Summary of Beaver and Iron Counties' Water Conservation and Provisioning Strategies

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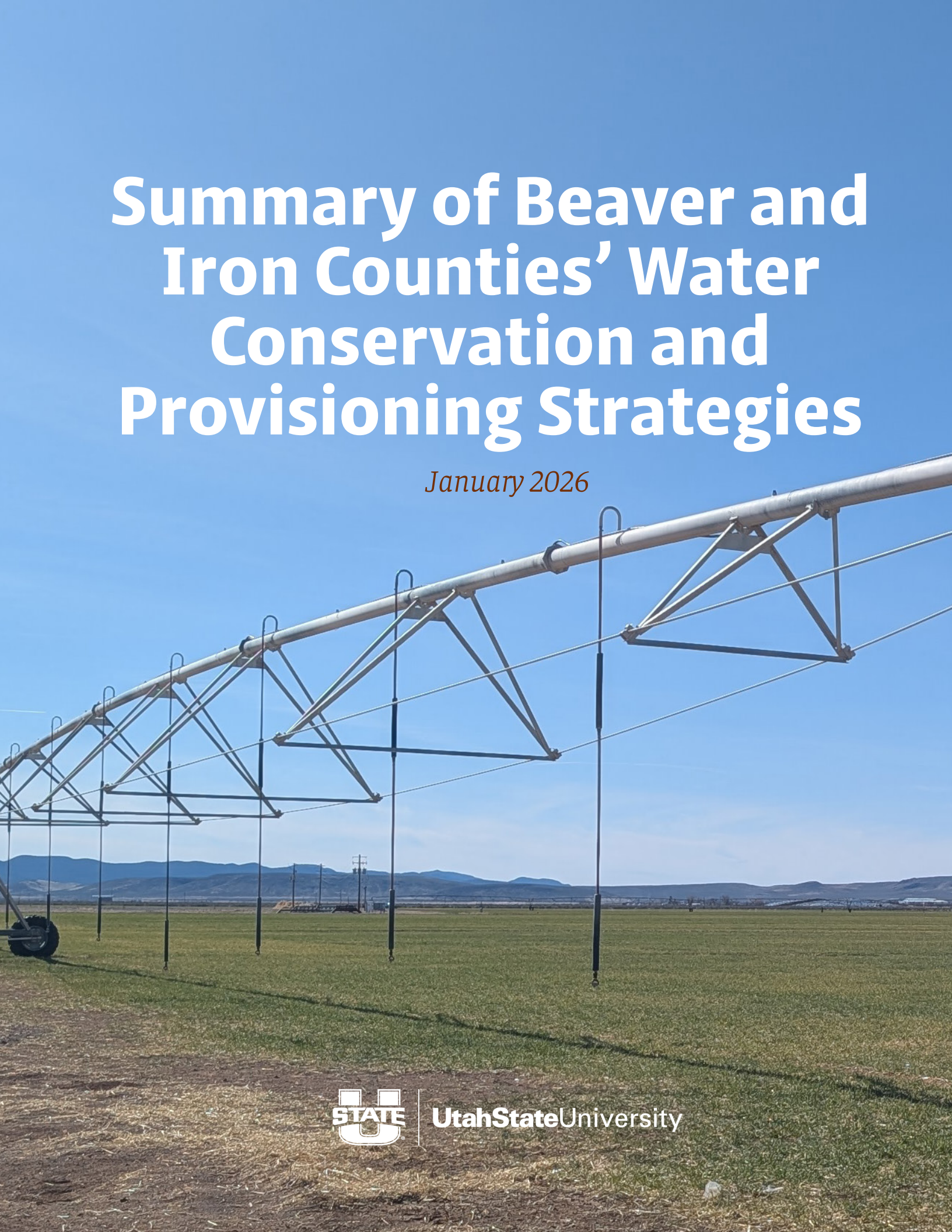

Utah State University

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Report Contents

Executive Summary

This report focuses on water conservation and provisioning strategies that both Beaver and Iron Counties are pursuing to help meet their citizens' current and future water needs and to contribute to statewide water conservation efforts. It primarily relies on publicly available data from state, county, conservancy district, and city databases, plans, and documents. The purposes of this document are to provide regional context for understanding water use in Beaver and Iron Counties and to describe water conservation strategies that can influence the trajectories of their future water use.

In both Beaver and Iron Counties, agriculture remains the primary user of private land and water resources. Water is fully appropriated in Beaver and Iron Counties, with the exception of some groundwater in Wah Wah Valley, Pine Valley, and Hamlin Valley in Beaver County. Cedar City, the largest and fastest-growing city in Iron County, relies on the Cedar City Valley Aquifer as its primary water source and is subject to a groundwater management plan that will reduce the annual depletion of the aquifer from 28,000 AFY to the estimated safe yield of 21,000 AFY over a period of 45 years. Groundwater management plans are also in effect in Parowan Valley and Beryl Enterprise areas of Iron County. With the additional challenges of more severe droughts and increasing growth, both Beaver and Iron Counties must carefully manage limited water supplies.

Municipal, secondary irrigation, and agricultural water conservation efforts are underway in Beaver and Iron Counties. Public water suppliers in Beaver and Iron Counties have improved water efficiency by installing meters, implementing leak detection programs, upgrading secondary systems for outdoor use, and carrying out artificial recharge projects to replenish aquifers and strengthen supplies. Each water supplier also encourages their customers to reduce water use through conservation education, tiered rate structures to discourage excessive use, financial incentives such as rebates, and ordinances that require specific water-saving practices. Both counties have secondary water systems for agricultural and residential outdoor irrigation, with half of those systems currently metered. Farmers and irrigation companies from Iron and Beaver Counties have implemented Agricultural Water Optimization projects to reduce consumptive water use in the agricultural sector.

Recognizing their unique circumstance and capacities, Beaver and Iron Counties can pursue additional water conservation opportunities in three key areas: agricultural water optimization; water smart urban growth; and enhancement of conservation efforts in existing urban areas. This report provides resources and suggestions on how Beaver and Iron Counties can advance their actions in these three areas. Both counties should also prioritize reducing groundwater pumping to recover and sustain their aquifers. Of the water they do extract and put to use, they should concentrate on reducing depletion through conservation in agricultural water use, irrigation, and urban outdoor water uses. Seeking to live within the Beaver/Cedar water budget is a worthwhile goal for these conservation efforts and one that can be facilitated by cooperation through the new Beaver/Cedar Watershed Council.

Terminology and Acronyms

AFY	acre-feet per year
AMI	advanced metering infrastructure
ARDL	Agriculture Resource Development Loan Program
CII	commercial, industrial, and institutional sector of urban water use
CICWCD	Central Iron County Water Conservancy District
Conservation	efforts that reduce per-capita or per-acre water demand
CRMP	county resource management plan
DDW	Utah Division of Drinking Water
GPCD	gallons per capita per day
LEPA	low-energy precision application, a water-saving irrigation technique for center pivot and linear irrigation systems, estimated to be 95% efficient
LESA	low-elevation spray application, an agricultural irrigation method that conserves water and energy, estimated to be 88% efficient
MESA	mid-elevation sprinkler application, an agricultural irrigation method that conserves water and energy, estimated to be 78% efficient
M&I	municipal and industrial water use; refers to water use for residential, commercial, institutional (e.g., schools, parks, cemeteries), and industrial processes
NRCS	Natural Resources Conservation Service, part of the U.S. Department of Agriculture
Potable Water	water that is clean enough to use for drinking, cooking, hygiene, and other household purposes, generally treated and supplied by municipal systems
QWEL	Qualified Water Efficient Landscaper; refers to a WaterSense certification program that provides 20 hours of educational training to professional landscapers to improve water use efficiency
SDI	subsurface drip irrigation
Secondary Water	untreated water or reclaimed wastewater that does not meet drinking water quality standards
UBWR	Utah Board of Water Resources
UDAF	Utah Department of Agriculture and Food
USDA	United States Department of Agriculture
WRe	Utah Division of Water Resources
WRi	Utah Division of Water Rights

State Context

Water conservation efforts are important components of water resources management in Beaver and Iron Counties, Utah, as they are throughout the State. The State of Utah has increasingly prioritized and promoted water conservation as it confronts the interconnected challenges of fully appropriated water supplies, increases in population and economic activity, and extended regional drought. Starting in the 1990s, water saved through conservation became recognized as an important new water source when building water supply infrastructure projects became more expensive and difficult. Local water providers started educational programming on how people could save water, including through replacement of indoor water fixtures and appliances and adoption of outdoor waterwise landscaping. The state's first major piece of water conservation legislation, the 1998 Water Conservation Plan Act (H.B. 418), required water conservancy districts to prepare water conservation plans and specified types of measures to be included (https://le.utah.gov/~1998/bills/hbillint/HB0418.pdf). Conservation efforts have continued to expand since that time with consumer messaging campaigns like Slow the Flow, construction of conservation gardens by non-profit entities and water conservancy districts, development of regionally appropriate landscape plant lists and watering guidelines, and investments in other water conservation programs, projects, and research at state (https://conservewater.utah.gov/) and local levels (Ericksen, 2023). This shift in emphasis is part of a larger transition toward incorporating water demand management into water planning and developing water efficiency tools, data, and infrastructure to support it.

The State of Utah has also prioritized comprehensive and accurate water data so that policymakers and water managers can make informed decisions on how to secure a reliable water supply for the future and assess progress on meeting conservation goals. In 2018, the Utah Division of Water Resources (WRe), along with coordination from the Utah Division of Water Rights (WRi) and the Utah Division of Drinking Water (DDW), implemented recommendations from analyses of state water use records and compiled updated 2015 water use data to serve as a new municipal and industrial (M&I) water use baseline for future water supply and demand projections (Utah Division of Water Resources, 2020). The 2015 M&I water use baseline also provides a benchmark for tracking M&I conservation progress over time. WRe has reported water use in gallons per capita per day (GPCD) using the "water use" method that measures all water used by water suppliers' customers. This means WRe includes "metered potable and secondary water and estimates secondary water use when a metering device isn't available. Utah does not apply credit for any types of return flows or direct reuse water" (Jacobs, 2022). This approach differs from other methods that either measure "all water delivered by the water agency" (often resulting in a higher GPCD) or measure "only water that is consumed and does not include water returned to the system" (often resulting in a lower GPCD) (Jacobs, 2022).

In 2019, WRe released a report detailing regional M&I water conservation goals to meet by 2030 with additional goal projections for 2040 and 2065 (Hansen Allen & Luce, Inc & Bowen Collins & Associates, Inc., 2019). The report formed nine M&I Water Conservation Regions (Figure 1), each with their own regional conservation goals to support "the diverse terrain, climates, populations, development patterns, and attitudes that affect what water is available and how it is used" (Hansen Allen & Luce, Inc & Bowen Collins & Associates, Inc., 2019, p. 3). In setting the goals, WRe evaluated water conservation potential both indoors and outdoors, looking at variables like adoption of high-efficiency fixtures, changes in landscaping and development density, and climate change impacts. Based on public comments and cost estimates, WRe prioritized water conservation practices to calculate the regional water conservation goals. To meet the goals, WRe recommends water suppliers and communities adopt and refine the following broad conservation recommendations:

- emphasize water conservation education;
- enact conservation tiered-rate pricing;
- encourage natural replacement of indoor fixtures and appliances with more water efficient ones and consider accelerating this process through incentives;
- fix indoor leaks;

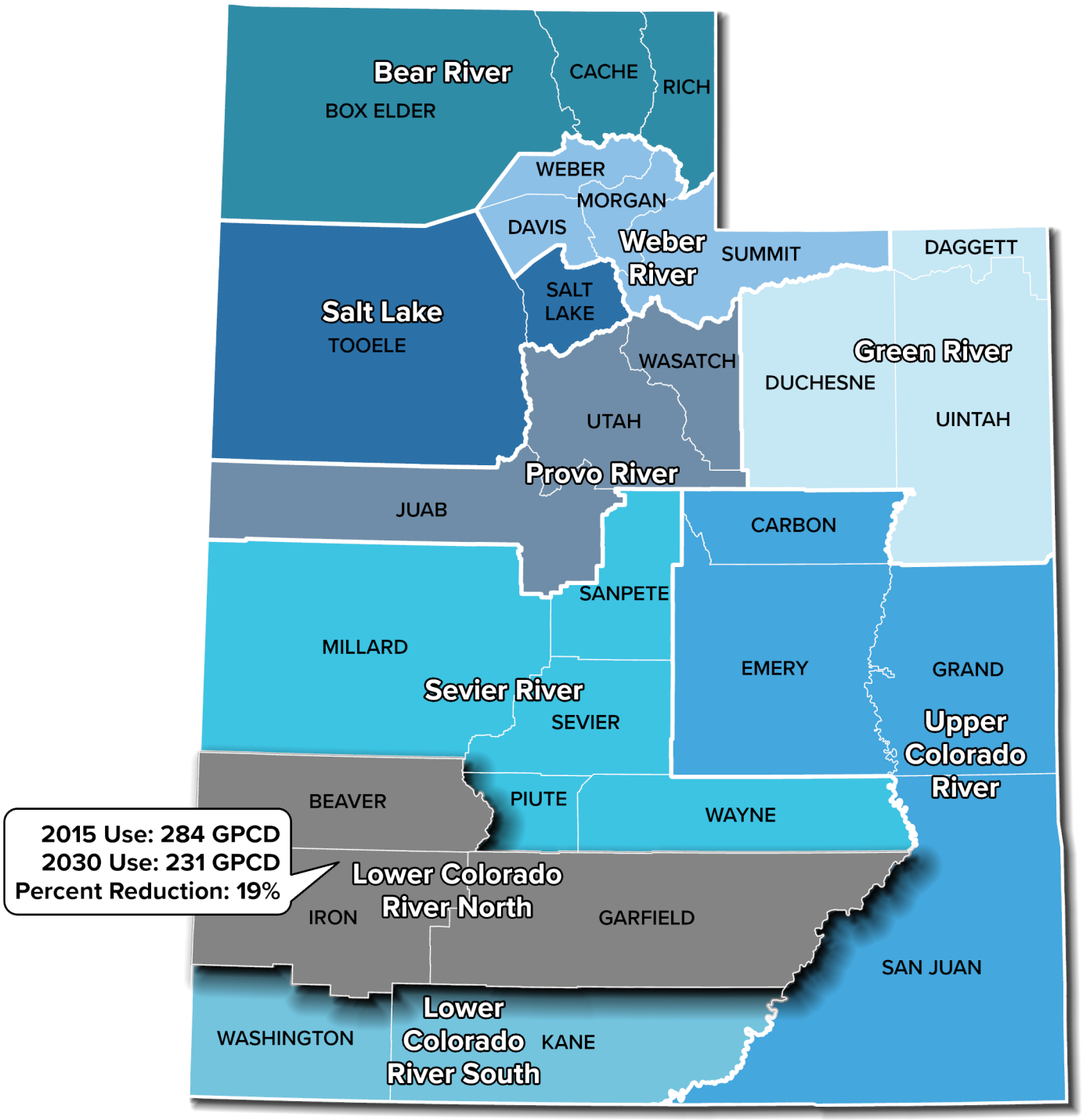

Figure 1. M&I Water Conservation Regions and 2030 goals for the Lower Colorado River North Region (Source: https://conservewater.utah.gov/regional-water-conservation-goals/)

- improve outdoor irrigation efficiency through secondary metering, smart irrigation sensors and controls, and drip irrigation efficiency;
- encourage waterwise landscaping in new construction and conversion of existing landscapes; and
- consider the water conserving impacts of smaller lot sizes and increased density (Hansen Allen & Luce, Inc & Bowen Collins & Associates, Inc., 2019).

WRe also created and has since maintained Utah's Open Water Data portal information (https://dwre-utahdnr.opendata.arcgis.com/) that includes comprehensive data for M&I water use, water-related land use, and basin water budgets (Department of Natural Resources, 2018). WRe estimates water demand primarily through models and population projections and has developed a statewide Water Demand Model to project future M&I water demand. The most recent results of the model have been published in the 2021 Utah State Water Plan (Utah Division of Water Resources, 2021). The Utah State Water Plan is required to be published and updated every ten years with an internal WRe goal of updating it every five years. The next update will be published by the end of 2026. WRe is currently hosting a series of "Water Talks" in each hydrologic basin to gather local water knowledge and priorities as input into this plan (https://water.utah.gov/water-talks-2025/#schedule).

Building on these ongoing statewide and regional water conservation efforts and investments, new focus areas were urgently announced by Governor Spencer Cox in 2021 who declared a drought emergency when 90% of Utah was in severe drought (Office of the Governor, 2021). Investments in programs and projects in these focus areas were mandated and incentivized by bills passed by the Utah Legislature over the 2021-2024 legislative sessions (Utah Division of Water Resources, 2025a, 2025d, 2025c, 2025b) and are being implemented in alignment with Utah's Coordinated Action Plan for Water (Governor's Office of Planning & Budget et al., 2022), the 2021 Utah State Water Resources Plan (Utah Division of Water Resources, 2021), and Utah's Regional M&I Water Conservation Goals (Hansen Allen & Luce, Inc & Bowen Collins & Associates, Inc., 2019). These new focus areas are:

- an expanded turf buyback program to reduce M&I outdoor water use;
- integrated land use and water planning to help local communities proactively plan for growth and adopt water efficiency standards for new development;
- statewide installation of secondary water meters on systems delivering untreated outdoor water; and,
- continued investment in Agricultural Water Optimization to improve water supply resiliency and improve water quality.

In April 2025, Governor Cox issued Executive Order 2025-04, which declared a state of emergency due to extreme or severe drought conditions for 13 counties in the southern part of Utah, including both Beaver and Iron Counties (Declaring a State of Emergency in Certain Counties Due to Drought Conditions, 2025). In this latest drought declaration (declarations also were issued in 2018, 2021, and 2022), Governor Cox called upon water suppliers, irrigation companies, local governments, and residents to all take actions to protect scarce water supplies.

Beaver and Iron Counties have made progress in using water more efficiently, but as both counties plan for their futures amidst increasing drought severity and declining water supplies, further consideration of how to manage and balance agricultural, M&I, and environmental uses of water over the long term are needed. The present report identifies current conservation measures taken by Beaver and Iron Counties and provides information on how these counties can enhance and expand their efforts.

Geographic Context in Beaver and Iron Counties

Land and Water

Beaver and Iron Counties are located in southwestern Utah. The land in Beaver County is split between three of Utah's twelve major hydrologic regions: Cedar/Beaver, Sevier River, and the West Desert. The land in Iron County is mostly within the Cedar/Beaver hydrologic region, with small parts of the county located within the Sevier River, Kanab Creek/Virgin River, and West Desert hydrologic regions (Figure 2).

Most of the land in these two counties is public land managed by various federal and state agencies: 87% of Beaver County and 64% of Iron County (Appendix A, Table A1). Much of the private land is used for agriculture: around 43,000 acres of private land (58% of the total) in Beaver County (Appendix A, Table A2); around 81,000 acres of private land (48%) in Iron County (Appendix A, Table A3). Tables A4-A11 in Appendix A detail the water suppliers in Beaver and Iron Counties that provide and deliver M&I, agricultural, and secondary irrigation water and supply other independent industrial uses.

History

Iron County was established in 1850, and Beaver County was established in 1856 by Utah's territorial government. Water was originally developed in both of these counties to supply drinking water for the population and to support agriculture and mineral extraction. Water was most readily available within the Cedar/Beaver hydrologic region of these counties where surface water streams and springs emanate from the Tushar Mountains, Black Mountains, and other smaller mountain ranges, and where subsurface water replenishes groundwater aquifers. Water development was undertaken by communities, irrigation companies, mineral companies, and individual farmers and ranchers who built canals and ditches and dug or drilled wells (Bradley, 1999; Seegmiller, 1998). Many of these water systems are still in use and are the current suppliers of water for the two counties' populations and economic activities.

