return flow by sector within the hydrologic basin. Imported water that is diverted within the basin is incorporated into the surface water diversion data. Water exports are not shown. Data source: Division of Water Resources Water Budget Model.*

## Basin challenges

- **Declining water supplies:** reduced streamflows and more frequent drought conditions limit water availability for agricultural and other uses.
- **Aging infrastructure and rising costs:** maintaining and replacing storage and conveyance infrastructure is increasingly expensive.
- **Wildfire risk and watershed condition:** wildfire and changing vegetation conditions reduce watershed function and increase risk to water supplies and infrastructure.
- **Land use and invasive species pressures:** expanding development and invasive species alter watershed conditions and increase demand on limited water resources.
- **Potential risks to Colorado River system water:** The water in this basin is part of the Colorado River system. Colorado River supplies may be subject to curtailment if obligations under the 1922 Compact are not satisfied.

## Basin needs

- **Strengthen watershed management:** expand forest health efforts and invasive species control to improve watershed function.
- **Reduce wildfire risk:** support proactive vegetation management and fuel reduction strategies.
- **Improve agricultural practices:** increase irrigation efficiency and support range management improvements.
- **Invest in water infrastructure:** upgrade existing water systems and expand capacity with new storage and infrastructure to improve reliability and flexibility.

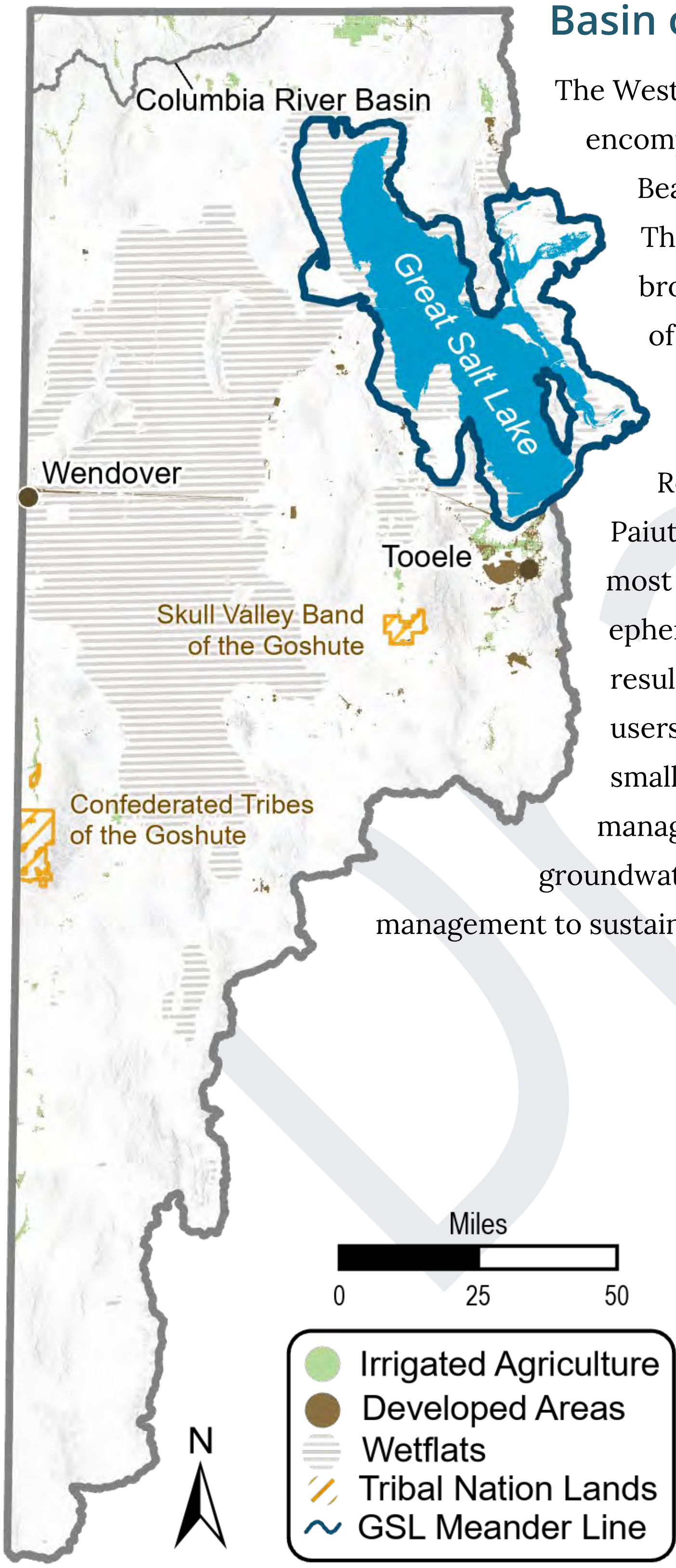
## Basin success story

As a leader in system automation, the Emery County Water Conservancy District has transformed regional water management. Historically, Emery County water users faced chronic shortages by late summer. By developing a customized real-time control system, the district is better equipped to reliably supply water to agriculture and industry.