Today, both counties emphasize the importance of protecting and planning for water in their current County Resource Management Plans (CRMPs) (Beaver County Commission, 2022; Iron County Commission, 2017). Beaver and Iron Counties use the CRMPs to articulate their local priorities in relation to watershed management to state and federal land management agencies. Both counties view agriculture, rural heritage, and access to federal public lands as central to their identity and economies, while also recognizing how their economies are changing and being open to new opportunities (Beaver County Commission, 2022; Iron County Commission, 2017).

Figure 2. The 12 watersheds in Utah

(Source: https://utahdnr.maps.arcgis.com/apps/instant/basic/index.html?appid=fa43f59104f047fdb0834d3351fb6ee0)

County Overviews

Beaver County

Beaver County remains largely rural with an economy concentrated in a few key industries. The predominant employment sectors are government; agriculture (including hunting, fishing, and forestry); and the leisure, hospitality, and retail industries. The CRMP notes "Beaver County has become a primary location for the development of energy resources in the State of Utah with development of wind, solar, biomass, geothermal and hydroelectric power" (Beaver County Commission, 2022, p. 22). The 2022 layoffs and 2023 termination of Smithfield Foods hog farm contracts and shutdown of its large meat processing facilities were a blow to Beaver County's agricultural sector and economy as a whole (Sollitt, 2024). Beaver County is also seeking diversification through the Mineral Mountains Utah Inland Port Project that was approved in 2023 (Felsted, 2023). However, it remains a stated objective of Beaver County "to preserve and protect the agricultural lifestyle, heritage, culture and rural character of the county" (Beaver County Commission, 2022, p. 32). Beaver County's population increased 0.35% from 2023 to 2024, almost exclusively due to natural population increase (Harris, 2025). From 2020 to 2060, Beaver County's population is projected to increase from about 7,100 to 10,200, a 44% increase (Kem C. Gardner Policy Institute, n.d.).

Beaver County is divided into five water right areas by WRi: Beaver Valley (Area 77), the Milford district of Escalante Valley (Area 71), Wah Wah Valley (Area 69), Pine Valley (Area 14), and a part of Hamlin Valley (Area 19) (Figure 3). These areas, based on geographic and hydrologic boundaries, are used to manage and administer water rights. All of the waters in Beaver Valley and the Milford district are "considered to be fully appropriated" (Utah Division of Water Rights, 2011c, 2013). While the surface waters of Wah Wah Valley, Pine Valley, and Hamlin Valley are "generally considered to be fully appropriated," "the State Engineer believes there is unappropriated [ground]water available in [these] aquifer systems" (Utah Division of Water Rights, 2011b, 2014b, 2014a). The Beaver River is the primary source of surface water in Beaver County and is mainly used for agricultural irrigation and secondary irrigation systems for urban outdoor water use on landscapes and gardens. Springs and underground wells source most of the drinking water in the county. Beaver, Milford, and Minersville are the incorporated cities in Beaver County.

Iron County

Iron County balances a growing, diversified urban economy in Cedar City with its rural agricultural base. Main contributors to Iron County's urban economy include Southern Utah University, government offices (local, state and federal), manufacturing (e.g., plastics, roofing supplies), and service industries (including health care and tourism) (Brandley, 2025). Nearby Cedar Breaks National Monument, Brian Head Ski Resort, Dixie National Forest, and nearby national parks (Zion, Bryce, Grand Canyon, Great Basin), along with the Utah Shakespeare Festival founded in 1962, are cornerstones of Iron County's tourism sector. Agriculture is the primary economic contributor to rural parts of the county and considered "to be part of its history, custom, and culture" and is "important for the natural, cultural, social, and economic benefits it provides" to the county (Iron County Commission, 2017, p. 15). However, the CRMP notes and cites sources documenting that "many farms are struggling" and "farming is losing its successors" (Iron County Commission, 2017, p. 16). The following trend was identified by stakeholders consulted for the plan: "Urban Development Impacts: More and more urban development is spreading into historical agriculture areas. Each development requires water and the only source is from agriculture" (Iron County Commission, 2017, p. 18). Iron County's population increased 2.8% from 2023 to 2024 with 75% of the growth from net migration (Harris, 2025). During that time, Iron County was one of Utah's fastest growing counties with a growth rate over 2%. From 2020 to 2060, Iron County's population is projected to increase from about 57,700 to 98,100, a 70% increase (Kem C. Gardner Policy Institute, n.d.).

Iron County is divided into four water right areas: Parowan Valley (Area 75), Cedar City Valley (Area 73), the Beryl-Enterprise district of Escalante Valley (Area 71), and a small section of Hamlin Valley (Area 19) (Figure 3). All waters in Parowan Valley, Cedar City Valley, and the Beryl-Enterprise district are "considered to be fully

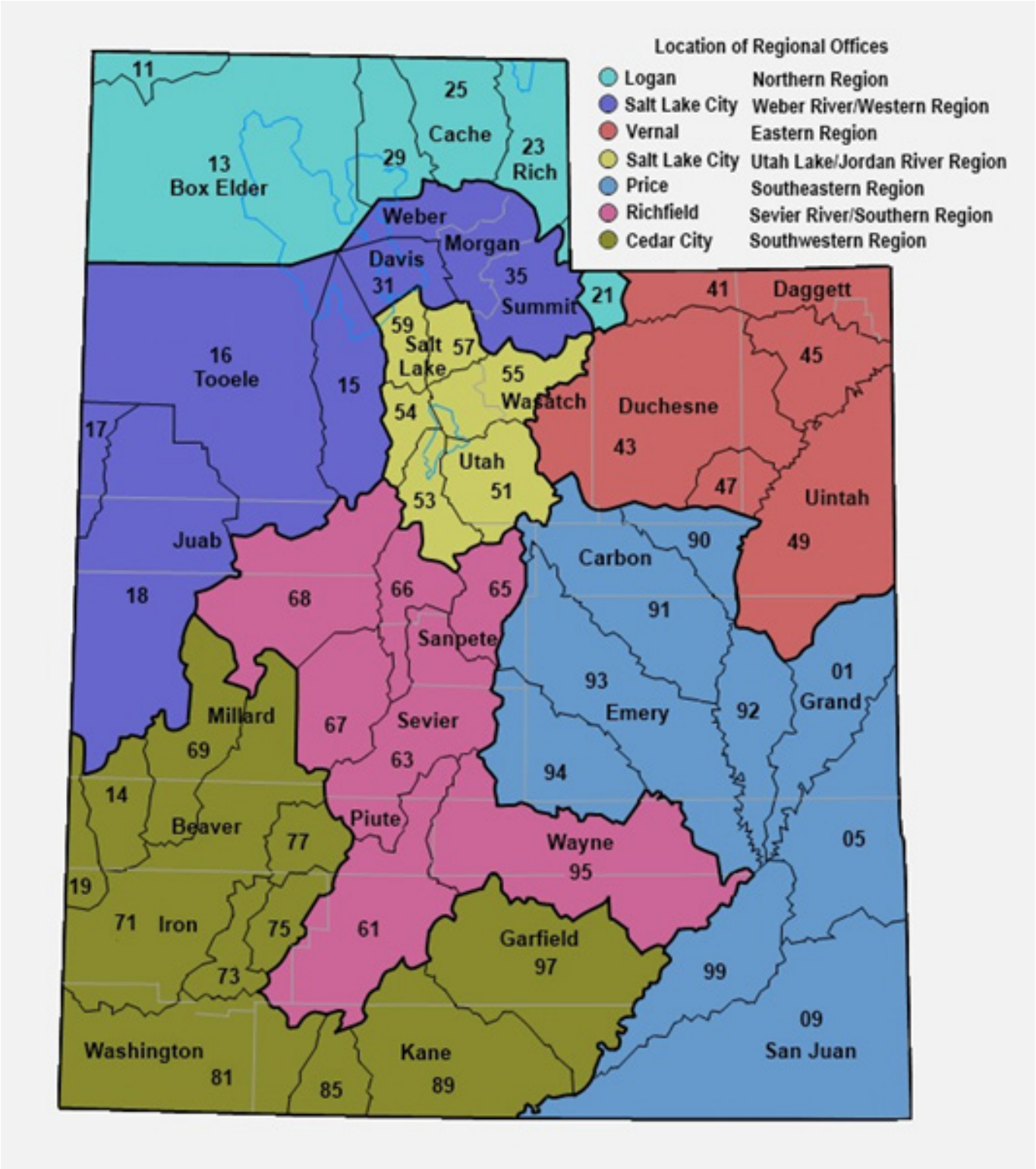

Figure 3. Water Rights Area Map

(Source: https://waterrights.utah.gov/wrinfo/policy/wrareas/)

appropriated" with a "limited amount of unappropriated water available in the [Hamlin Valley] aquifer system" (Utah Division of Water Rights, 2011a, 2011b, 2013, 2019).

The Central Iron County Water Conservancy District (CICWCD) was formed in 1997 to establish a reliable, stable, regionalized water system in its service area, which lies in the center of Iron County (Figure 4). Cedar City, Enoch, Brian Head, Kanarraville, Parowan, and Paragonah are the incorporated cities in Iron County, but only Cedar City, Enoch, and Kanarraville are in CICWCD's service area.

Iron County's water supply is dominated by groundwater. Coal Creek in Cedar City Valley and Parowan and Summit Creeks in Parowan Valley contribute limited amounts of surface water. WRi has placed Cedar City Valley, Beryl-Enterprise, and Parowan Valley under groundwater management plans (Utah Division of Water Rights, 2012, 2021, 2024)[1]. The Cedar City Valley groundwater management plan aims to reduce the annual depletion of the aquifer from 28,000 AFY to the estimated safe yield of 21,000 AFY over a period of 45 years.

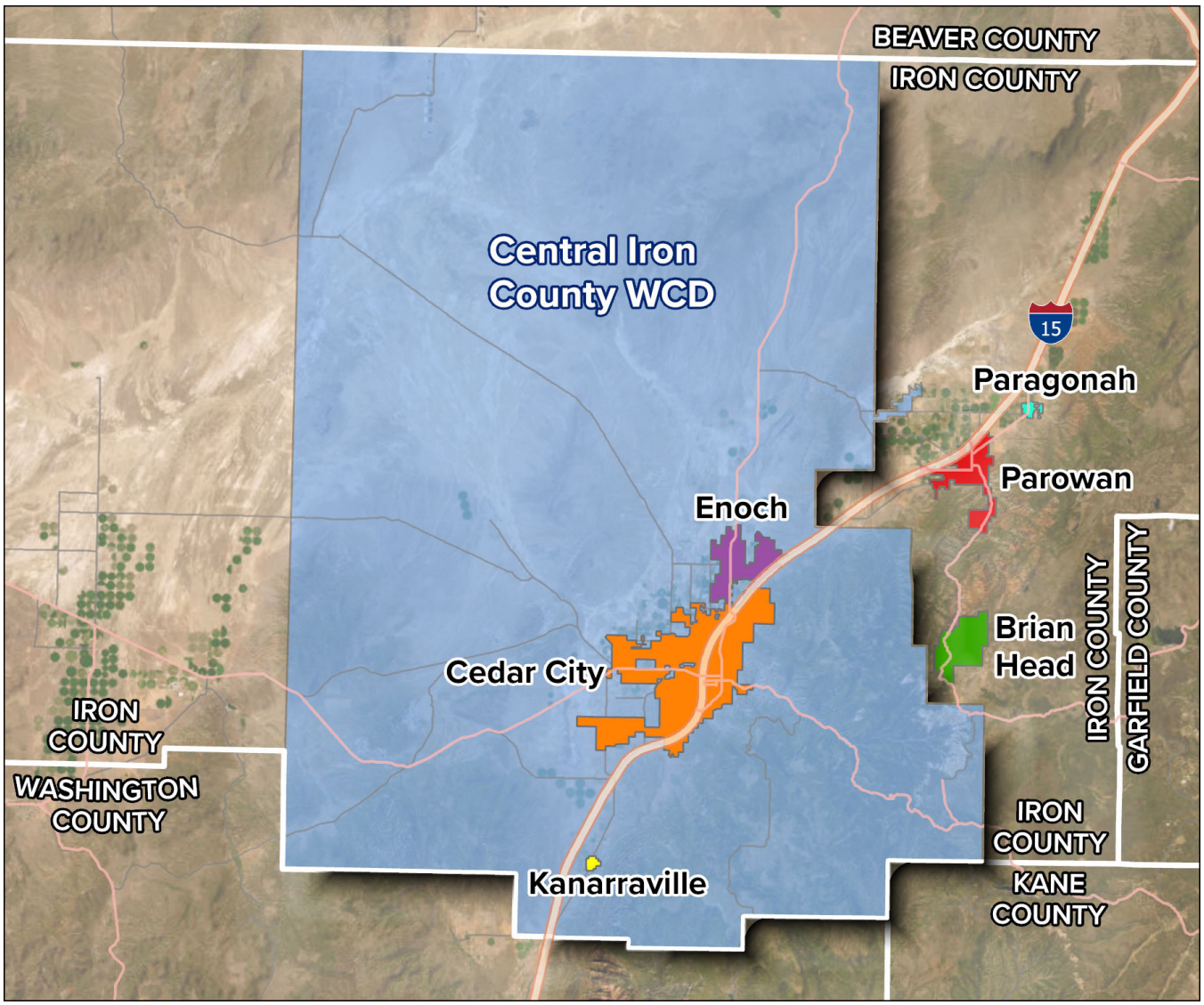

Figure 4. CICWCD district boundaries.

(Source: https://cicwcd.org/wp-content/uploads/2018/01/c-1-boundary.pdf)

1 The State Engineer was given the authority to establish groundwater management plans in 2006 in Section 73-5-15 of the Utah Code. According to the code, the objectives of groundwater management plans are to limit groundwater withdrawals to maintain safe yield, protect the physical integrity of the aquifer, and protect water quality.

Conservation Efforts in Beaver and Iron Counties

The focus of this section is on providing an overview of water efficiency and conservation efforts currently being undertaken in Beaver and Iron Counties. At the state level, water conservation is being promoted across all geographic regions and all sectors of water use. We describe water conservation efforts in public M&I systems, secondary irrigation systems, and agriculture in accordance with state-supported programs in these areas and with reference to some best management practices in water conservation more generally.

Water suppliers are responsible for water supply reliability and have traditionally focused on building engineered systems to consistently supply water to meet demands while responding to factors that increase its uncertainty. Methods for improving long-term water supply reliability have come to include approaches such as diversification of water sources, integrated water resource management (IWRM), demand-side management, water leasing and water banking, and improved water data monitoring, metering, and analytics. Water supply entities are important in the landscape of water conservation efforts in Utah because they have various responsibilities and capacities to improve water use efficiency within their own delivery systems and to encourage conservation actions among their individual members, customers, and residents. Water suppliers are sometimes mandated to report water use data and develop water conservation plans, and they are the local entities through which state water conservation programs and projects can be delivered and enacted.

M&I Water Conservation Efforts

Overview

Iron and Beaver Counties are both in the Lower Colorado River North region under Utah's M&I Water Conservation Regions (Figure 1). This region has a water conservation goal of 231 GPCD for 2030, a 19% reduction from the region's 2015 water use of 284 GPCD. Table 1 shows M&I water use from 2015-2022 with 2030, 2040, and 2065 conservation goals for Beaver and Iron Counties as provided by the Regional Water Conservation Dashboard. The dashboard is currently being updated. 2015 was a particularly low water year in Utah, leading to lower GPCD numbers. Averaging the M&I GPCD numbers across 2015 to 2019 shows that both Beaver and Iron Counties have made some progress in reducing their M&I GPCD.

For M&I use, water conservation efforts occur on the part of both water suppliers and the end water users. Water suppliers can focus on water supply conservation efforts by making their systems more efficient, reducing water loss, protecting the quality and usability of existing water supplies, and finding ways to reuse water and augment their water supplies. Public water systems with 500 or more connections must prepare and submit a water conservation plan to WRe every five years under the Water Conservation Act (Utah Code 73-10-32). Each water conservation plan must include the water system's pricing structure, plan for a reliable water supply, future demand estimates, a water reduction goal, and an explanation of the water conservation measures it will use to meet its goal. WRe reviews and supports these systems in preparing these plans.

The public water systems' water conservation plans in Beaver and Iron Counties explain how system operators have worked to increase water efficiency through meters and more precise measurement, leak detection programs, improving secondary systems for outdoor water use, and conducting artificial recharge projects to help replenish groundwater aquifers and augment water supply. The conservation plans also detail how each supplier works to encourage their customers to reduce their use through educational programming, tiered water rate structures that target high-end customers, rebates to help financially incentivize end users to increase their water efficiency, and ordinances that require particular water conservation actions.

Table 1. M&I water use from 2015-2019 with 2030, 2040, and 2065 conservation goals.

Region	2015 Baseline GPCD	2016 M&I GPCD	2017 M&I GPCD	2018 M&I GPCD	2019 M&I GPCD	2015-2019 average M&I GPCD	2020 M&I GPCD	2021 M&I GPCD	2022 M&I GPCD	2030 GPCD goal	2040 GPCD goal	2065 GPCD goal
Beaver County	553	714	782	686	704	688	701	654	654	390	360	356
Iron County	223	238	232	228	229	230	270	203	197	193	182	173

* Beaver and Iron Counties are both in the Lower Colorado River North conservation region. Data from "Utah's Regional Water Conservation Goals" interactive dashboard. Available at: https://utahdnr.maps.arcgis.com/apps/dashboards/1eee737fc5094b06a5c71ac3f1716055
** Various context-specific factors affect Beaver County's high GPCD numbers, most importantly the presence of major high-volume, self-supplied industrial water uses (geothermal power plants), larger residential lot sizes, and a small population

The primary objectives of M&I water suppliers are water delivery reliability and revenue stability in service of their customer base. Most water efficiency and conservation programs are implemented by these suppliers to directly support these objectives, especially when water is in short supply and demands are growing. Water metering and leak detection helps them to more effectively identify and address system losses and recover water that can instead be distributed to points of sale, stored for future use, or returned to the hydrologic system. Related, artificial recharge projects, while not conservation in the sense of reducing per-capita water demand, can help water suppliers protect the stability and quality of their water supply, manage excess runoff water, prevent flooding and erosion, and improve water quality.

Expanding service to new areas is often a challenge for water providers with limited water supplies. Land use ordinances on new development that specify water fixture efficiency and waterwise landscaping standards are among means for water systems reaching capacity to avoid extending their services in ways that could threaten their ability to reliably supply water over the long term. Development fees levied on new development and/or requirements for developers to acquire and deed water rights to the water supplier are also ways to address this challenge.

Water pricing is a powerful conservation tool. Historically, drinking water rates in Utah were low with flat-rate fee structures regardless of volume used, largely because water infrastructure was subsidized with impact fees and property taxes (Utah Division of Water Resources, 2010). Water conservation can be financially incentivized through tiered rate structures that incorporate increasing block rates where users pay higher per unit fees for water use in higher volume blocks. Utah legislation now requires:

- retail water providers to use an increasing tiered rate system (S.B. 28 in 2016);
- applicants for secondary water metering grants to use tiered conservation billing and/or customer specific education (H.B. 242 in 2022);
- water conservation plans to include the officially adopted rate structure (S.B. 89 in 2022);
- water suppliers to consider water conservation when setting rates and factor conservation into the highest residential tier by July 1, 2027 (H.B. 274 in 2025).