The network uses monitoring stations equipped with dataloggers, sensors and weather instruments to track water flow and quality. The data is transmitted to a central office, where the district can respond to changing conditions. The continuous tracking of flow rates at various points in the delivery network makes the system completely transparent. Farmers see exactly what they are receiving and use their individual water allocations more efficiently. By saving water that used to be lost to evaporation, delays and imprecise measurements, the local supply is maximized and can be stretched later into the season. Designed for long-term durability, this robust network remains a constantly evolving model of efficient water management decades later.

*Automated and metered diversion. Photo credit Emery County Water Conservancy District.*

# West Desert Basin




## Basin overview

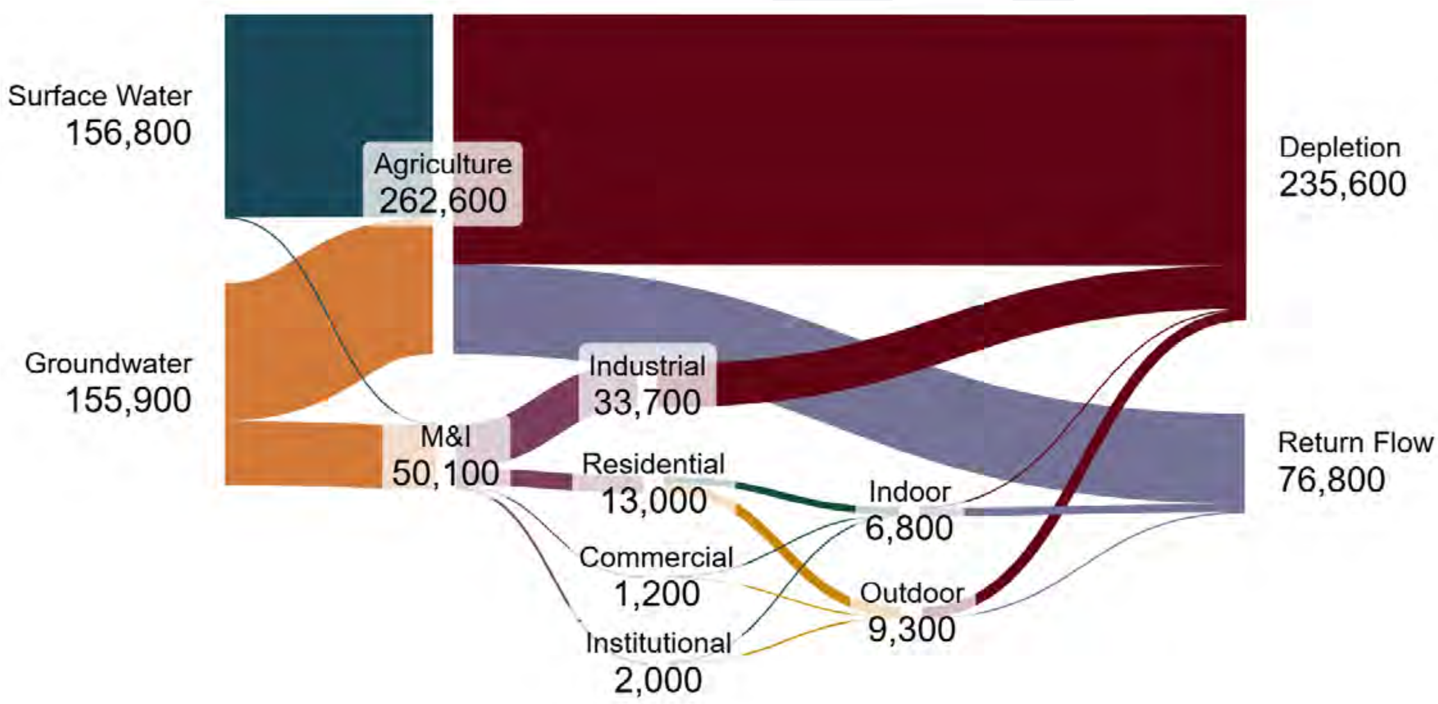
The West Desert Basin covers roughly 18,000 square miles, encompassing Great Salt Lake and includes portions of Beaver, Box Elder, Iron, Juab, Millard and Tooele counties. The area is sparsely populated and characterized by broad, arid valleys separated by mountain ranges typical of the Basin and Range region. The basin is home to two bands of the Goshute Tribe, the Skull Valley Goshutes and the Confederated Tribes of the Goshute Reservation, as well as the Indian Peaks Band of the Paiute Tribe. Hydrologically, the area includes some of the most arid lands in the western U.S., with intermittent and ephemeral streams providing limited surface water. As a result, groundwater is the primary water source for most users. Water use is largely associated with agriculture and small rural communities, with minimal M&I demand. Water management is shaped by extreme aridity and reliance on groundwater with limited recharge, requiring careful management to sustain long-term water supplies.