One of the most common methods for M&I water suppliers to promote water conservation is through customer education and public communication campaigns. Water users are often motivated to conserve when they know there are water shortages affecting the whole community and they need to contribute to collective conservation efforts. Having a water conservation manager on staff is often key to framing and disseminating water conservation information and implementing water conservation programs. The State of Utah supports three water conservation incentive/rebate programs directed at individual end users under the umbrella of the statewide Utah Water Savers Program (https://www.utahwatersavers.com/).

Outdoor water use makes up about 60% of M&I water use and, in 2023, Utah announced a statewide incentive program through Utah Water Savers, the Landscape Incentive Program, so water consumers can recover some of the costs of replacing water-intensive turf to water-efficient landscape alternatives (Wells, 2023). Under S.B. 118 (2023), the Utah Legislature allocated $3 million in ongoing funds to support the program. For residents to be eligible for the incentives, their communities must adopt qualifying water-efficient ordinances that at minimum require:

- no lawn on parking strips;
- in new development, no lawn in areas less than 8 feet in width;
- no more than 50% of front and side yard landscaped areas in new residential developments are lawn (Lawn limitations do not apply to small residential lots with less than 250 square feet of landscaped area);
- in new commercial, industrial, institutional, and multi-family development common-area landscapes, lawn areas shall not exceed 20% of the total landscaped area outside of active recreation areas.

In Iron County, residents in Cedar City, Enoch, and unincorporated areas of Iron County qualify for the Landscape Incentive Program. In each of these areas, residents are currently eligible for $2 per square-foot of grass replaced. Communities in Beaver County currently do not qualify for the program.

All Utahns are eligible for the other two Utah Water Savers incentive programs. Utah Water Savers offers a $150 rebate for water-efficient WaterSense toilets and a $100 rebate for smart irrigation controllers. Smart irrigation controllers adjust outdoor watering schedules using local weather data. The EPA estimates a home can save up to 15,000 gallons of water by using a smart irrigation controller (United States Environmental Protection Agency, 2025b). Toilets are the main sources of water use in the home, making up 30% of a home's indoor water use. Residents can also save up to 13,000 gallons of water by replacing old toilets (manufactured before 1994) with WaterSense labeled toilets (United States Environmental Protection Agency, 2025a).

The remainder of this section describes what communities in Beaver and Iron Counties are doing to promote M&I water conservation in these areas.

Beaver County

In Beaver County, Beaver City Water System and Milford Water System are required to submit water conservation plans. Both Beaver City's and Milford City's water conservation plans were last approved in 2022. Table 2 shows the water conservation efforts of Beaver City and Milford City to increase efficiency and supply in their water systems. Table 3 shows the water conservation efforts that focus on helping end users save water.

Table 2. Municipal water conservation programs in Beaver County related to water system supply management (Source: Limb & Brown, 2022; Sunrise Engineering, 2022)

Program	Description
Leak detection and metering	Beaver City: • Contracted a study in 2008 to determine water leakage in its drinking water distribution system, which found 30-40% of daily water flows were lost. Beaver City replaced 40 miles of piping, eliminated older leaky galvanized pipes, and connected several dead-end lines. • Replaced existing drinking water meters with radio-equipped meters. These new meters can be read more quickly and frequently and help alert the water system operators to leaks and excessive water use. Milford City: • Installing radio-equipped meters and a SCADA (Supervisory Control and Data Acquisition) system that can control and monitor the water system to detect leaks.

Table 3. Municipal water conservation programs in Beaver County related to end user water demand management strategies (Source: Limb & Brown, 2022; Sunrise Engineering, 2022)

Program	Description
Ordinances and regulations	Beaver City: • Prohibits outdoor watering in July and August between 10:00 A.M. and 8:00 P.M. • Prohibits areas that have secondary water from watering outdoors with the drinking water system. • Has created a water conservation contingency plan for secondary water during times of water shortages that limit and restrict outdoor watering during times of drought. Milford City: • Plans to adopt a resolution to prohibit general waste of water and set time of day watering restrictions. • Also plans to establish an emergency water conservation contingency plan to limit outdoor watering during times of drought.
Education	Beaver and Milford Cities: • Occasionally include information on efficient outdoor and indoor water use with customers' water bills. See Limb & Brown, 2022; Sunrise Engineering, 2022 for examples of these educational water conservation guidelines that are disseminated. Milford City plans to expand these educational efforts to local schools. Milford: • Will also encourage the use of high-efficiency fixtures and low-water-use landscaping in yards.
Tiered water rates	Beaver and Milford: • Use tiered water rate schedules for drinking water. See Table 4 for schedules.
Impact fees	Beaver: • Mentions in their water conservation plan that it charges impact fees to new developments. A 2021 fee schedule shows an impact fee of $7,535 for a residential unit (https://beaverutah.net/wp-content/uploads/2022/01/FEE-SCHEDULE-2021.pdf). Developers are also required to secure water rights and deed them to the city to meet water demands of their projects.
Incentive programs	All Beaver County residents: • Are eligible for the toilet replacement program and smart controller rebate program under the Utah Water Savers program (utahwatersavers.com).

Table 4. Current tiered water rate structures for Beaver and Milford cities' drinking water systems (Source: Limb & Brown, 2022; Sunrise Engineering, 2022)

	Beaver City	Milford
Residential Base Rate	$35/month (includes 10,000 gallons)	$50/month (includes 9,999 gallons)
Level 1	$0.40 per 1,000 gallons (10,001-15,000 gallons)	$1.50 per 1,000 gallons (10,000+ gallons)
Level 2	$0.80 per 1,000 gallons (15,001 – 30,000 gallons)	
Level 3	$1.60 per 1,000 gallons (30,001-60,000 gallons)	
Level 4	$2.20 per 1,000 gallons (60,001+)	

Iron County

In Iron County, CICWCD, Cedar City, Enoch, and Parowan are required to submit water conservation plans to WRe. CICWCD's plan was last approved in 2020; Parowan in 2021; and Cedar City and Enoch's plans in 2024. Table 5 shows the water conservation efforts to increase efficiency and supply in their water systems. Table 6 shows the water conservation efforts that focus on helping end users save water.

Table 5. Municipal water conservation programs in Iron County related to water system supply management (Source: Cedar City Engineering Department, 2024; Central Iron County Water Conservancy District, 2020; Enoch City, 2024; Parowan City, 2021)

Program	Description
Leak detection and metering	Cedar City: • Controls for water leakage loss through annual water system audits and repairs known leaks. The city has proposed expanding their leak detection and repair program to detect leaks in real time. CICWCD: • Installing Phase 1 of AMI (advanced metering infrastructure) meters to report and show leak detection and live readings of water use. Enoch City: • Installed meters at all sources and connections and are read on a monthly basis to help identify leaks. Parowan City: • Installed water meters with radio communication capabilities and has a schedule to check for water leakage in fire hydrants and main water lines.
Artificial recharge and reuse	CICWCD: • Involved with aquifer recharge projects in cooperation with Cedar City and Iron County: Quichapa Recharge, Western Rock Recharge, Schmidt Pit Recharge, Airport Recharge, Horse Alley Recharge, and Enoch Graben Recharge. As of June 2023, 20,000 acre-feet of water has been stored through these projects (Kopp & Endter-Wada, 2024b, p. 41). • Working with Cedar and Enoch Cities on a water reuse system for the wastewater treatment plant.

Table 6. Municipal water conservation programs in Iron County related to end user water demand management strategies (Source: Cedar City Engineering Department, 2024; Central Iron County Water Conservancy District, 2020; Enoch City, 2024; Parowan City, 2021)

Program	Description
Ordinances and regulations	CICWCD, Cedar City and Enoch: • Have adopted ordinances and regulations for new growth for smart water landscapes, limiting the amount of outdoor landscape into turf. Cedar City: • From April through October, outdoor watering is not allowed in Cedar City between 8:00 A.M. and 6:00 P.M. • All new buildings must comply with international building codes, like the International Plumbing Code that standardizes requirements for design and installation of plumbing systems. • If the Cedar City Council deems it necessary, the mayor can limit water use to a determined method, manner, and time. Enoch City: • Has adopted a water conservation contingency plan for times of drought so actions like rate increases, outdoor water restrictions, and fines can be enacted. Parowan City: • Limits on water use can be enacted when deemed necessary by the city council and mayor. • Does not allow outdoor watering between 10:00 A.M. and 6:00 P.M.
Education	CICWCD: • Has developed numerous educational programs on water conservation, including an annual community Water Festival and an annual Fifth Grade Water Fair. CICWCD partners with Cedar City and Enoch City on water conservation education. • Is educating people within its service area on the declining aquifer and the Cedar City Valley Groundwater Management Plan that will reduce water rights in Cedar City Valley to the safe yield of 21,000 AFY. • Holds Localscapes classes (https://localscapes.com/classes) to promote water-wise landscaping methods and provides information on certification programs for multiple landscape irrigation certifications, like Qualified Water Efficient Landscaper (QWEL). • Has full-time staff with water conservation responsibilities. Cedar City: • Educates residents on improving water efficiency and sends reminders of water ordinances through monthly newsletters. Enoch City: • Educates residents on efficient water use through multiple avenues: newsletters, radio announcements, social media campaigns, and educational partnerships. Parowan City: • Plans to provide information on individual residents' irrigation practices to educate residents on water conservation practices and will include water conservation tips in monthly water bills.

Table 6. *cont.* Municipal water conservation programs in Iron County related to end user water demand management strategies (Source: Cedar City Engineering Department, 2024; Central Iron County Water Conservancy District, 2020; Enoch City, 2024; Parowan City, 2021)

Program	Description
Tiered water rates	CICWCD, Cedar City, Enoch, and Parowan: • Use tiered water rate schedules for drinking water. See Table 7 for these schedules. CICWCD: • Requires developers to secure 1 acre-foot of water rights for each new residential connection to the district. If developers limit lawn sizes, the requirement is reduced to 0.8, 0.7, or 0.6 acre-feet per residence, depending on the level of landscaping restrictions (not to exceed 3,500 square-feet, 2,500 square-feet, or 1,500 square-feet, respectively). These reduced lawn sizes qualify for an adjusted conservation water rate tiered structure.
Incentives	All Iron County residents: • Are eligible for the toilet replacement program and smart controller rebate program under the Utah Water Savers program (utahwatersavers.com). Cedar City, Enoch City, and unincorporated areas of Iron County: • Are eligible for the Landscape Incentive Program under the Utah Water Savers program. This program pays residents per square foot of lawn that they replace with water-efficient landscaping. In 2023, CICWCD passed a resolution to encourage communities in the district to adopt ordinances that support statewide water conservation incentive programs, like the Landscape Incentive Program. CICWCD: • Plans to expand promotion of incentive programs like Water Wise Plants, Slow the Flow, Utah Water Savers, and WaterSense. • Plans to develop a rebate program to cover the costs for landscapers who obtain Landscape Irrigation Certifications.

Table 7. Current tiered water rate structures for Iron County drinking water systems (Source: Cedar City Engineering Department, 2024; Central Iron County Water Conservancy District, 2020; Enoch City, 2024; Parowan City, 2021)

	CEDAR CITY (single family residential)	CICWCD	ENOCH (residential & commercial 1 inch meter)	PAROWAN (1 inch meter size)
Base Rate	$17/month (includes no water)	$31/month (includes no water)	$30/month (includes 20,000 gallons)	$36.79/month (0-5000 gallons)
Level 1	$1.00 per 1,000 gallons (0-8,000 gallons)	$0.78 per 1,000 gallons (0-12,000 gallons)	$1 per 1,000 gallons (20,000-40,000 gallons)	$1.19 per 1,000 gallons (5,000 – 10,000 gallons)
Level 2	$2.18 per 1,000 gallons (8,001 – 20,000 gallons)	$0.94 per 1,000 gallons (12,001-20,000 gallons)	$2 per 1,000 gallons (40,001 – 60,000 gallons)	$1.78 per 1,000 gallons (10,001 – 15,000 gallons)
Level 3	$4.21 per 1,000 gallons (20,001-35,000 gallons)	$1.65 per 1,000 gallons (20,001-30,000 gallons)	$3 per 1,000 gallons (60,001+ gallons)	$2.45 per 1,000 gallons (15,001+ gallons)
Level 4	$4.71 per 1,000 gallons (35,000+ gallons)	$2.78 per 1,000 gallons (30,001-60,000 gallons)		
Level 5		$3.09 per 1,000 gallons (60,001-100,000 gallons)		
Level 6		$4.12 per 1,000 gallons (100,001+ gallons)		

Secondary Irrigation Systems Water Conservation Efforts

Secondary irrigation systems provide non-drinking (untreated) water for urban outdoor water use, generally in areas that were formerly agricultural land. The WRe estimates that "[h]undreds of thousands of residential connections in Utah use secondary water for outdoor irrigation" and those historically have been unmetered connections (Utah Division of Water Resources, n.d.-a)

Statewide installation of meters on secondary irrigation systems is one of the focus areas of Utah's Coordinated Action Plan for Water (Governor's Office of Planning & Budget et al., 2022). Users of unmetered secondary water are not subject to tiered pricing structures (as with most drinking water) or to use limitations (as with agricultural duties of water), thus limiting incentives to conserve. These users are also not generally aware of how much secondary water they use or even need, and meters have been proven to reduce water use when the information they provide is interpreted and shared with water users (e.g., Kopp & Endter-Wada, 2024, pp. 51-52). Thus, metering of secondary water use presents significant water conservation potential.

Bills passed by the Utah Legislature in 2022 (H.B. 242) and 2023 (S.B. 251) mandated that all secondary pressurized connections be metered by January 1, 2030 (Utah Code 73-10-34.5) except in instances where secondary water providers submit a Declaration of Exemption form and receive exempt status. Funding of $265 million from the federal 2021 America Rescue Plan Act (ARPA) was appropriated to assist secondary irrigation system providers with the purchase and installation of these meters. The Utah Board of Water Resources (UBWR) was charged with overseeing the distribution of grants of up to 70% of total project costs and low-interest loans for the matching portion.

Receipt of funding for secondary metering requires that the applicant submit a Secondary and Small System Water Provider Water Conservation Plan. The WRe provides a template for those conservation plans. The plans should include a water conservation goal that matches or exceeds the regional goal and specify an implementation timeline and evaluation processes for measuring conservation progress. The plan must also be adopted by the provider's city/town council or company board/shareholders. All secondary water suppliers that provide pressurized secondary water to a commercial, institutional, or residential user must submit or update these conservation plans by December 31, 2025. Secondary water suppliers who received exemption status from needing to install meters must still submit a secondary water system conservation plan within six months of receiving that exemption and undergo conservation evaluation review by WRe.

Tables A6 and A10 in Appendix A identify the secondary irrigation water suppliers in Beaver County (4 suppliers) and Iron County (4 suppliers), respectively. These tables detail acres irrigated, volume (acre-feet; AF) of water from sources in 2023, and the percentages of water that supplies urban and agricultural users. Table 8 below describes the status of secondary metering for these secondary irrigation suppliers. Two systems in each county are metered (50%). Three of these four systems had installed metering around 2019 while the fourth, Minersville Reservoir & Irrigation Company in Beaver County, received grants for secondary metering from the UBWR and recently metered their system in 2023. Some of these systems have individual wells to service large public properties, and those wells are metered as noted in the right-hand column of Table 8.

Table 8. Metering of Secondary Irrigation Water Suppliers in Beaver and Iron Counties

SECONDARY IRRIGATION WATER SUPPLIER	STATUS OF METERING AND SYSTEM INFORMATION
BEAVER COUNTY: *county of the Fifth Class (5,000 – 11,999 population range)* *These suppliers may be exempt under Utah Code 73-10-34(9) or (10).*	
Beaver City Corporation (irrigation)	• No connections are metered • Connections: 1,019 residential, 2 industrial, 20 institutional, 15 agriculture = 1,056 total • Water sources: Center Street Well; Beaver River drainage
Harris Willis Irrigation Company	• No connections are metered • Connections: 33 residential; 3 institutional; 71 agriculture = 107 total • Water source: Beaver River
Milford Municipal Water System (irrigation)	• All connections metered since 2019 • Connections: 8 institutional; 5 agriculture = 13 total • Water sources: 7 wells
Minersville Reservoir & Irrigation Co.	• Recipient of a state secondary water metering grant • All connections metered since 2023 • Connections: 165 residential; 36 agricultural = 201 total • Water source: Beaver River (Main Meter) • Received funding from Utah Board of Water Resources to meter their system (grants RM098 and RM098a)
IRON COUNTY: *county of the Third Class (40,000 – 259,999 population range)*	
Cedar City Municipal Water (irrigation)	• All connections metered since 2019 • A system serving 6 large public institutional properties • Water sources: 2 wells; transfers from drinking water system
Enoch City Water System (irrigation)	• All connections metered since 2019 • Connections: 202 residential; 1 commercial; 10 institutional; 2 agriculture = 215 total • Water Sources: 4 wells
Parowan Municipal Water System (irrigation)	• No connections are metered • Connections: 1,104 residential; 18 commercial; 29 institutional = 1,151 total • Water Sources: 2 wells; 1 irrigation pond
Summit Irrigation Stock Company	• No connections are metered • Connections: 41 residential; 12 agriculture = 53 total • Water Sources: Summit Creek

Data Sources (Accessed 8/6/2025):
1. Division of Water Rights Water Records/Use Information Viewer:
https://www.waterrights.utah.gov/wateruse/WaterUseList.asp
2. Utah Open Data, Secondary Water Systems:
https://opendata.gis.utah.gov/datasets/6d75d02478a74e128ac726890a93dff8_0/explore

Agricultural Water Optimization Efforts

Background

Federal and state agencies have long been involved in both promoting agricultural water use and increasing its efficiency over time in water conveyance and on-farm application. The United States Bureau of Reclamation provides significant federal financial investments for water efficiency and reuse and drought resiliency projects, including converting open canals to piped conveyance systems, through the WaterSMART (Sustain and Manage American Resources for Tomorrow) program. The United States Department of Agriculture (USDA) Natural Resource Conservation Service (NRCS) provides technical and financial assistance through a variety of programs to help farmers, ranchers, and irrigation companies voluntarily engage in water and soil conservation actions. The Utah Department of Agriculture and Food (UDAF) and the Utah Board of Water Resources (UBWR) also provide technical assistance and administer federal and state-funded grant and loan programs to preserve and protect Utah's soil and water resources. The WRe maintains a comprehensive and interactive website (https://water.utah.gov/development-branch/board-projects/) of the approximately 1600 projects that have been funded through the UBWR revolving fund since its establishment in 1947.

As a result of these government programs and private efforts, some of the early irrigation canals and ditches have been lined or piped to improve operational efficiencies. Early wells were dug in the nineteenth century but a big push to use groundwater came in the 1930s and has expanded since, enabling the use of other types of irrigation systems. This push coincided with the availability of well drilling and pumping technologies that enabled the development of deep-water wells. Replacing surface (flood) irrigation with sprinkler irrigation systems became more commonplace in the 1960s and 1970s, which also increased acres under cultivation and started reducing groundwater recharge (Bradley, 1999; Seegmiller, 1998). Currently, a few farms are experimenting with drip-irrigation systems and other irrigation practices and technologies intended to further reduce water use. Table 9 shows the types of systems currently (2023) used on irrigated agricultural land in Beaver and Iron Counties.

Table 9. Irrigation Systems in Beaver and Iron Counties (2023)

Land Use Type	Subcategories	Acres	% Of Acres	Total Acres
Beaver County				
Irrigated Agriculture				40,678
	Drip Irrigation	3	< .0001%	
	Flood Irrigation	12,330	30%	
	Sprinkler Irrigation	28,345	70%	
Iron County				
Irrigated Agriculture				72,317
	Drip Irrigation	50	< .1%	
	Flood Irrigation	6,514	9%	
	Sprinkler Irrigation	65,753	91%	

Data Source: Utah Water Related Land Use, 2023 Report, Utah Division of Water Resources. Available at: https://dwre-utahdnr.opendata.arcgis.com/pages/wrlu/

Agricultural Water Optimization Program

Utah's Coordinated Action Plan for Water (Governor's Office of Planning & Budget et al., 2022, p. 17) notes that "Utah agriculture comprises 75 percent of Utah's total water usage, which is down from its historical average of 79 percent." The plan emphasizes that Utah is committed to optimizing agricultural water use and management to reduce consumptive use while also preserving a productive agricultural sector. UDAF operates several programs through its Conservation Division to help preserve agriculture and reduce water usage (Governor's Office of Planning & Budget et al., 2022, p. 59).

Among UDAF's programs, the Agricultural Water Optimization Program was designed "to reduce consumptive water use, improve water quality, provide increased operational flexibility for agricultural water users, and show accurate, real-time measurement of diverted water to demonstrate actual water savings" (Governor's Office of Planning & Budget et al., 2022, p. 60). The program was created in 2018 through H.B. 381 and as of November 2022 had allocated $76 million as matching grants for applicant projects (Governor's Office of Planning & Budget et al., 2022, p. 60). Under the guidance of the Agricultural Water Optimization Task Force, the program completed an initial phase of assessing how the State of Utah could optimize agricultural water supply and use and improve the quantification of agricultural water use (see annual summaries/reports for 2020, 2021 and 2022 at https://water.utah.gov/agwateroptimization/).

In 2023, the Utah Legislature passed S.B. 277, the "Water Conservation and Augmentation Amendments," to expand the existing grant program, replace the task force with the Agricultural Water Optimization Committee (overseen by representatives from UDAF, WRe, and WRi, among others), and legally recognize saved water as a beneficial use in an approved change application by the State Engineer. An additional $200 million in funding was appropriated to expand the Agricultural Water Optimization Program. The legislature also appropriated $20 million for loans through the Agriculture Resource Development Loan (ARDL) program to allow producers to borrow for the required matching funds for the Agriculture Water Optimization grant program (Utah Division of Water Resources, 2023). In 2025, H.B. 243 modified the committee overseeing the program, and reduced matching fund requirements from 50% to 25% for projects involving subsurface drip, automated surge, or measurement/telemetry irrigation systems. As of the 2025 application cycle, the total awarded funds of the program now exceed $149M statewide.

WRe's 2024 annual report on the Agricultural Water Optimization Program is an evaluation of program effectiveness to date (Utah Division of Water Resources et al., 2024). The program is furthering its main goals of supporting resilience in agricultural water use and agricultural operations. Observable program benefits primarily consist of helping to maintain viable agriculture through increasing agricultural yields, reducing labor costs, and helping farmers adapt through greater operational flexibility. Other program benefits include expanded measurement and telemetry, environmental benefits (maintaining open space, wildlife habitat, and soil health; improving water quality), and outreach activities to agricultural producers. The report states: "As of November 2024, no saved water change applications have been filed with the Division of Water Rights. Measuring the impact of this program on water use will be more accurate and effective as projects are installed and data becomes available (Utah Division of Water Resources et al., 2024, p. 3)."

Specific goals, objectives, and metrics for continuing to measure and assess the outcomes of the Agricultural Water Optimization Program going forward are contained in the 2024 Agricultural Water Optimization Strategic Plan (Utah Department of Agriculture and Food, 2024). Documentation and research being conducted with agricultural producers on implemented projects will support this continuing assessment.

Organizations from Beaver and Iron Counties have participated in the Agricultural Water Optimization Program. This participation includes representatives from these counties serving on or otherwise attending the meetings of the Agricultural Water Optimization Task Force and Committee. Additionally, farmers and irrigation companies from the counties have implemented projects with financial assistance from the program and their

required matching funds, which have sometimes come from federal sources. Some of the incentives cited in project descriptions that were publicly available included the need to ensure all irrigators had enough water for their operations and the declining aquifers and groundwater management plans that have been put in place in Iron County by the State Engineer. Table 10 provides a summary of Beaver County's state-funded Agricultural Water Optimization projects, and Table 11 provides a summary of those from Iron County.

The effectiveness of the Agricultural Water Optimization Program in terms of water savings will continue to be assessed in annual reports by WRe. The return of saved agricultural water to the hydrologic system and/or its transfer to potentially serve new water demands within these counties has yet to be fully realized and documented, which is part of the ongoing research and program assessment currently being conducted.

Table 10. Beaver County Agricultural Water Optimization Projects from 2022-2025

TYPE OF PROJECT	FUNDING
Aquifer recharge	$0
Constructing water storage	$250,000
Installing center pivots with LESA sprinklers	$337,000
Installing center pivots with MESA sprinklers	$315,000
Installing meters/telemetry	$65,000
Piping ditches and canals	$1,422,000
Total	$2,388,000
Data sources (accessed August 2025): 2022-2023: https://docs.google.com/spreadsheets/d/1rywImjUvb9VWLUXcmOEo7UL1Exu9Aqe6_nDV1nOvLEg/edit?gid=0#gid=0 2024: https://ag.utah.gov/conservation-division/agricultural-water-optimization/fy2024-grant-recipients/ 2025: https://ag.utah.gov/conservation-division/agricultural-water-optimization/	

Table 11. Iron County Agricultural Water Optimization Projects from 2022-2025

TYPE OF PROJECT	FUNDING
Aquifer recharge	$1,490,000
Constructing water storage	$1,250,000
Installing center pivots with LESA sprinklers	$609,000
Installing center pivots with MESA sprinklers	$1,308,000
Installing meters/telemetry	$260,000
Piping ditches and canals	$1,575,000
Total	$6,493,000
Data sources (accessed August 2025): 2022-2023: https://docs.google.com/spreadsheets/d/1rywImjUvb9VWLUXcmOEo7UL1Exu9Aqe6_nDV1nOvLEg/edit?gid=0#gid=0 2024: https://ag.utah.gov/conservation-division/agricultural-water-optimization/fy2024-grant-recipients/ 2025: https://ag.utah.gov/conservation-division/agricultural-water-optimization/	

Additional Conservation Opportunities and Information

Since the turn of the 21st Century, there has been a significant shift in the approach to water provisioning for communities located in arid and drought impacted parts of the western United States. The key elements of that shift include: greater emphasis on water demand management; growing realization of the need to live within the limitations of available water supplies; and, increasing caution among municipal water suppliers regarding commitments they make to serve new development, especially as they seek to maintain service obligations to existing customers and the long-term sustainability and reliability of their water sources and systems. This shift has been in response to rapid growth and climatic change affecting the region as a whole, and to resulting challenges over how to deal with water shortages in the face of competing and growing demands.

Within this context, there have been numerous efforts in government institutions, non-profit organizations, and private companies to develop, implement, and assess the effectiveness of various approaches and tools to promote water efficiency and conservation. Conservation approaches have undergone a general shift from earlier dependence on education to motivate private, voluntary consumer conservation actions toward inclusion of broader public, financially-incentivized, and legally-mandated approaches that increase community, regional, and state engagement in conservation activities. As water conservation increasingly makes financial sense, the economy is responding with an array of technological innovations and products to help end users save water (e.g., water-efficient and sensor-operated fixtures, appliances, and irrigation systems) and to help communities and businesses better manage their water system operations (e.g., leak detection software, advanced metering infrastructure or AMI systems, industry-specific technologies).

Utah, the third driest U.S. state in terms of annual, state-wide average precipitation (Sowby, 2024), is responding to these larger challenges and adopting innovations in its own approach to water conservation. In addition to various strategies that can be characterized as traditional water demand management (i.e., efficiency and conservation in water system performance and end uses to reduce the amount of water diverted from sources), the State of Utah is investing more heavily in data management and modeling to refine regional water budgets and integrate analysis of both water diversions and depletions (https://dwre-utahdnr.opendata.arcgis.com/pages/water-budget). The state's new water budgets are based on a more complex understanding of water within hydrologic basins at various scales. The goal of water budgets is to differentiate and account for water that is actually depleted, (i.e., consumed and not returned to the hydrologic system), versus water that is diverted, varying portions of which are returned to the system (depending on the use) and available to serve other uses or sustain sources of water supply.

The management purpose of regional water budgets is to better understand the hydrologic context of Utah's diverse watersheds to help Utahns prioritize conservation actions and cooperate towards living within the means of the state's generally scarce water resources. In a new report prepared for the WRe analyzing M&I water conservation opportunities in the Great Salt Lake Watershed (Hansen Allen & Luce, Inc & Jacobs, 2025), the authors conclude that the greatest urban water depletion reduction potential, and hence avenue for getting more water to Great Salt Lake (the focus of that analysis), comes from turf removal and transitions to waterwise landscaping in urban areas and from the long-established pattern and anticipated future conversion of agricultural land to M&I use, though that potential reduction in water use could be attributed to agriculture as much as M&I. They recommend developing regional water budgets similar to the regional water conservation goals and involving watershed councils and other constituents in utilizing them to prioritize conservation efforts and optimize overall water management on a basin scale.

Nearly all the population and economic activity in Beaver and Iron Counties is located in the Cedar/Beaver Watershed, a semi-arid region and one of the twelve watershed council areas defined by the State of Utah, where furthering water conservation efforts is extremely important. In this final section of the report, we look

at additional water conservation opportunities Beaver and Iron Counties can pursue, recognizing that their circumstances and capacities vary. As an example of varying circumstances, water conservation is of particular urgency in Iron County. Located primarily in the Escalante Desert sub-basin of the Cedar/Beaver Watershed, Iron County has often been in severe drought in recent years, has three aquifers under groundwater management plans due to depletion beyond safe yield, and is among the fastest growing counties in Utah (see Section II). As an example of varying capacity, it is often challenging for rural communities like Beaver County to hire dedicated water conservation staff, enact sophisticated conservation programs, and apply for and be awarded grant funding, especially when they do not have a water conservancy district with revenues from taxing authority dedicated to water management operations.

Beaver and Iron Counties may need and be able to prioritize and pursue different water conservation opportunities. Many publicly available resources exist to help them advance and tailor their water conservation efforts. Among these resources is state institutional support and programs, e.g., from WRe, Utah State University Extension (Utah's land-grant institution), as well as other institutions and organizations. See the toolboxes, case studies, and extensive "Additional Resources" section in *Utah Growing Water Smart: The Water-Land Use Integration Guidebook for Southwestern Utah* (Kopp & Endter-Wada, 2024b).

In the remainder of this section, we identify the main opportunities for water conservation and provisioning that Beaver and Iron Counties can consider to help them meet their future water needs. These opportunities are described in three subsections below:

1. agricultural water conservation and transfer opportunities;
2. water smart growth opportunities; and,
3. opportunities to enhance water conservation in existing urban areas.

Agricultural Opportunities

Since agriculture diverts and depletes the largest portion of water in the Cedar/Beaver Watershed (Utah Open Water Data), reducing agricultural water use and managing how agricultural water might be converted to urban water use are the highest priority conservation opportunities.

Agricultural Water Optimization

Agricultural producers and irrigation companies in both counties have received Agricultural Water Optimization grants from UDAF. Continuing the research to document and assess water savings from these projects is a high priority and legislative mandate for WRe. Based on the results of these assessments, the program may be modified and/or expanded to further promote agricultural water reductions.

This water conservation opportunity is particularly important for Iron County, where a critical need and one of the stated goals of many applicants for Agricultural Water Optimization projects is to reduce withdrawals from the three overdrawn aquifers under groundwater management plans (Cedar City Valley, Parowan, and Beryl Enterprise). Besides reducing stress on groundwater aquifer systems, agricultural water savings also can be used to supply water directly for urban use through change applications reviewed and approved by the State Engineer. This can occur through water sales or leases to drinking water systems or through adding more urban connections to secondary irrigation systems. CICWCD recognizes that agriculture is the largest water user in Iron County. As growth continues in the Cedar City Valley, balancing agricultural needs, water resource sustainability, and development will require both agricultural water conservation and the strategic conversion of agricultural water for M&I use.

For agricultural water savings to have meaningful impacts on the source groundwater systems in these counties, the savings must include reductions in depleted water. This is challenging because some irrigation efficiency projects (agricultural and urban) unintentionally increase depletion (e.g., Grafton et al., 2018). This can happen for multiple reasons. In the case of a conveyance system, reducing losses often allows an irrigation company to better serve its shareholders, which is beneficial for the company. However, this often means that

the shareholders can more adequately irrigate the land under the company's water right, which in addition to increasing production (a benefit) also increases depletion through plant transpiration. Water that once seeped or spilled from the canal (and may have recharged groundwater), now would be depleted. In the case of an on-farm irrigation system, improving irrigation efficiency typically results in a crop with less water stress and less nutrient leaching, both of which tend to increase crop production (this is the benefit) and increase depletion.

This efficiency challenge has been observed in Utah and globally for decades. It leaves water users and water managers with a relatively small toolbox for reducing depletion. The easiest, and most unpleasant, method to reduce agricultural water depletion is to reduce irrigated land through short-term or permanent cessation of irrigation (e.g., fallowing). This comes with an accompanying land management challenge. Appropriate plant communities must be established on the land to conserve the soil (i.e., prevent erosion and reduce the growth of invasive species). A related strategy is to reduce the irrigation season, sometimes called "seasonal fallowing" or in Utah, "seasonal leasing." In this strategy, irrigation is applied for less than the full irrigation season, often ceasing in the mid-to-late summer. This strategy has the potential to reduce crop evapotranspiration during the cessation period, thus reducing depletion. The cost, as in fallowing, is reduced agricultural production. However, some production still occurs on the land.

Another option is to reduce depletion by changing crops if it is economically viable for the producer. This works if a long-season crop (like alfalfa) is replaced with a shorter season crop (like a small grain forage), though this may not result in large water savings. Small grain forages are commonly grown in both Beaver and Iron Counties. Growing the grain for forage takes advantage of hay harvesting equipment already available for alfalfa production. Small grain forages cease growing in mid-summer, and they have an existing market. However, they do not, on their own, typically produce as much forage as alfalfa or other long-season forage crops. So, the cost is total production. One interesting adaptation of small grain forages that at least one Iron County farm has implemented is the interseeding of these crops into existing alfalfa stands. This approach increases early-season production (when water use is typically less). The total effect of these cropping systems on per-acre depletion has not yet been assessed. However, it is almost certain that the depletion per ton of hay produced is less than for alfalfa-only production systems.

A related depletion reduction strategy is deficit irrigation. In deficit irrigation, crops are intentionally supplied with less irrigation water than needed for full production. The plants experience water stress, which reduces production and evapotranspiration. Deficit irrigation is most easily practiced on forage crops, where less water typically reduces total yield in a somewhat proportional manner. For grain and fruit crops, deficit irrigation can completely prevent yield of the grain or seed if not done properly.

From each of the above listed methods, the lesson is that when plants grow, they transpire. So, reductions in plant transpiration result in reduced production. Plants with shorter seasons can be grown, but an ongoing challenge has been to identify a selection of short season crops that are high enough in value to replace existing rotations and make use of existing farm equipment (or justify investment in different equipment). While state agencies and Extension services will continue to work on these problems, it is likely that many future solutions will come from the agricultural community itself.

The difficulty of the above depletion reduction options has led many in Utah (and globally) to investigate changes to irrigation systems to seek to reduce depletion. For an irrigation system change to significantly reduce depletion it must: 1) reduce evaporative losses, 2) reduce irrigated area, 3) reduce crop evapotranspiration, or 4) reduce crop production. The fourth option is an unreasonable goal, so it will not be considered further. The others are discussed below:

1. Reducing evaporative losses.

Evaporative losses include the direct evaporation from irrigation water before it infiltrates into the soil. The best example is evaporation from sprinkler water droplets as they travel through the air. The portion of droplets that evaporate depends primarily on their size (small droplets evaporate more readily than large ones), how long they are in the air, air humidity, and wind speed. In Utah, direct evaporation from canal water surfaces or water as it is flooding across a field in surface irrigation are typically negligible compared to the total volume of water applied.

The most common sprinkler systems that have potential for evaporative loss reduction are wheel lines and center pivots. Wheel lines throw water 20 or more feet in the air (giving droplets a relatively long time to evaporate). Conventional center pivots in Utah typically have mid-elevation spray application (MESA) sprinklers (standard drops with sprinklers about 4 feet from the ground). Replacing these systems with sprinklers that have less opportunity for evaporation loss provides an opportunity to reduce depletion without reducing crop production. Low-elevation spray application (LESA) and low-energy precision application (LEPA) are two "sprinkler" classes for center pivots than involve applying water near (< 2 feet) the ground. This reduces the travel time of droplets in the air and the subsequent evaporation loss. LEPA and LESA systems have been demonstrated to be effective at water conservation in Utah, including near Cedar City (e.g., Crookston et al., 2025). These systems have been adopted more widely in Iron County than anywhere in Utah. However, they are not suitable for significantly sloping lands or lands with low infiltration capacity.

A final practice to reduce evaporation losses is to avoid using end guns on center pivots because they have greater potential evaporation losses than the rest of the machine. This may be challenging because it would reduce the land irrigated unless land previously irrigated with end guns can be consolidated and irrigated another way.

2. Irrigation systems that reduce irrigated land.

The primary example of reducing irrigated land with an irrigation system is replacing systems that irrigate rectangular areas with center pivots, which, due to their circular geometry, often irrigate about 22% less area. Replacing wheel lines with a center pivot is a common example.

3. Irrigation systems that reduce evapotranspiration.

From an irrigation science/engineering standpoint, evapotranspiration includes only crop transpiration and evaporation from the moist soil surface. If crop productivity is to be maintained, transpiration cannot be reduced. However, wet soil evaporation can be reduced by wetting the soil less frequently. This may yield only marginal reductions. But, subsurface drip irrigation (SDI), where drip irrigation lines are buried 12 inches below the soil surface throughout a field, is a means of potentially reducing evaporation. This is because water is applied in the soil without wetting the surface. These systems are only now being experimented with in Utah thanks to the Agricultural Water Optimization Program. SDI requires extensive control of burrowing rodents to prevent system damage. Ongoing studies are being conducted in Northern and Eastern Utah to quantify evapotranspiration with SDI compared to other irrigation methods. Time is needed to fully assess the feasibility of this irrigation method for reducing depletion in Utah.

Though there may be other potential means of reducing depletion from irrigated agriculture in Beaver and Iron Counties, the above options represent the best potential at present.

Agricultural Water to Municipal and Industrial Water Use

As Utah's population has grown and the state has become highly urbanized in terms of where that population resides, through voluntary sales of private land and water rights agricultural lands have been converted into urban areas. When this happens, the water rights that were associated with those agricultural lands are typically transferred for M&I use. This process creates a potential source of water for the growing M&I sector from supplies already developed by irrigation companies or individual farmers through their construction of the infrastructure to put that water to beneficial use, (i.e., surface water conveyance systems and groundwater wells). This opportunity is illustrated by the emergence of secondary water systems serving urban properties within municipal boundaries in both Beaver and Iron Counties, many of which used to be or still are, in part, agricultural irrigation companies (Table 8 above and Appendix A, tables A6 and A10).