## Description of water use

The West Desert Basin water budget (Figure 8-12) highlights the following patterns:

- 50% of diversions are from surface water, and 50% are from groundwater.
- 84% of diverted water in the basin is used for agricultural irrigation, and 73% of that gets depleted.
- 16% of diverted water is used for M&I purposes, and 85% of that gets depleted. Outdoor water use accounts for 20% of M&I depletions and industrial water use accounts for 79% of M&I depletions.
- In Great Salt Lake, mineral industries divert 176,000 acre-feet of lake water on average to evaporation ponds for mineral production.

**Figure 8-12. West Desert Basin water budget.**




*1Data reported is the average (2020-2024) in acre-feet for diversions, depletions and return flow by sector within the hydrologic basin. Imported water that is diverted within the basin is incorporated into the surface water diversion data. Water exports are not shown. Data source: Division of Water Resources Water Budget Model.*

## Basin challenges

- **Aging and inadequate water infrastructure:** aging water systems and limited storage capacity are insufficient to support growing communities.
- **Limited water supply:** limited precipitation and drawdown of regional groundwater systems affects local aquifers already under pressure from drought and development.
- **Wildfire risk and watershed degradation:** wildfire and changing vegetation conditions reduce watershed function and increase risk to water supplies and infrastructure.
- **Basin water rights protection:** concern about inter-basin water rights transfers and appropriations of water rights by entities outside the basin.
- **Regional coordination barriers:** limited collaboration hinders efforts to address basin-wide infrastructure and management needs.

## Basin needs

- **Protect water supply and water rights:** protect groundwater levels, existing water rights and natural habitat to maintain the ecological and economic integrity of the basin.
- **Study groundwater conditions:** updated aquifer studies are needed in areas under growing development pressure.
- **Build collaborative governance:** build stronger partnerships with state and federal agencies and increase water governance transparency to foster trust and coordinated management.
- **Invest in water infrastructure:** expand access to state and federal grant and loan programs to invest in storage and modernize infrastructure.
- **Increase public engagement and conservation:** implement waterwise land use ordinances and education campaigns to empower residents to reduce demand.
- **Balance competing uses:** support planning approaches that address growth, agricultural needs and Great Salt Lake restoration and inflows.

## Basin success story

Public and private entities throughout the West Desert Basin have been working together to manage pinyon-juniper woodlands to protect against conifer expansion into sagebrush habitat. Conifer expansion results in sagebrush wildlife habitat loss and fragmentation, reduced forage production, decreased resilience to fire and less resistance to cheatgrass invasion. The Utah Department of Natural Resources Watershed Restoration Initiative has been a key partner in the area, helping to fund and manage projects to remove pinyon-juniper trees in priority landscapes. Since the initiative began in 2006, 145 pinyon-juniper projects have been completed in the West Desert Basin, resulting in 184,000 treated acres thanks to $37 million of public and private funds.

*Sage grouse. Photo credit Department of Natural Resources.*

## Recommendations

8-1. The Legislature should support watershed councils with dedicated staff to improve coordination between state agencies, reduce duplication of efforts among water entities, increase education and outreach, contribute to local and state water planning and advise the Legislature and governor on water-related issues through the Utah Watersheds Council.

# 9

# Moving Forward Together

In this chapter:

- Looking forward
- Shared priorities
- Shared responsibility
- From planning to action

## Looking forward

Utah's water future will be shaped by the decisions made today. Population growth, climate variability and evolving water demands present significant challenges. But they also create opportunities to strengthen the state's long-term water security through thoughtful planning, continued investment and coordinated action. By preparing for a range of possible future conditions, Utah can be better positioned to adapt and meet the needs of generations to come.