The USDA has collected detailed agricultural statistics since 1840, at first every 10 years and now every five years. These statistics document a long-term decline in farming operations and agricultural acreage nationwide, particularly in the vicinity of growing urban areas, but also general shifts in cropping patterns and increases in agricultural productivity. The trends for Iron and Beaver show a steady loss of irrigated agricultural land over many decades. WRe has conducted water-related land use surveys in Utah and has found that both Beaver and Iron Counties are experiencing a decline in agricultural land (Utah Division of Water Resources, 2021). In its 2024 statewide water-related land use inventory, WRe describes the decrease in agricultural lands compared to 2023 as "a direct result of agricultural land being converted to urban land" (Utah Division of Water Resources, 2024, p. 4).

While both Beaver and Iron Counties prioritize maintaining their agricultural heritage, the highest proportion of private land and an even higher proportion of water usage remains in their agricultural sectors. WRe has developed a model to estimate agricultural land and water transfers. The model is based on multiple factors like the historical agricultural land use change, population growth, and a real estate market model. Although Table 6-1 of the 2021 Water Resources Plan shows potential for some water to become available in the Cedar/Beaver basin because of agricultural land changing to other uses, there is a large degree of uncertainty associated with the estimate (Utah Division of Water Resources, 2021, p. 75). WRe based its slight decrease in agricultural land estimate on a comparison of WRe's land use survey results from 2000, 2010, and 2017. A trend analysis over a similar period (2000 – 2020) using the National Land Cover Database produced by the US Geological Survey indicated a slight increase in agricultural land for both Beaver and Iron Counties. Because of the substantial uncertainty associated with the land-cover datasets and estimation methods employed by both agencies, WRe is unable to provide reliable projections of future land-use change in Beaver and Iron Counties. WRe staff are currently developing a more robust agriculture-to-M&I land-conversion prediction approach to improve confidence in future assessments.

The agricultural sector has experienced challenges from warmer temperatures and changing economic circumstances (e.g., the departure of the large Smithfield hog production facilities in Beaver County). Rapid growth in Iron County is increasing the value of agricultural land in the vicinity of communities. Water rights are also increasing in value, especially senior rights not impacted under the 2021 Cedar City Valley and the 2024 Parowan Valley groundwater management plans. Updating modeling results in light of these changing circumstance is warranted, along with more focused analysis of the potential for agricultural land and water conversions within the service areas of secondary water systems (see Appendix A, Tables A6 and A10 and Figures A1-A7).

Water Marketing

In 2020, the Utah Legislature passed the Water Banking Act to facilitate temporary, voluntary, and local transfers of water (Utah Code 73-31). One of the main purposes of the legislation was to find avenues to avoid "buy and dry" of agricultural land and maintain agricultural operations but incentivize conservation savings that could be used for the environment, water quality, and other uses such as M&I. The legislation led to a multi-year pilot program to develop a statewide water marketing strategy to help water users explore and learn how they can create a water market to more flexibly move and manage water in a local area. WRe provides multiple resources to help water users navigate the five Water Marketing Milestones that the pilot program identified:

- "People: Engage participants and ask the right questions.
- Markets: Assess local water supply and demand needs.
- Logistics: Analyze feasible water delivery options, physical water distribution and legal considerations.
- Transactions: Negotiate water leasing arrangements.
- Approvals: Identify and prepare approvals" (Utah Division of Water Resources, n.d.-d).

During WRe's exploration of pilot projects, the idea of an Iron County Groundwater Bank was proposed. The bank would allow for the deposit and withdrawal of pre-approved groundwater rights. At the time of the Water Marketing Strategies report's publication, the proponent of the bank was planning on conducting outreach to evaluate local interest in an Iron County Groundwater Bank (Clyde Snow & HDR, 2023).

Water Smart Growth Opportunities

The State of Utah has focused on helping Utah communities better integrate land use and water planning for water smart growth. This section covers several parts of that integration process:

- water in land use planning;
- water in other planning efforts; and,
- policies for water smart growth.

Water in Land Use Planning

Because many parts of Utah are growing rapidly, including the southern portion of the Cedar/Beaver Watershed, new development can have a major impact on M&I water demand depending on its location, form and design (e.g., infill, compact, sprawl); components (e.g., the types of residential, commercial, and industrial units and connections); and the strictness of building codes and landscaping standards. Planning for growth by considering the resulting water use and long-term demand it entails can help communities manage limited water resources more effectively and reduce the controversies over new development that often occur within communities. It is also more cost-effective to integrate land and water planning requirements into new developments, since retrofitting existing developments for water efficiency is often more difficult and costly (Utah Division of Water Resources, n.d.-b).

Under S.B. 110 (2022) and S.B. 76 (2023), Utah requires municipalities with a population greater than 10,000 and all counties to include a water use and preservation element in their general plans, which must be adopted by December 31, 2025. "The water use and preservation element should include the following:

- effect of permitted development on water demand and infrastructure;
- methods for reducing water demand and per capita consumption for existing development;
- methods for reducing water demand and per capita consumption for future development;
- opportunities to modify operations to eliminate or reduce conditions that waste water" (Utah Division of Water Resources, n.d.-c).

The water use and preservation element requirement also mandates closer coordination between a community's planning commission and public water system as well as other water suppliers (e.g., secondary water systems). At the time of this report, the water use and preservation elements for Beaver and Iron Counties and Cedar City (the only municipality in this report's study area that must meet this requirement) were not available to review, but some of the components of the water use and preservation elements can also be found in their water conservation plans and are summarized in this document. The conservation measures described in Beaver and Iron Counties' water conservation plans are primarily geared towards existing development. Water conservation plans from public water systems in Iron County include some measures geared towards future development, like a conservation water rate for new developments with smaller lawn sizes and some landscape-efficient ordinances for future development. The water use and preservation element sections in each county's and Cedar City's general plans, due December 31, 2025, should further address water conservation strategies for future development.

Water in Other Planning Efforts

Communities in Utah engage in various types of planning efforts in addition to their foundational general plans. Examples of such plans are water conservation plans; stormwater management plans; hazard mitigation, response, and recovery plans; capital improvement plans; drinking water source protection plans; waste management plans; transportation plans; economic development plans; and sustainability plans. They sometimes do more detailed area or site-specific plans in areas of redevelopment or growth, such as area master plans. An important element of planning is incorporating community context considerations, such as potential growth within and adjacent to the community as well as in the larger jurisdictional units where communities are located (e.g., counties and regions).

Communities facing water quantity and quality constraints should seek to ensure that water resources are considered in these other types of planning efforts. Plans are important for providing guidance for a community's policies, programs, and regulations that become tools for implementing plans. Investment of time and resources in planning is important for helping communities define their visions and goals for their community, gathering and analyzing data on bio-physical and socio-economic trends, and educating and engaging residents in creating desired futures (Kopp & Endter-Wada, 2024b).

Policies for Water Smart Growth

The most comprehensive overview of best management practices for integrating water efficiency into land use planning is provided in a guidebook produced by the Land Use Law Center at Pace University and Western Resource Advocates (Blanchard, 2018). Integrating water considerations into local community land use general plans/master plans (states use different terminology), as Utah is now doing, is foundational. Opportunities to implement and enhance the water element of those plans include a suite of options, including measures under the general categories of:

- zoning code changes
- subdivision regulations
- site-plan regulations
- building and plumbing codes
- supplemental regulations
- development moratoria
- development agreements
- non-zoning incentives
- post-occupancy enforcement.

Among the suggestions in this guidebook are many water conservation opportunities being promoted by professional organizations such as the American Planning Association, supported by legislation in Utah, and implemented in other Utah communities. Some examples are permitting accessory dwelling units to foster water-efficient densities, bonus density zoning or "density overlays," transferable development rights, water efficiency audits, water waste ordinances, commercial audit programs, and stormwater management fee reductions.

The best development policies for water-smart growth promote "higher density, cluster development, and infill, especially where infrastructure already exists; high-efficiency plumbing, building, and irrigation standards; [and] water saving and climate appropriate landscaping standards and maintenance practices" (Kopp & Endter-Wada, 2024b, p. 21). The Southwest Utah Growing Water Smart Guidebook includes some of these tools as well as Utah case studies to link new development to water supply planning (Kopp & Endter-Wada, 2024b). These tools include:

- zoning ordinances, subdivision regulations, and planned development policies
- water budgets
- demand offset programs
- building and design codes
- robust development review processes
- water-efficient landscaping ordinances.

The Great Salt Lake Water Conservation Toolbox outlines outdoor and indoor ordinances that communities can adopt to reduce water consumption of M&I water users (SWCA Environmental Consultants, 2024). These ordinances were designed after consulting water efficiency guidelines from many national and local secondary sources. Ordinances are often most effective when addressing new developments, because they are easier to adopt and enforce. The outdoor landscaping ordinance options range from turf size restrictions, plant selection requirements and other landscape design and materials, landscape irrigation schedules, irrigation technology and design requirements, and enforcement mechanisms. Indoor ordinance options include plumbing fixture standards. SWCA recommends municipalities encourage adoption of EPA WaterSense standards or higher standards, like those used in California.

Utah Growing Water Smart

WRe has also helped fund Growing Water Smart Workshops throughout the state. The Growing Water Smart Workshops bring key community staff and decision makers on water and land use planning together for three days of collaborative work, and uses the resources cited above as part of its curriculum. At the end of these hosted workshops, community teams will have developed goals and an action plan on how to integrate water considerations into their land planning efforts. These action plans include team-defined milestones to be achieved within a year of the workshop, to support progress toward their overall goal. So far, four workshops have occurred in Utah with more workshops planned over the next five years. Participating in a Growing Water Smart Workshop could help Beaver and Iron Counties plan for future growth. It could be particularly helpful in Iron County as local entities there adapt to future cuts to groundwater withdrawals in the Cedar City Valley, Parowan Valley, and Beryl Enterprise areas, which are under state groundwater management plans.

Previous community teams have used the Growing Water Smart Workshops to develop or revise their water conservation plans and to work on the water use and preservation element now required in their general plans. Some other examples of what community teams accomplished after one year of participation in the Growing Water Smart program include:

- planning on how to integrate water issues across all city departments with scheduled interdepartmental meetings;
- identifying and applying for water efficiency grants through the Bureau of Reclamation's WaterSMART grants program or grants through Utah State University's Extension Water Initiative;
- implementing projects to increase water efficiency on city properties, like finding areas where turf could be converted to water-wise landscaping;
- developing further landscaping standards like approved plant lists for new development (e.g., a model code was developed by Ivins City); and,
- increasing educational programming on water conservation.

Many workshop participants noted that the Growing Water Smart program not only resulted in updates to city codes but also shifted community mindsets by bringing diverse leaders and staff together and exposing them to new perspectives, tools, and resources that other Utah communities use to increase water efficiency.

Existing Urban Area Opportunities

Growth in population and economic activity in the Cedar/Beaver Watershed is concentrated in and around its cities and towns. Existing M&I conservation efforts described in Section III can be enhanced through continuing water system infrastructure efficiency upgrades, such as active leak detection systems, and expanding the scope and reach of end user water conservation programs. Here we highlight several of the highest priority opportunities for furthering water conservation in existing urban areas:

- focus on reducing outdoor water use
    - metering secondary systems
    - conversion of large public and private landscapes
    - residential landscape and irrigation efficiency programs
- increase tiered water rates and use of conservation pricing
- continue to reduce indoor water use
    - audits of large water users
    - expand incentive programs for new fixtures and appliances

Outdoor Water Use

The most significant water conservation opportunity for existing urban areas is reducing outdoor water use and its associated depletion from the hydrologic system. Priority actions for reducing outdoor use are covered in this section.

Metering and data sharing on secondary irrigation systems:

Making sure all secondary irrigation water systems are fully metered in Beaver and Iron Counties is a priority water conservation action. The secondary irrigation systems that remain unmetered are Beaver City Corporation (irrigation) and Harris Willis Irrigation Company in Beaver County and Parowan Municipal Water System (irrigation) and Summit Irrigation Stock Company in Iron County (see Table 8). Metering of secondary irrigation systems has been shown to yield significant savings of approximately 30% when paired with sharing the meter data and interpreting the appropriateness of the amounts being used (Kopp & Endter-Wada, 2024, pp. 49-50). While meters are being installed on existing connections (which often takes time), all new connections should be metered as they are added to these systems. A high priority opportunity is to meter the Parowan and Summit secondary irrigation systems, especially since the Parowan Valley was placed under a state groundwater management plan in October 2024.

Irrigation audits on properties with high volumes of summer use:

Identifying properties with high volumes of summer use, such as schools, parks, and golf courses, and offering free water audits can help prioritize locations for more focused water conservation assistance. Such audits can help the water supplier work with the property owner/manager to identify ways to conserve water through various improvements to irrigation systems and/or conversions to low-water landscaping. Installing advanced metering infrastructure (AMI) can provide real-time water use data that can help identify where and when people use water. Water suppliers can seek to connect large volume water users to various forms of assistance and incentives to help reduce their water use. Such actions can result in water savings for water suppliers and financial savings for the water users (especially in locations under high tiered water rate structures).

Conversion of large public landscapes:

Increasing water use efficiency on large public and private landscapes has the potential to yield the largest volumes of outdoor water savings and demonstrates government commitment to water conservation, setting an example for community residents. The State of Utah enacted legislation in 2022 requiring public agencies to reduce landscape water use 25% by 2026 (H.B. 121). Beaver and Iron Counties can pursue opportunities to convert to waterwise landscaping and more efficient irrigation systems in their municipal areas, particularly on institutional properties served by secondary irrigation systems. They should prioritize metering of institutional connections in currently unmetered systems. Cedar City has some unique conservation opportunities in its metered municipal irrigation system that serves six large institutional properties: the campus of Southern Utah University, its high school and middle school, a park & cemetery, a golf course, and a large softball complex.

Residential landscape and irrigation efficiency programs:

WRe announced that in 2024, the Landscape Incentive Program replaced three million square-feet of lawn statewide, leading to an estimated 100 million gallons (approximately 307 acre-feet) of water saved. Communities in Beaver County and those in Iron County that are not yet eligible for the program could adopt water-efficient landscaping ordinances, allowing more residents and businesses to qualify for incentives to convert their lawns to water-wise landscapes. There are also opportunities for residents to take advantage of the pollinator program provided by UDAF. CICWCD encourages public entities and businesses to have their outdoor maintenance staff certified through the Qualified Water Efficient Landscaper (QWEL) program and to hire landscape companies with certified QWEL professionals. Recognized by the U.S. Environmental Protection

Agency as a WaterSense certification program, QWEL provides about 20 hours of training for professional landscapers on irrigation system design, maintenance, programming, and operation to improve water-use efficiency. CICWCD could further expand its efforts by hosting QWEL trainings locally and assisting community members in finding certified professionals.

Some areas of Utah offer additional incentive programs also geared towards outdoor water use that Beaver and Iron Counties could consider: the Switch to Drip and Treebate programs. Switch to Drip allows residents and businesses to earn rebates for converting irrigation systems to drip systems in gardens and flowerbeds. The Treebate program offers rebates for planting shade trees in residential yards and is only available if combined with the Landscape Incentive Program or Switch to Drip. Some utility providers in Utah also offer free or discounted landscaping materials to encourage conversion to water-wise landscaping. For example, Salt Lake City Department of Public Utilities has a Turf Trade Program that provides low water turf seed blends that require 30% less water than traditional Kentucky bluegrass lawns at cost for their customers (Kopp & Endter-Wada, 2024, p. 54).

Tiered Water Rates and Conservation Pricing

Tiered water rates that are connected to water use can have a direct impact on water users' behaviors. Beaver and Iron County water suppliers have all adopted tiered water rates for their drinking water systems (Tables 4 and 7). The Utah Foundation found that generally, a 10% increase in a water rate led to a reduction of 2.9% in GPCD (Utah Foundation, 2019). Tiered water rate schedules can be highly variable, as demonstrated by the differences across community water rate schedules in Beaver and Iron Counties (Tables 4 and 7).

The GSL Toolbox (SWCA Environmental Consultants, 2024) recommends some factors to consider when setting tiered water rate structures:

- accurate measurement and billing capacity;
- affordability across income levels;
- clear and immediate feedback on water usage and associated costs;
- presence of high-volume water users; and,
- billing that links reduced water consumption to reduced water bills.

Water rate structures can be further refined to meet specific water system operational needs, such as reducing daily peak usage, seasonal peak usage, and total system demand. They can also incorporate targeted conservation-oriented objectives by including rate structure options such as but not limited to:

- drought demand pricing;
- different outdoor and indoor rates where secondary systems exist;
- seasonal pricing;
- penalties for exceeding allowable water usage limits; and,
- block rates tied to individual location water budgets (Kopp & Endter-Wada, 2024b).

In 2025, the Utah Legislature passed H.B. 274, which allows conservation-based, tiered water rates for both drinking and secondary water systems. Various resources are available to provide guidance on how to incorporate water efficiency and conservation considerations into rate structures, such as the Financing Sustainable Water toolkit from the Alliance for Water Efficiency (Alliance for Water Efficiency, 2014).

Additionally, tiered water rates can be developed and implemented on secondary water systems. Metering these systems has been a state priority investment area and sharing the meter data with customers (as covered above) is an important subsequent step. An Envision Utah study found that most survey respondents thought more water was used indoors than outdoors, which is not the case in most Utah communities (Envision Utah, 2025). Secondary irrigation system metering and detailed drinking water billing data made more accessible to water customers are helping to correct that general misconception. Once secondary water users are educated about their secondary water use, which alone yields water use reductions (Kopp & Endter-Wada, 2024a, p. 51), implementation of tiered rates on secondary water can deliver further water use reductions through the financial disincentive to waste outdoor water.

Indoor Water Use

One strategy that has proved useful in other communities is to identify the largest water users and work with them to find ways to potentially reduce their water use. Water audits for large commercial and industrial water users are an important tool but can be highly specialized depending on the type of facility. However, expertise and services for conducting these audits can be contracted when needed and the water supplier staff can be involved in conducting the audits for experience and oversight. Related, some communities are taking a more careful look at the potential water demand of new commercial and industrial users seeking to locate in their communities and requiring them to meet certain water efficiency standards as a condition of their land use approval and connection to the community water system. Additionally, some communities have limited the total amount of water that any new commercial and industrial customer can use (Kopp & Endter-Wada, 2024b, p. 30, SLC code 21A.33.010). This is particularly important for small communities in which a large commercial, industrial, or institutional (CII) customer may want to locate when the community is trying to reach (or exceed) the state's regional water GPCD conservation goals.

Voluntary, incentivized replacement of indoor water fixtures and appliances is a popular program that oftentimes is people's entry into the realm of water conservation and can encourage them to do even more. Such programs generally return small but consistent long-term conservation savings. They reduce water use through water saving infrastructure that does not rely upon but aids people's individual water conservation practices.

CICWCD is currently a promotional partner in EPA's WaterSense program and encourages residents and businesses to use WaterSense products to increase water efficiency. While Utah offers rebates for toilet replacement and smart irrigation controllers, other WaterSense partners offer additional rebates for WaterSense labeled products. Additional rebates the State of Utah and Beaver and Iron Counties could consider include more efficient bathroom sink faucets and showerheads, hot water recirculation systems, water-efficient washing machines, and home leak sensors.

Summary

This report described water scarcity challenges facing Beaver and Iron Counties and efforts currently underway to promote water conservation and enhance their long-term water provisioning strategies. It also identified and prioritized additional water conservation opportunities these counties could pursue.