Utah has already made substantial progress through collaboration, research, conservation, watershed restoration, infrastructure investment and modernization. However, continued success will require sustained commitment and shared responsibility at the individual, local and state levels. Together, these efforts can help ensure a safe, reliable water supply now and into the future.

## Shared priorities

Although water challenges vary across Utah, several common priorities are shared. These priorities reflect the interconnected nature of the state's water resources and the need for coordinated, long-term planning.

The sustainable management of both surface water and groundwater resources relies on sound science, reliable data and monitoring. Strengthening understanding of these interconnected systems supports informed decision-making and helps to ensure Utah's future water needs are met.

Healthy watersheds and ecosystems are essential to the long-term quality and reliability of Utah's water resources. Climate variability, wildfire, invasive species and changing land use can affect water quality, water quantity and ecosystem function, underscoring the importance of protection and restoration efforts.

Supporting vibrant communities will require integrated planning that aligns population growth, economic development and infrastructure needs with available water resources. Conservation, innovative water management strategies and strategic investment to build, maintain and modernize water infrastructure can help communities meet changing needs while maintaining public health, safety and quality of life.

Agriculture remains a cornerstone of Utah's economy, heritage and working landscapes. Supporting agricultural viability while encouraging innovation and efficient water management can help sustain rural communities, provide food security, strengthen local economies and maintain Utah's agricultural heritage.

Together, these shared priorities provide a common foundation for addressing Utah's water challenges while recognizing the unique needs and opportunities across the state. Although implementation will vary, these priorities provide a consistent framework for strengthening long-term water security.

## Shared responsibility

No single project, policy or organization can address Utah’s water challenges alone. Lasting progress depends on collaboration among communities, agricultural producers, businesses, water providers and state, tribal and federal partners, with each contributing unique perspectives, expertise and resources.

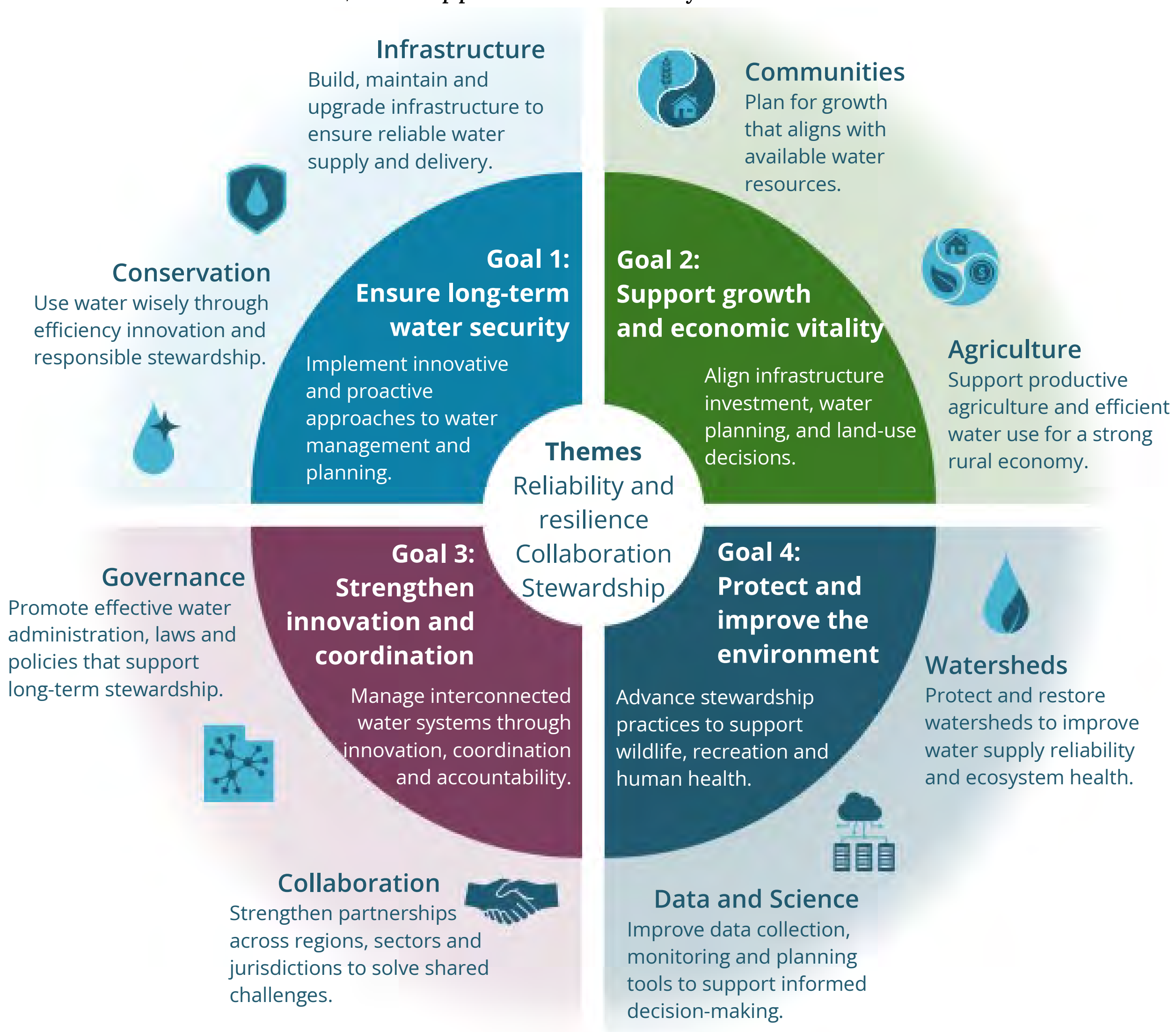
Actions at every level contribute to Utah's long-term water security. Individuals can make informed decisions about water use and support stewardship within their homes and communities. Local governments, water providers and businesses play a critical role by investing in infrastructure, planning for future growth and implementing practices that improve water management and efficiency. Agricultural producers continue to advance innovative approaches that sustain both food production and water resources while supporting the economic vitality of rural communities. State, tribal and federal partners provide leadership through planning, technical assistance, research, funding and resource management. By building on existing partnerships and shared expertise, Utah can continue developing practical, locally informed solutions that advance the vision and goals of this plan.