The checklist in Figure 5 summarizes current efforts of water suppliers in these counties, as was described in more detail in this report. Many of these efforts can be enhanced. M&I water system supply management efforts to monitor loss and increase efficiencies should be continued and extended to all water supplier systems. M&I end user water demand management strategies should be promoted across all water use sectors (residential and CII), and greater participation should be encouraged on the part of individual water customers and users. Secondary irrigation systems currently unmetered should install meters, and implementation and assessment of Agricultural Water Optimization projects should continue.

Figure 5. Current water conservation efforts in Beaver and Iron Counties

1. M&I Water Suppliers
    a. Water System Supply Management
        - *meter installation and new technologies*
        - *leak detection programs*
        - *artificial recharge projects*
    b. End User Water Demand Management Strategies
        - *water conservation education and public communications*
        - *tiered water rate structures*
        - *incentive and rebate programs through Utah Water Savers*
        - *ordinances that requrie specific water-saving practices*
2. Secondary Irrigation Metering
        - *metering of connections*
3. Agricultural Water Optimization
        -*implementation of irrigation company and on-farm projects*
        - *assessment of project outcomes*

Figure 6 provides a checklist summarizing and prioritizing the additional water conservation opportunities Beaver and Iron Counties can undertake to increase their water conservation efforts. This checklist aligns with WRe recommendations to communities and water suppliers for meeting the regional water conservation goals and with the new conservation focus areas announced by Governor Cox in 2021 (see Section I; Hansen Allen & Luce, Inc & Bowen Collins & Associates, Inc., 2019). Section IV provides guidance on how to implement each opportunity, with additional resources in Appendix B.

Figure 6. Prioritized Water Conservation Opportunities for Beaver and Iron Counties

1. Agricultural Opportunities
- a. Agricultural water optimization
- b. Agricultural water to municipal and industrial water use
- c. Water marketing

2. Water Smart Growth Opportunities
- a. Water in land use planning
- b. Water in other planning efforts
- c. Policies for water smart growth
- d. Utah Growing Water Smart

3. Existing Urban Area Opportunities
- a. Reducing outdoor water use
  - *-metering and data sharing on secondary irrigation systems*
  - *- irrigation audits on properties with high volumes of summer use*
  - *- conversion of large public landscapes*
  - *- residential landscape conversion and irrigation efficiency programs*
  - *- Qualified Water Efficient Landscaper training*
- b. Tiered water rates and conservation pricing
  - *- increase tiered water rates to help meet conservation goals*
  - *- incorporate conservation pricing strategies into rate structures*
- c. Continue to reduce indoor water use
  - *- identify and audit large water users*
  - *- demand assessment and efficiency requirements for new large CII customers*
  - *- continue to encourage and support fixture and appliance replacements*

Both Beaver and Iron Counties heavily rely on stressed groundwater systems in the Cedar/Beaver Watershed. Prioritizing strategies to reduce withdrawals from aquifers and to lower water use in agricultural and urban outdoor irrigation is essential to prevent further groundwater declines and recover aquifers to safe yield levels. The majority of water use occurs in the agricultural sector and land is naturally transitioning from agricultural to urban, particularly in Iron County. Consequently, Iron County should strategically manage the transition of water associated with that land and prioritize water-related requirements for new M&I development. Additionally, as growth continues, communities should carefully evaluate the types of new water users they add to their systems to ensure sustainable water use. For example, the counties should be cautious before attracting or approving recreational, industrial, and commercial developments or sprawling residential subdivisions with high-volume water use. They should carefully assess and deliberate the water-related trade-offs involved in community growth and its effects on the long-term reliability and sustainability of their community water systems.

In 2020, the Utah Legislature passed the Watershed Council Act (H.B. 166), which created 12 local watershed councils (Figure 2). The purpose of the watershed councils is to promote discussion and collaboration on water-related issues among stakeholders within a watershed. The stakeholders should represent diverse interests, such as agriculture, industry, public water suppliers, irrigation companies, fish and wildlife, and Utah tribal nations. Iron and Beaver Counties are in the Cedar/Beaver Watershed Council and started meeting quarterly in 2024. The Cedar/Beaver Watershed Council has the potential to provide stakeholders with an additional forum to address regional water conservation and other key water-related concerns to maintain a healthy watershed.

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Appendix A: *Additional County Information*

This appendix contains text and tables with supplemental information supporting the main narrative of the report.

Land Ownership

At present, Beaver and Iron Counties consist primarily of various types of federal and state public land (Albers 2025; https://gardner.utah.edu/public-policy/utah-lands/). Only 12.7% of Beaver County land and 36% of Iron County land is private as shown in Table A1. Private land inventoried by use type in the 2024 WRe Water-Related Land Use Report (Utah Division of Water Resources, 2024) comprises only 4.5% of all land in Beaver County and 8.0% in Iron County.

Table A1. Land Ownership and Management for Beaver and Iron Counties, 2024

Land Ownership	Acres	% Of Total
Beaver County		
Classification of Total Land Ownership[1]		
Federal Land	1,267,491	76.6
State Land	177,052	10.7
Tribal Land	0	0
Private Land	210,145	12.7
Total Land	**1,654,688**	**100.00**
Categories of Private Land		
WRe Water-Related Land Use[2]	73,809	4.5
Other Private Land	136,336	8.2
All Private Land	**210,145**	**12.7**
Iron County		
Classification of Total Land Ownership[1]		
Federal Land	1,217,008	57.6
State Land	133,110	6.3
Tribal Land	2,113	0.1
Private Land	760,630	36.0
Total Land	**2,112,861**	**100.00**
Categories of Private Land		
WRe Water-Related Land Use[2]	167,251	8.0
Other Private Land	593,379	28.0
All Private Land	**760,630**	**36.0**

1 *Data Source: Albers, E., 2025. Utah's Land Ownership Legacy: A History and Inventory of Utah's Lands. Kem C. Gardner Policy Institute, University of Utah.*
2 *Data Source: Utah Water Related Land Use, 2024 Report, Utah Division of Water Resources. Available at: https://dwre-utahdnr.opendata.arcgis.com/pages/wrlu/*

Private Land Use

Our analysis of water use in Beaver and Iron Counties focuses on the private lands (including local government urban land) that have been classified by the Utah Division of Water Resources in its 2024 Water-Related Land Use report and database (Utah Division of Water Resources, 2024). Current acreage in different water-related land uses are listed below in Table A2 for Beaver County and in Table A3 for Iron County. The data show that Beaver County has less than half as much total private land in these water-related land uses as Iron County, with 73,809 acres in Beaver County compared to 167,251 acres in Iron County. Agriculture is the predominant water-related land use in both counties at 58.21% of the total private land in Beaver County and 48.43% in Iron County. There is also a greater percentage of "Dryland/Other" land use in Iron County compared to Beaver County (this category includes fallow/idle land, wetflats, and wildland). Iron County has a slightly higher percentage (24.33%) of urban land compared to Beaver County (20.73%).

Table A2. Beaver County Water-Related Private Land Uses (2024)

Use Type	Subcategories	Acres	Total Acres	% of Total Private Land
Agriculture			42,967	58.21%
	irrigated	40,678		
	dry crop	1,571		
	sub-irrigated	717		
Dryland/Other			13,012	17.63%
	fallow/idle	7,160		
	wetflats	271		
	wildland	5,581		
Riparian		648	648	.88%
Urban			15,301	20.73%
	urban	14,532		
	turfgrass	167		
	sewage lagoon	602		
Water		1,881	1,881	2.55%
Totals		**73,808**	73,809	**100.00%**

Data Source: Utah Water Related Land Use, 2024 Report, Utah Division of Water Resources. Available at: https://dwre-utahdnr.opendata.arcgis.com/pages/wrlu/

Table A3. Iron County Water-Related Private Land Uses

Use Type	Subcategories	Acres	Total Acres	% of Total Private Land
Agriculture			81,003	48.43%
	irrigated	72,317		
	dry crop	7,218		
	sub-irrigated	1,468		
Dryland/Other			40,404	24.16%
	fallow/idle	13,982		
	wetflats	4,057		
	wildland	22,365		
Riparian		2,280	2,280	1.36%
Urban			40,693	24.33%
	urban	36,332		
	turfgrass	4,057		
	sewage lagoon	304		
Water		2,871	2,871	1.72%
Totals		**167,251**	**167,251**	**100%**

Data Source: Utah Water Related Land Use, 2024 Report, Utah Division of Water Resources.
Available at: https://dwre-utahdnr.opendata.arcgis.com/pages/wrlu/

Water Suppliers

Beaver County Water Suppliers

M&I Summary (Beaver County)

Water for M&I use in Beaver County is delivered primarily by public community drinking water systems in Beaver City, Manderfield, Milford and Minersville and the four secondary water suppliers described later. Table A4 provides municipal use data for these communities for 2023. Drinking water in Beaver County is also provided by 14 other small non-community water systems and by individual wells.

Table A4. Beaver County M&I Water Use for Community Water Systems, 2023

Community Water System	Population	AF of Drinking Use	AF of Secondary Use	Total AF of M&I Use
Beaver City	3865	786	1,635	2,422
Milford City	1575	365	218	583
Minersville City	825	201	242	442
Manderfield	50	59	0	59

Data Source: Utah Water Related Land Use, 2024 Report, Utah Division of Water Resources.
Available at: https://dwre-utahdnr.opendata.arcgis.com/pages/wrlu/

Agricultural Summary (Beaver County)

Water for agricultural use is primarily provided through irrigation companies and private wells. Table A5 shows the irrigation companies in Beaver County that supply water to farms and the total number of irrigated acres they serve. Most of these irrigation companies were originally built to provide water for agricultural fields in or adjacent to communities. Consequently, their service areas overlap and/or are in the vicinity of the boundaries of Beaver County's major cities and towns: Adamsville, Beaver, Greenville, Manderfield, Milford, and Minersville.

Beaver County also has "Secondary Water Suppliers," i.e., agricultural irrigation companies that provide non-drinking, outdoor water through secondary systems for urban uses, as shown in Table A6. Inspection of these secondary systems on the Division of Water Rights map show their geographic locations in relation to urbanizing communities. For instance, in the Beaver City area, only 5% of the 2,880 acre-feet of the water deliveries from the Beaver City Corporation irrigation system goes to agricultural land. However, 84% of the 1,975 acre-feet of the water deliveries from the Harris Willis Irrigation Company still goes to agricultural land. The map in Figure A1 shows the service areas of these two secondary systems. Growth in Beaver City occurring north of the downtown area is expanding into the agricultural fields of the Harris Willis Irrigation Company where outdoor water can be provided for lawns and gardens. In the Milford subarea west of Beaver City and further from the Interstate 15 corridor, most of the acres of land and acre-feet of water are still in agricultural use in the Milford Municipal Water System (irrigation) as shown in Figure A2 and the Minersville Reservoir & Irrigation Company secondary water supplier system as shown in Figure A3.

Table A5. Beaver County Irrigation Companies

Irrigation Companies (Active):	WRi ID	Acres Irrigated
Aberdare Bench Canal Company	1138	1,006.49
Barton Ditch Association	1140	429.23
Barton Ditch Association (two listings on WRi table)	1140	790.21
Furnace Ditch	1144	627.21
Harris Willis Irrigation Company	895	1,067.47
Kents Lake Reservoir Company	984	3,308.19
Last Chance Bench Water Users Association	1042	81.23
Mammoth Canal & Irrigation Company	1145	1,814.17
Manderfield Irrigation & Reservoir Company	961	677.99
Minersville Reservoir and Irrigation Company	978	373.36
North Creek Irrigation Company	982	2,873.46
Rocky Ford Irrigation Company	894	4,048.17
Second Northwest Canal & Irrigation Company	885	---
Second South Bench Reservoir & Irrigation Company	878	719.47
West Side Irrigation Company	884	1,387.91
Westfield Canal & Irrigation Company	1047	920.68
Total acres irrigated with water from irrigation companies		**20,125.24**

Data Sources (Accessed 8/6/2025):
1. Utah Open Data, Irrigation Company Service Areas (accessed 8/6/2025; data updated 7/16/2025)
https://opendata.gis.utah.gov/datasets/utahDNR::irrigation-company-service-areas/explore
2. Utah Division of Water Rights, Utah Canal Companies (list):
https://waterrights.utah.gov/canalinfo/canal_owners.asp

Table A6. Beaver County Secondary Water Suppliers, 2023

Secondary Water Supplier Name	WRi ID	Acres Irrigated	AF from sources	% urban use	% agricul-tural use
Beaver City Corporation (irrigation)	11378	330	2,880	95%	5%
Harris Willis Irrigation Company	11994	866	1,975	16%	84%
Milford Municipal Water System (irrigation)	11457	396	1,248	25%	75%
Minersville Reservoir & Irrigation Company	11971	2,000	6,985	10%	90%
Totals		**3,592**	**6,985**		

Data Sources (Accessed 8/6/2025):
1. Division of Water Rights Water Records/Use Information Viewer:
https://www.waterrights.utah.gov/wateruse/WaterUseList.asp
2. Utah Open Data, Secondary Water Systems:
https://opendata.gis.utah.gov/datasets/6d75d02478a74e128ac726890a93dff8_0/explore