*Mount Ogden. Photo credit Todd Stonely*

# Utah 2026 State Water Plan

## Moving forward together

Vision: A safe, reliable water supply that improves the environment, enhances urban and rural communities, and supports the economy now and into the future




## Implementation: a shared responsibility


Utah's water future depends on continuous action, innovation and collaboration. The decisions we make today will shape the availability and reliability of water for generations to come.

## From planning to action

The recommendations presented at the end of each chapter and compiled here are intended to guide future policy discussions, investments, planning and management decisions. Many actions can build on existing programs, partnerships and funding opportunities, while others will require new approaches or expanded collaboration to address critical needs.

The state water plan is intended to be a living resource that evolves alongside Utah's water needs. Future updates will incorporate new information, technological advances, lessons learned and changing priorities to ensure the plan remains relevant and responsive.

Utah's water challenges are complex, but they are not insurmountable. Continued investment, innovation, collaboration and thoughtful planning will enable Utah to adapt to future change. By building on the progress already made and working toward shared goals, Utah can realize its vision for a safe, reliable water supply that improves the environment, enhances urban and rural communities and supports the economy now and into the future.

## Reliability and resilience

2-1. The Legislature should expand capacity to study groundwater conditions, including groundwater resources, groundwater quality and surface water-groundwater interactions.

2-3. The Legislature should continue to provide funding to fill gaps in statewide data collection and modeling for water supply, quality and use, leveraging collaborations with key federal partners.

3-1. The Division of Water Resources should improve statewide long-term planning by developing future scenarios and more robust water supply and demand models that include the possibility of variable precipitation and prolonged drought and the impacts to surface water and groundwater.

3-3. The Legislature should support the implementation of the Unified Water Infrastructure Plan and allocate additional funds to the Water Infrastructure Fund to build, repair and replace water infrastructure.

4-2. The Legislature should support continued development for water distribution and accounting processes (e.g., streamgages, metered diversions, evapotranspiration models) to demonstrate water delivery for approved uses and interstate reporting, especially within the Colorado River and Great Salt Lake systems.

4-4. State water funding boards should require state-funded water projects to install permanent metering systems and report the data to the Division of Water Rights.

6-1. The Legislature should fund a study on the water-energy nexus for water-intensive industries and emerging technologies.

6-3. The Legislature should continue to support integrated land and water planning, adoption of waterwise landscape ordinances and improving water and energy efficiency across sectors.

6-7. The Legislature should allocate additional resources to support cybersecurity for water systems and continue ongoing funding for the Division of Drinking Water's Source Protection program to preserve drinking water sources.