Figure A1. Secondary Water Suppliers' service areas in vicinity of Beaver City

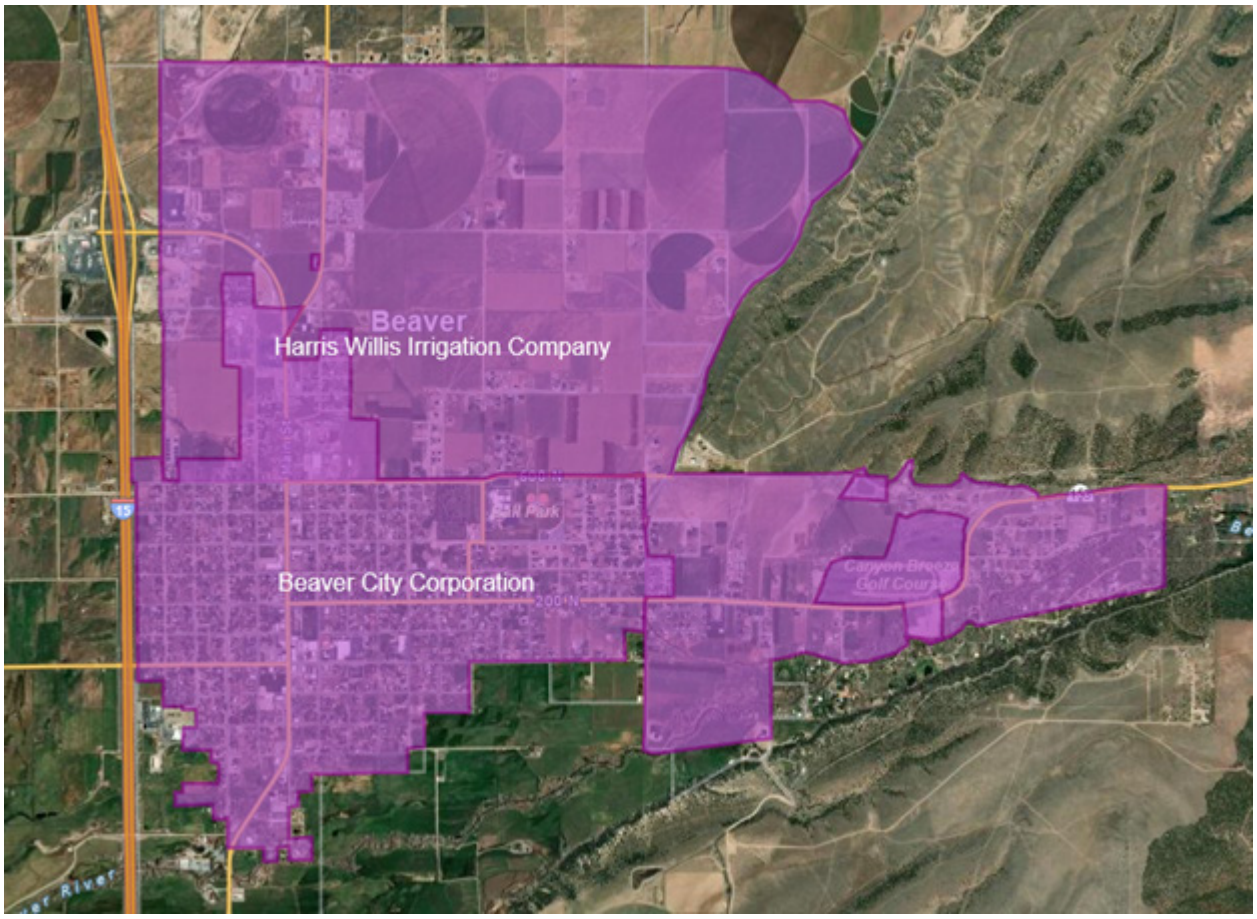


Figure A2. Secondary water supplier service area in relation to Milford

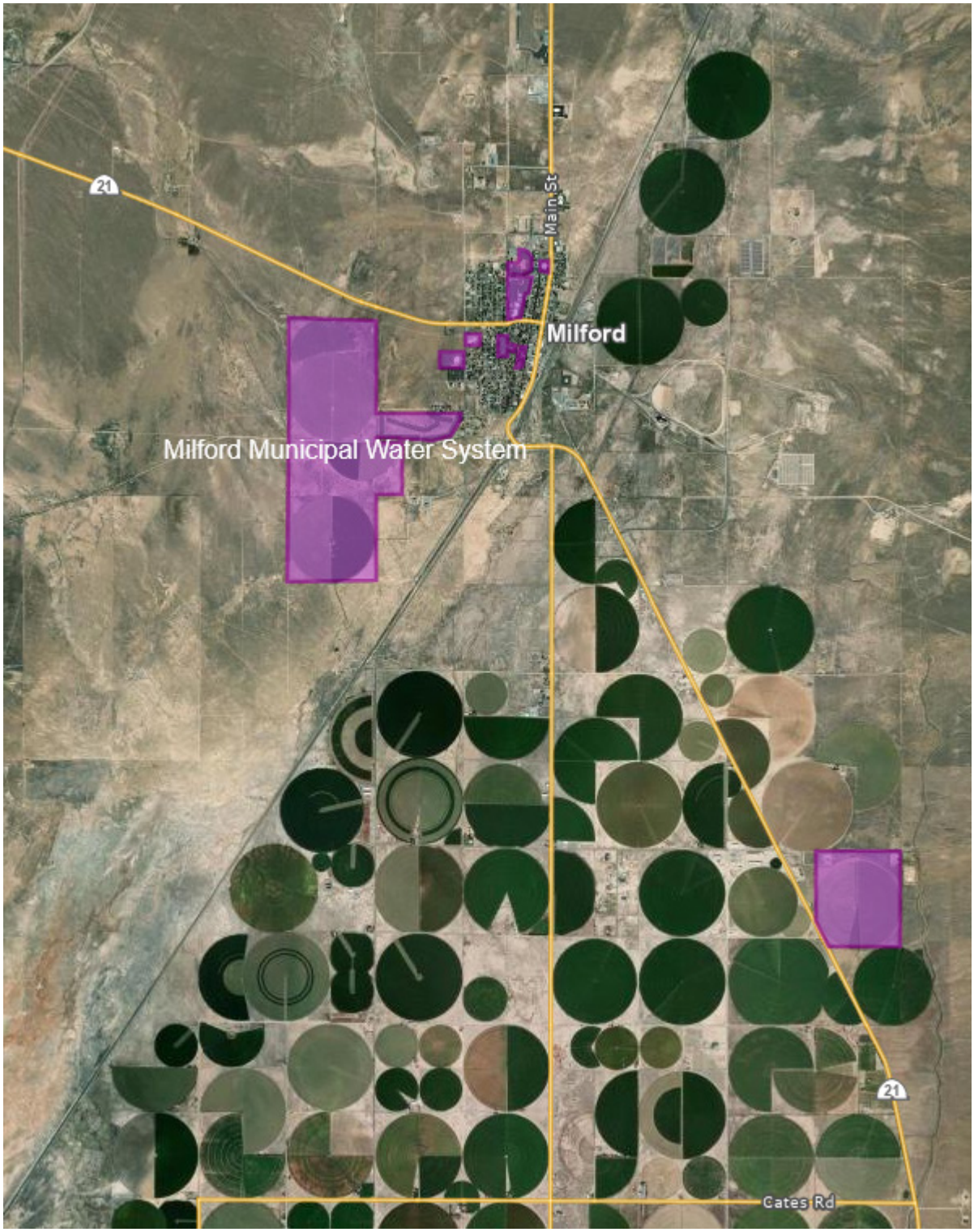
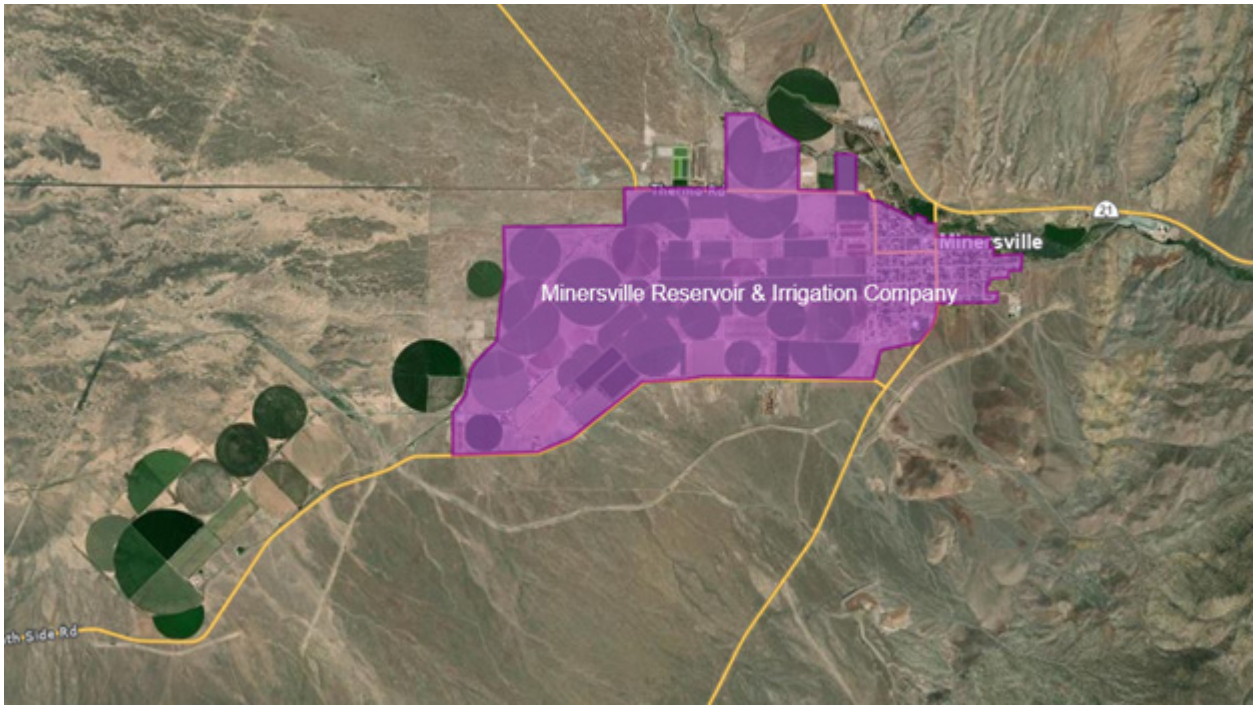


Figure A3. Secondary water supplier service area in relation to Minersville



Independent Industrial Water Use Summary (Beaver County)

Beaver County also has some large industrial water users who have their own water systems and report separately to the Division of Water Rights. Table A7 describes these users.

Table A7. Beaver County Other Water Suppliers (Independent/Industrial), 2023

Supplier Name	WRi ID	Use	Source Amt (acre-feet)	Return Amt (acre-feet
Martin Marietta Materials	2200	Industrial	48	
PacifiCorp (Blundell Plant)	2732	Industrial	7,589	6,205
Smithfield Hog Production Skyline (Milford)[1]	2027	Industrial/ Irrigation	1,058	
Smithfield Hog Production West Skyline (Milford)[2]	11468	Industrial	43	
Smithfield Hog Production Blue Mountain North (Milford)[2]	11477	Industrial	116	
Smithfield Hog Production Pinnacle (Milford)[2]	11593	Industrial	861	
Thermo No. 1 BE-01, LLC	11068	Industrial	11,488	11,109
Totals			**21,203**	**17,314**

1 Source amt (use) dropped some from previous years; approximately half of water used in irrigation
2 Source Amt (use) dropped dramatically from previous years with close of hog production facilities
Data Source (Accessed 8/6/2025):
Division of Water Rights Water Records/Use Information Viewer:
https://www.waterrights.utah.gov/wateruse/WaterUseList.asp

Water Suppliers *cont.*

Iron County Water Suppliers

M&I Summary (Iron County)

Water for M&I use in Iron County is delivered by a wide array of community drinking water systems as well as by the secondary water suppliers described below. The convention for calculating the gallons per capita per day for a community or water system incorporates both types of water. Table A8 provides data on M&I water use and GPCD data for community water systems in Iron County for 2023.

Table A8. Iron County M&I Water Use for Community Water Systems, 2023

Community Water System	Population	AF of Drinking Use	AF of Secondary Use	Total AF of M&I Use
Brian Head Town	160	247	0	247
Buena Vista Community	470	112	0	112
Cedar City	38,905	7,361	665	8,026
CICWCD	3,995	609	14	623
CICWCD - Bumblebee	220	34	0	34
CICWCD - Cedar Highlands	100	12	0	12
CICWCD – Chekshani	120	21	0	21
Enoch City	8,615	1,288	87	1,375
Escalante Valley Housing	50	24	0	24
Flying L Subdivision	255	71	0	71
Harmony Mnt. Ranch Water Co.	33	11	0	11
Irontown	110	11	0	11
Kanarraville Municipal	467	106	68	174
Meadow Ranches Water Co.	490	110	0	110
Midvalley Estates Water Co.	770	118	0	118
Monte Vista Community Water System	170	38	0	38
Mountain View Special Service District	180	45	0	45
New Castle Water Company	345	127	52	179
Old Meadow Ranches Community and Water Co.	130	26	0	26
Paragonah	585	68	132	200
Parowan	3,470	373	1,068	1,441
Rainbow Ranches Water Company	280	51	0	51
Spring Creek Water Users	300	50	0	50
Summit	200	90	47	137
Totals	**60,420**			**13,136**

Data Sources (Accessed 8/6/2025):
1. Utah Division of Water Resources Municipal Water Dataset, accessed 8/20/2025
2. Utah Division of Water Rights Water Records/Use Information Viewer:
https://www.waterrights.utah.gov/wateruse/WaterUseList.asp

Agricultural Summary (Iron County)

Water for agricultural use is primarily provided through irrigation companies and private wells. Table A9 shows the irrigation companies in Iron County that supply water to farms and the total number of irrigated acres they serve. Most of these irrigation companies were originally built to provide water for agricultural fields in or adjacent to communities. Consequently, their service areas overlap and/or are in the vicinity of the boundaries of Iron County's cities and towns: Cedar City, Enoch, Parowan, Kannarraville and Summit. These service areas can be viewed on the Utah's open data irrigation company service areas map.

Some irrigation companies provide water through secondary systems (non-drinking, outdoor water) for urban uses in addition to their agricultural deliveries. They are classified as "Secondary Water Suppliers" by the Utah Division of Water Rights and comply with the same reporting requirements of "Public" and "Industrial" water systems (https://www.waterrights.utah.gov/wateruse/WaterUseList.asp).

Table A10 shows the Secondary Water Suppliers in Iron County. Two of these systems just provide urban secondary water: the Cedar City Municipal irrigation system provides water for public properties (golf course, schools, parks, cemetery) (Fig. A4); and the Parowan Municipal Water System irrigation component is largely contiguous with the older sections of Parowan City boundaries (Fig. A5). The Enoch City Water System services scattered public properties and residential developments on former agricultural land within the city (Fig. A6). The Summit Irrigation Stock Company is still primarily an agricultural irrigation company but also provides secondary water to 41 residential connections comprising the small town of Summit, Utah (Fig. A7).

Table A9. Iron County Irrigation Companies

Irrigation Companies (Active):	WRi ID	Acres Irrigated
Coal Creek Irrigation Company	1227	5,729.63
Kanarra Field Reservoir and Irrigation Company	1295	2,083.00
Linealsam Water Company	1224	45.21
Old Meadows Ranchos Community & Water Company	1226	161.29
Parowan Reservoir Company	1210	4,303.60
Parowan West Fields Irrigation, Inc.	1216	5,618.58
South and West Field Irrigation Company	1205	1,752.27
Summit Irrigation Stock Company	1236	1,549.20
Total acres irrigated with water from irrigation companies		**21,242.78**

Data Sources (Accessed 8/6/2025):
1. Utah Open Data, Irrigation Company Service Areas:
https://opendata.gis.utah.gov/datasets/utahDNR::irrigation-company-service-areas/explore
2. Utah Division of Water Rights, Utah Canal Companies (list)
https://waterrights.utah.gov/canalinfo/canal_owners.asp

Table A10. Iron County Secondary Water Suppliers, 2023

Secondary Water Supplier Name	WRi ID	Acres Irrigated	AF from sources	% urban use	% agricultural use
Cedar City Municipal Water (irrigation)	11405	198	665	100%	0%
Enoch City Water System (irrigation)	11444	149	185	65%	35%
Parowan Municipal Water System (irrigation)	11438	580	1,068	100%	0%
Summit Irrigation Stock Company	11975	1,000	717	5%	95%
Totals		**1,927**	**2,635**		

Data Sources (Accessed 8/6/2025):
1. Division of Water Rights Water Records/Use Information Viewer:
https://www.waterrights.utah.gov/wateruse/WaterUseList.asp
2. Utah Open Data, Secondary Water Systems:
https://opendata.gis.utah.gov/datasets/6d75d02478a74e128ac726890a93dff8_0/explore

Figure A4. Cedar City secondary water supplier service area

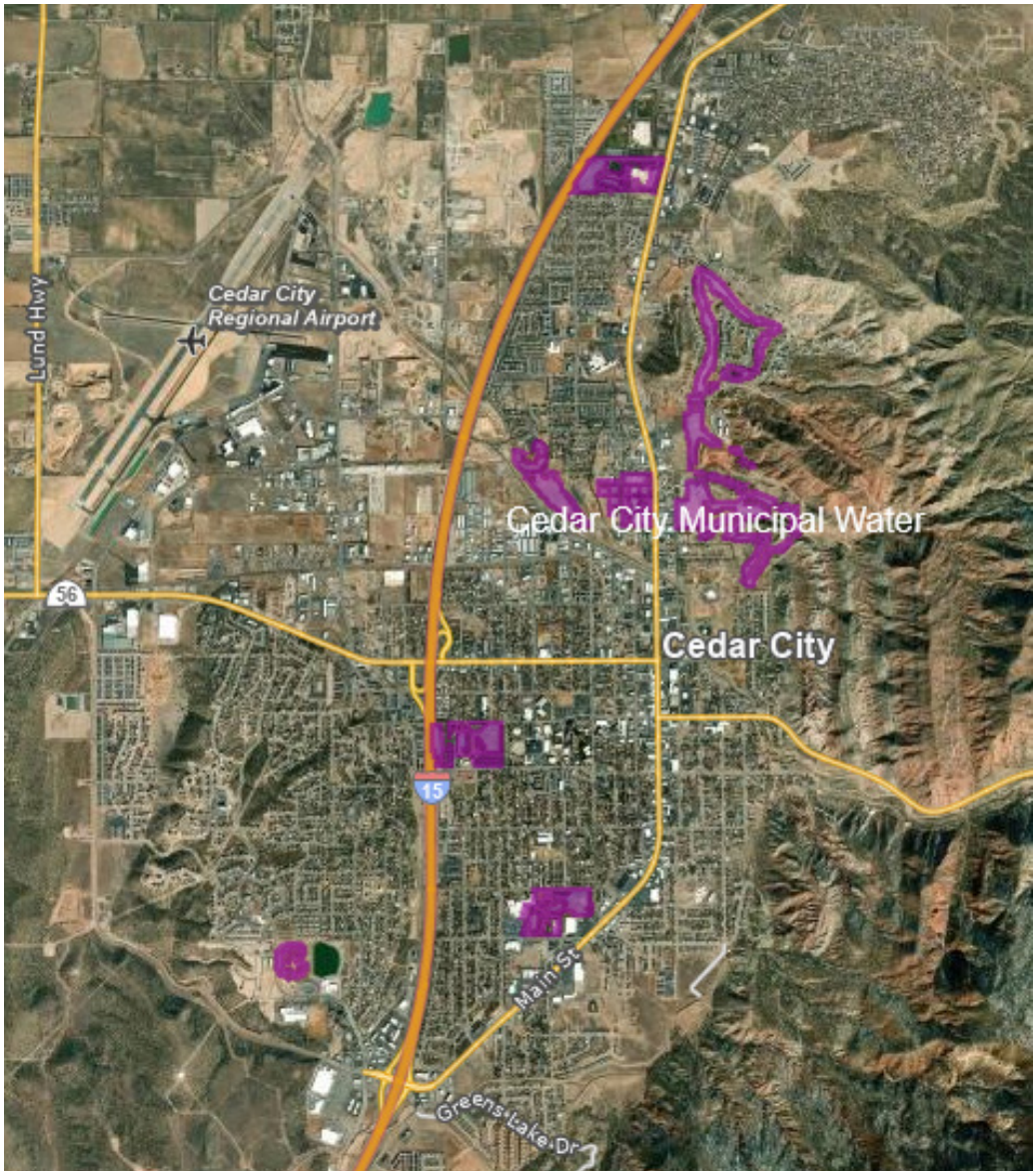


Figure A5. Parowan City secondary water supplier service area

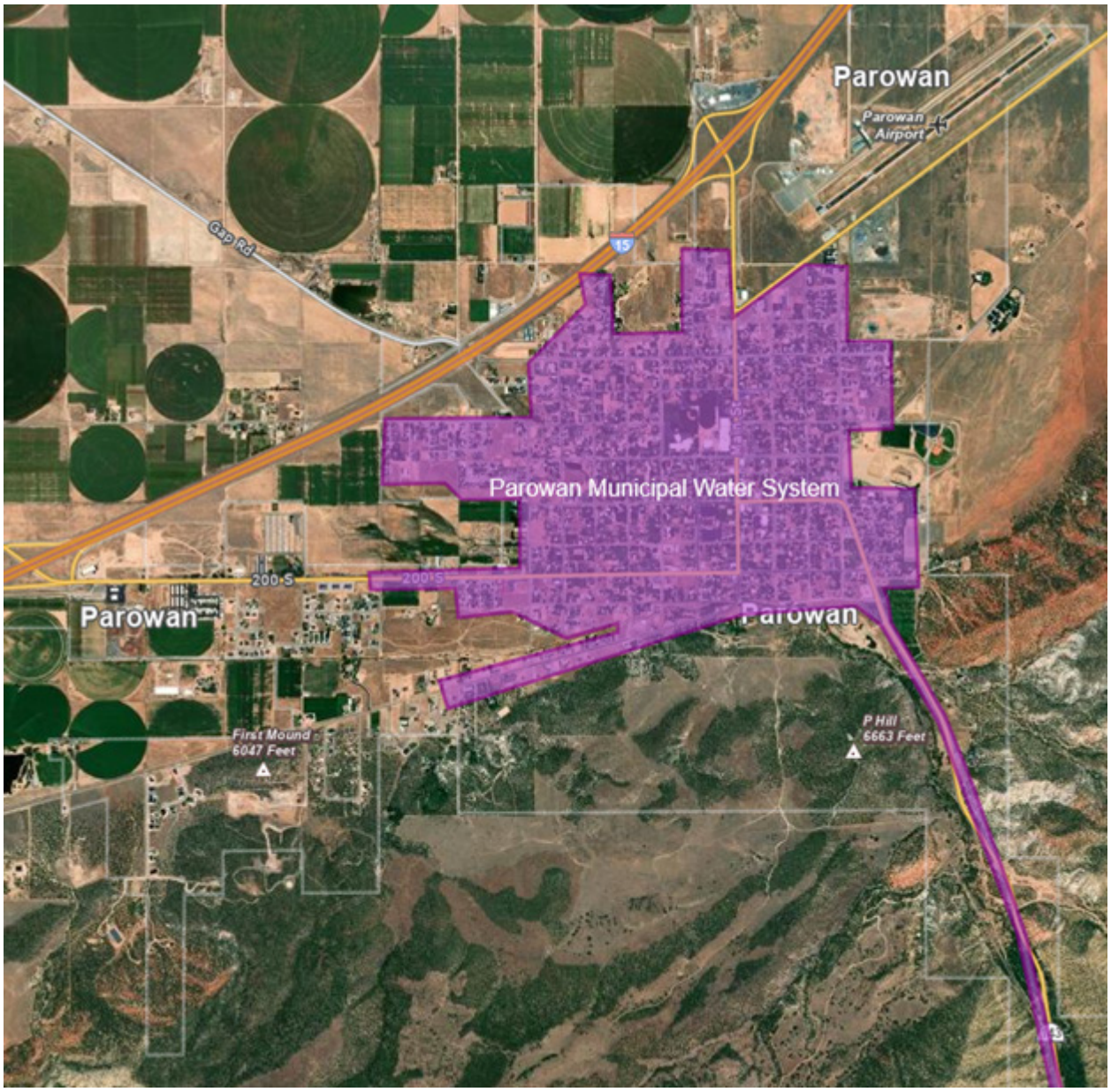


Figure A6. Enoch City secondary water supplier service area

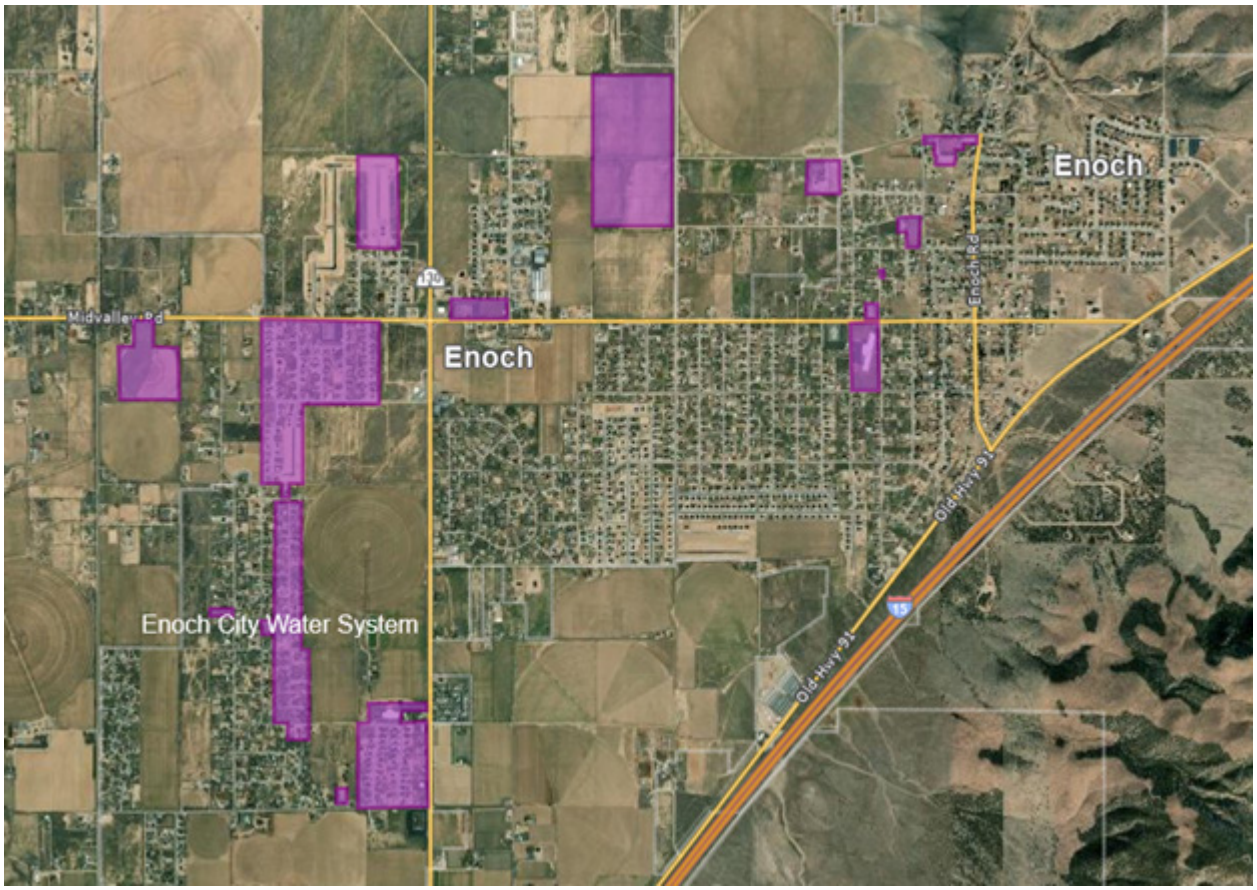


Figure A7. Summit secondary water supplier service area

Independent Industrial Water Use Summary (Iron County)

Iron County has industrial water users that operate with their own water supply systems, generally wells. These independent water suppliers are listed in Table A11.