6-8. Water providers should conduct regular water loss audits, maintain updated capital asset management plans that dedicate funding to replace and modernize aging infrastructure and implement tiered water rates with appropriate increases between tiers to discourage excessive use and reinvest revenue from higher tiers into water conservation programs and public education.

6-9. The Legislature should ensure ongoing support and funding for the Dam Safety Minimum Standards Program through the divisions of Water Rights and Water Resources.

6-10. The Legislature should continue support for cloud seeding so that the Division of Water Resources can modernize equipment and validate outcomes through independent research.

7-1. The Legislature should support policies that maintain agricultural viability while providing flexibility for producers to adapt to changing water conditions and market demands.

7-3. The Utah Department of Agriculture and Food should strengthen agricultural resilience by continuing to provide tools and support to help producers manage risk and maintain operations during prolonged drought.

7-4. State and federal sources should continue to support the following programs:

- Conservation easement funding for the LeRay McAllister Fund and other local land trusts to preserve agricultural land.
- Water Optimization Program for agricultural producers to implement best management practices that optimize water use and reduce total consumptive use.
- Agricultural Voluntary Incentive Program to improve opportunities for farmers to implement conservation practices for their operations.
- Future water leasing programs.

7-5. The Legislature should provide statutory authority and funding opportunities to support small irrigation companies with planning, legal, engineering and other project development needs to be eligible for state and federal programs.

## Collaboration

2-2. The Legislature should create policy and funding mechanisms for state water agencies to publish data and reports to a central water data hub following best practices in data accessibility.

3-2. The Division of Water Resources should facilitate or coordinate basin-level planning with interested parties.

4-1. The Legislature should continue to support Utah's Colorado River Commissioner in reaching creative solutions and consensus with Basin State agreements and representing Utah's rights in the event of Colorado River litigation.

5-5. Division of Wildlife Resources should lead a collaborative effort to develop a functional flows strategy in Utah's watersheds to meet conservation, management and recovery needs for aquatic and wetland-dependent species.

5-7. The Legislature should continue to support a stabilized source of funding for fuels mitigation work that allows for cross-boundary work with a landscape scale approach focusing on watersheds, the wildland-urban interface and high fire prone areas.

6-4. The Division of Water Quality should expand coordination among state, regional and local entities to educate the public on stormwater and non-point source pollution.

6-5. The divisions of Wildlife Resources and Outdoor Recreation should convene reservoir management teams to incorporate recreational access with reservoir elevation and waterway management plans and coordinate drought messaging.

7-6. The Department of Agriculture and Food, Division of Water Resources and Division of Water Rights should continue to improve methods to collect data and quantify depletion changes from agricultural optimization projects.

8-1. The Legislature should support watershed councils with dedicated staff to improve coordination between state agencies, reduce duplication of efforts among water entities, increase education and outreach, contribute to local and state water planning and advise the Legislature and governor on water-related issues through the Utah Watersheds Council.

## Stewardship

4-3. The Legislature should continue prioritizing investment in conservation and storage in Utah's portion of the Colorado River and Great Salt Lake systems, including in the agricultural sector where voluntary, temporary and compensated reductions in water use have been shown effective to mitigate potential mandatory reductions in use.

4-5. State, regional and local entities should expand communication capacity to improve coordination, information sharing and public understanding of water management.

5-1. The Legislature should expand ongoing funding to implement the Great Salt Lake Strategic Plan.

5-2. State and federal sources should continue to support and fund the development and execution of the Integrated Report on Water Quality and Utah Wildlife Action Plan and support the Nonpoint Source Management Plan and the Utah Wetland Program Plan.

5-3. The Legislature should expand ongoing funding and support for invasive species management programs, specifically phragmites, tamarisk, Russian olive, Eurasian watermilfoil and quagga mussels.

5-4. The Legislature should continue support for Utah's Watershed Restoration Initiative to improve high priority watersheds throughout the state.

5-6. The Legislature should provide funding for more coordinated public outreach and education on the importance of healthy watersheds and ecosystems.

6-2. The Legislature should expand funding for education and technical training programs to build and sustain a skilled water workforce, including essential trades such as dam, drinking water and wastewater operators.

6-6. The Division of Drinking Water should continue to collect data and monitor for PFAS and other emerging contaminants and provide assistance to help local entities comply with federal and state regulations.

7-2. The Utah Department of Agriculture and Food should expand education on the importance of agriculture to make clear connections between agriculture and food supply.