Table A11. Iron County Other Water Suppliers (Independent/Industrial), 2023

Supplier Name	WRi ID	Use	Source Amt (acre-feet)	Return Amt (acre-feet
American Pacific Corporation	11051	Industrial	113	
Ashdown Brother Construction	11717	Industrial	30	
Castle Valley Greenhouses, LLC	2188	Industrial	97	97
Dutch Cowboy Dairy	10864	Industrial	342	
Milgro New Castle, Inc.	2196	Industrial	1,738	461
Milgro New Castle, Inc. Freshwater	11466	Industrial	136	
Milgro New Castle, Inc. Range #6	11467	Industrial	183	
Smithfield Hog Production Blue Mtn. South (Milford)	11478	Industrial	444	
Staker & Parson Companies/Western Rock Products	11608	Industrial	5	
Sunroc Corporation (Cedar City Pit)	11623	Industrial	110	
Triple S Farms, a California Corporation	11626	Industrial	57	
Utah Iron, LLC	11880	Industrial	458	
Totals			**3,713**	**558**

1 Source amt (use) dropped some from previous years; approximately half of water used in irrigation
2 Source Amt (use) dropped dramatically from previous years with close of hog production facilities
Data Source (Accessed 8/6/2025):
Division of Water Rights Water Records/Use Information Viewer:
https://www.waterrights.utah.gov/wateruse/WaterUseList.asp

Appendix B: *Additional Conservation Resources*

These additional resources and case study examples are reproduced from the Utah Growing Water Smart: The Water-Land Use Integration Guidebook for Southwestern Utah (Kopp & Endter-Wada, 2024b), available at: https://digitalcommons.usu.edu/cwel_water_smart/2/

SECTION 1: Water Supply & Demand, Planning and Development
State of Utah: Water Plans and Data
Utah's Coordinated Action Plan for Water A collaborative effort from Governor's Office of Planning & Budget, Governor's Office of Economic Opportunity, Department of Agriculture and Food, Department of Environmental Quality, Department of Natural Resources, and Colorado River Authority of Utah; Full Report released November 2022. Plan available at: https://gopb.utah.gov/waterplan/
Water Resources Plan (Utah State Water Plan) Utah Department of Natural Resources, Utah Division of Water Resources; December 2021 Plan available at: https://water.utah.gov/2021waterplan/
Utah's Regional M&I Water Conservation Goals Utah Department of Natural Resources, Division of Water Resources; November 2019 Report available at: https://conservewater.utah.gov/regional-water-conservation-goals/
Utah's Open Water Data Utah Department of Natural Resources, Division of Water Resources Includes extensive visualized and downloadable publicly available data related to Municipal and Industrial Water Use, Water-Related Land Use, Water Budgeting, an online Water Resource Map Gallery, and More Water Data Resources. Website: https://dwre-utahdnr.opendata.arcgis.com/
General Land and Water Planning Resources for Sustainability
The Comprehensive Plan: Sustainable, Resilient, and Equitable Communities for the 21st Century By David Rouse and Rocky Piro Published in 2022 by Routledge (New York) as part of the American Planning Association (APA) Series on Planning Essentials. Available through APA, Amazon, or other book sellers.

Net Blue: Supporting Water-Neutral Growth

Alliance for Water Efficiency

A suite of resources designed to help communities grow sustainably through a water demand offset approach. Includes a research report, User Guide, Model Ordinance, Offset Methodology and example ordinances.

Available at: https://allianceforwaterefficiency.org/resource/net-blue-supporting-water-neutral-growth/

A Guide to Designing Conservation-Oriented Water System Development Charges

By Western Resource Advocates and Raftelis Financial Consultants, May 2018

Report available at: https://westernresourceadvocates.org/publications/a-guide-to-design-conservation-oriented-water-system-development-charges/

Resources for Integrating Land and Water Planning

From the Utah Department of Natural Resources, Division of Water Resources:

Integrated Water and Land Planning

Website: https://water.utah.gov/integrated-water-land-planning/

Water as Part of a General Plan (General Plan Primer)

Available at: https://water.utah.gov/wp-content/uploads/2023/07/General-Plan-Primer.pdf

Integrated Water & Land Use Element: General Plan Requirements (Requirements Guide)

Available at: https://water.utah.gov/wp-content/uploads/2023/07/Requirements-Guide.pdf

From the Utah Growing Water Smart program:

Website for information on Growing Water Smart Workshops and Case Studies:

https://extension.usu.edu/cwel/utah-growing-water-smart/

Utah Growing Water Smart: The Water-Land Use Integration Guidebook for Southwestern Utah

By Kelly Kopp and Joanna Endter-Wada, January 2024

Available at: https://digitalcommons.usu.edu/cwel_water_smart/2/

Incorporating Water into General Plans in Utah

A recorded presentation by Erin Rugland for Utah Growing Water Smart; November 2022

Available at: https://drive.google.com/file/d/1aLuLWhBdzCLYkn9egCCrff-huQowZ1Uo/view

Integrating Water Efficiency into Land Use Planning in the Interior West: A Guidebook for Local Planners

By Jennie C. Nolan Blanchard. Prepared by the Land Use Law Center at Pace Law School for Western Resource Advocates, November 2018.

Comprehensive Guidebook including:

Part I: Background and Getting Started (includes how to work together and engage or lead the process).

Part II: Integrating Water Efficiency into Land Use Documents (includes sections on the Comprehensive Master Plan, the Sustainability Plan, The Zoning Code, Subdivision Regulations, and Site-Plan Regulations).

Part III: Additional Strategies (includes sections on Building and Plumbing Codes, Supplemental Regulations, Development Moratoria, Development Agreements, Non-Zoning Incentives, and Post-Occupancy Enforcement).

Guidebook available at: https://westernresourceadvocates.org/wp-content/uploads/2019/06/Integrating-Water-Efficiency-into-Land-Use-Planning_6.3.2019.pdf

Integrating Land Use and Water Management: Planning and Practice

A report by Erin Rugland for the Lincoln Institute of Land Policy; February 2022

Report available at: https://www.lincolninst.edu/publications/policy-focus-reports/integrating-land-use-water-management

Incorporating Water into Comprehensive Planning: A Manual for Land Use Planners in the Colorado River Basin

A manual by Erin Rugland for the Lincoln Institute of Land Policy; February 2020

Manual available at: https://www.lincolninst.edu/publications/other/incorporating-water-comprehensive-planning

Growing Water Smart Metrics: Tracking the Integration of Water and Land Use Planning

A report by Sarah Martin, Shelby Sommer and Amy Volckens of Brendle Group. Prepared for the Sonoran Institute; 2020

Available at: https://sonoraninstitute.org/resource/growing-water-smart-metrics-report/

Assured Water Supply Laws in the Western States: The Current State of Play

An article by Monica Green and Anne Castle. Colo. Nat. Resources, Energy & Envtl. L. Rev. (2017) 28:1, 67-145.

Article available at: https://www.colorado.edu/law/sites/default/files/attached-files/castle_final.pdf

Guiding Principles for Equitable Engagement in Coordinated Planning

CivicWell, Local Government Commission and Smart Growth California

Principles available at: https://civicwell.org/wp-content/uploads/2022/01/Guiding-Principles-for-Equitable-Engagement-2.pdf

American Planning Association Water and Planning Network

This group sponsors webinars, meetings, research projects and a newsletter about integrating land and water planning. Description: https://www.planning.org/divisions/groups/water/

To join (free), email: water@planning.org

Resources for Land Use Policy and Planning
Handbook for Planning Commissions and Land Use Authorities Utah League of Cities and Towns, 2021 Available at: https://luau.utah.gov/wp-content/uploads/ULCT-Land-Use-Authority-Handbook-2021-Version.pdf
Utah League of Cities and Towns Statewide organization that represents municipal governments, provides land use resources, hosts trainings and events, and tracks land use policy and legislation. Website: https://www.ulct.utah.gov/
Utah Association of Counties Statewide private, non-profit organization whose members are the 29 Utah counties. Provides management, training and intergovernmental relations services to counties and its officials. Website: https://www.utahcounties.org/
Land Use Academy of Utah Funded by the Utah Legislature and spearheaded by the Utah League of Cities and Towns, this consortium of Utah groups supports training and education in land use for local elected and appointed officials. Website: https://luau.utah.gov/
The Utah Land Use Institute Sponsors conferences, seminars and workshops and maintains a Land Use Library focused on land use issues and law in Utah. Website: https://utahlanduse.org/
Lincoln Institute of Land Policy Founded in 1946, this nonprofit private operating foundation works to improve the quality of life through the effective use, taxation and stewardship of land. Its extensive international work in education, training, publications and events includes work in the areas of sustainably managed land and water resources and climate-resilient communities. It is a founding organization of the Growing Water Smart Program. Website: https://www.lincolninst.edu/
Urban Land Institute Founded in 1936, it is the oldest and largest network of real estate and land use experts in the world. It works to promote best practices for equitable and sustainable land use through educational and networking opportunities. Global ULI: https://uli.org/ Utah ULI website: https://utah.uli.org/

Resources for Specific Types of Water Planning (Public Works)
Public Water Supplier 40 Year Water Requirement Plan Standards Utah Office of Administrative Rules – Natural Resources – Water Rights – R655-18 Available at: https://adminrules.utah.gov/public/rule/R655-18/Current%Rules#
Financing Sustainable Water: Rates, Revenue, Resources Alliance for Water Efficiency Suite of resources for developing, evaluating, and implementing effective rate structures that supports water efficiency and revenue stability in the short term and enables utilities to realize the many long-term benefits of water efficiency, including avoided cost savings. Available at: https://www.allianceforwaterefficiency.org/resources/financing-sustainable-water
A Guide to Low Impact Development within Utah Utah Department of Environmental Quality, Division of Water Quality, 2020 Guidebook available at: https://lf-public.deq.utah.gov/WebLink/ElectronicFile.aspx?docid=12628&eqdocs=DWQ-2019-000161
Utah Water Conservation Plan Resources Utah Department of Natural Resources, Division of Water Resources Includes a Water Conservation Plan Guide, Best Management Practices, and plan examples. Available at: https://conservewater.utah.gov/water-conservation-plans/conservation-plan-resources/
Preparing Source Water Protection Plans Utah Department of Environmental Quality, Division of Drinking Water Available at: https://deq.utah.gov/drinking-water/preparing-source-protection-plans Environmental Protection Agency – Source Water Protection Available at: https://www.epa.gov/sourcewaterprotection
Stormwater Planning: Community Solutions for Voluntary Long-Term Stormwater Planning Guidance, Green Infrastructure Modeling Toolkit, and Technical Assistance from the U.S. Environmental Protection Agency Available at: https://www.epa.gov/npdes/stormwater-planning
Integrated Planning for Municipal Stormwater and Wastewater Guidance, Story Map, Toolkit, and new provisions in Water Infrastructure Improvement Act (WIIA) from the U.S. Environmental Protection Agency Available at: https://www.epa.gov/npdes/integrated-planning-municipal-stormwater-and-wastewater

Drought Planning

Utah Drought Response Plan: Triggers and Actions, prepared by the Division of Water Resources (2022).

Report available at: https://water.utah.gov/wp-content/uploads/2022/07/Drought-Response-Plan-070822.pdf

Other resources available from State of Utah agencies:

- Updates on current conditions, impacts and restrictions from the Department of Natural Resources: https://drought.utah.gov/

- Drought guidance for public water systems from the Department of Environmental Quality: https://deq.utah.gov/drinking-water/drought-guidance-for-public-water-systems

- Webinars and information on defining, managing and measuring drought from the Division of Water Resources: https://water.utah.gov/drought/

Utah Hazard Mitigation Planning

Planning resources, mitigation strategies, and grant funding for hazards including water-related ones (climate change, dam failure, drought, flood, severe weather, and wildfire) from the Utah Department of Public Safety.

Available at: https://hazards.utah.gov/

Utah Watershed Councils Act & Implementation

Utah Department of Natural Resources, Division of Water Resources

Available at: https://water.utah.gov/watershed-councils/

SECTION 2: Water Conservation

Conservation Programs, Grants & Rebates

Utah Division of Water Resources | Conserve Water

Summarizes many programs available throughout Utah at: https://conservewater.utah.gov/

Includes links to:

Weekly Lawn Watering Guide: https://conservewater.utah.gov/weekly-lawn-watering-guide/

Slow the Flow: https://slowtheflow.org/

Utah Water Savers (rebate programs): https://utahwatersavers.com/ (includes landscape conversions, smart controllers, toilet replacement, water conservation programs)

Report Water Waste and Wins: https://conservewater.utah.gov/report-water-waste-wins/

Water Check Program: https://extension.usu.edu/cwel/watercheck

Localscapes: https://localscapes.com/

Landscape Incentive Program: https://www.utahwatersavers.com/landscapeincentiveprogram

Home Water Use Calculator: https://home-water-works.org/calculator

Conservation Plan Resources: https://conservewater.utah.gov/water-conservation-plans/conservation-plan-resources/

Water Conservation Rebate Programs

Utah Division of Water Resources: https://utahwatersavers.com/

Secondary Irrigation System Metering

Utah Division of Water Resources

Information for water users and water providers on legislative requirements and grants and loans to purchase meters for metering secondary water used for outdoor irrigation.

Website: https://water.utah.gov/secondary-metering/

Great Salt Lake Water Conservation Toolbox

Great Salt Lake Advisory Council, with support from SWCA Environmental Consultants, developed this Water Conservation Toolbox, to provide municipalities and other local governments with the information needed to optimize their water conservation practices.

Report: https://lf-public.deq.utah.gov/WebLink/ElectronicFile.aspx?docid=431749&eqdocs=DWQ-2024-005116

Rain Barrels

Rain Barrels in Utah. Utah State University Extension Information by Brian Greene, Nancy Mesner, and Roslynn Brain.

Website: https://extension.usu.edu/sustainability/research/rain-barrels-in-utah

Rainwater Harvesting Registration, Utah Division of Water Rights:

https://waterrights.utah.gov/forms/rainwater.asp

Graywater Systems in Utah

Gray Water Use and Regulations in Utah:

Webinar by Rosylnn Brain McCann and Jeff Adams for USU's Center for Water Efficient Landscaping: https://www.youtube.com/watch?v=WEfppCoKbLk

Graywater Regulations in Utah: https://adminrules.utah.gov/public/rule/R317-401/Current%20Rules?

Examples of Implementation:

Moab City Gray Water Systems Permitting: Municipal Code 13.20.210: https://moab.municipal.codes/Code/13.20.200

U.S. Bureau of Reclamation Grant Programs

WaterSMART Water and Energy Efficiency Grants: https://www.usbr.gov/watersmart/weeg/

Small-Scale Water Efficiency Grants: https://www.usbr.gov/watersmart/swep/index.html

Landscape Water Conservation
Center for Water Efficient Landscaping, Utah State University Extension Website on USU research, Extension programs, webinar series, publications, education, and training. Focus is on water efficient landscaping, sustainable turfgrass management, ornamental and landscape horticulture, and human dimensions to improve the efficient use of water for landscape irrigation. Website: https://extension.usu.edu/cwel/
How to Have a Water Efficient Landscape Center for Water Efficient Landscaping, Utah State University Extension Online course covering the principles of Water Wise Landscaping with related USU Extension Fact Sheets. Available at: https://extension.usu.edu/cwel/principles
Design 4 Everyone: Advanced Landscape Design Process Utah State University Extension Online course covering the landscape design process with readings, demonstration videos, assignments, and individual consultation with a landscape architect for feedback on developed designs. Available at: https://extensioncourses.usu.edu/product/design-4-everyone/
Conserving Water in Your Landscape in times of Drought, Utah State University Extension Resources for preparing for and responding to drought in landscape irrigation and maintenance. Website: https://extension.usu.edu/drought/in-the-landscape
Qualified Water Efficient Landscaper (QWEL) A certification program designed to educate landscape professionals and their customers on the benefits of water efficient landscape design, management and irrigation practices. Utah QWEL Program: https://extension.usu.edu/cwel/education National QWEL Program: https://www.qwel.net/
Localscapes Resources on landscaping patterns and practices designed for Utah including guides, landscape designs, and classes from Jordan Valley Water Conservancy District. Website: https://localscapes.com/
Firewise Landscaping for Utah Utah State University Extension publication by Michael Kuhns and Barbara Daniels Available at: https://extension.usu.edu/forestry/files/resources/firewise-landscaping-updated-2018.pdf
Water Marketing Strategies & The Utah Water Banking Act Resources developed by the Utah Division of Water Resources to help local water users understand the Utah Water Banking Act and create a water bank. Website: https://water.utah.gov/water-marketing/

Landscape Transformation: Assessment of Water Utility Programs and Market Readiness Evaluation

Alliance for Water Efficiency

Analysis and report of research covering Impact Analysis and Process Evaluation of programs, practices, and irrigation technologies that can support effective utility-driven outdoor water efficiency standards.

Available at: https://allianceforwaterefficiency.org/resource/landscape-transformation-assessment-water-utility-programs-and-market-readiness/

Learning Landscapes: Outdoor Water Efficiency and Conservation Lessons

Alliance for Water Efficiency

Lessons designed to be used by educators in grades 3-8 that align with the associated Next Generation Science Standards.

Available at: https://www.allianceforwaterefficiency.org/impact/our-work/learning-landscapes-outdoor-water-efficiency-and-conservation-lessons