

Chapter 02

Chapter

Population & Municipal Water Use

Chapter Highlights

- Water availability has been the primary factor that determines where people have settled in the state.
- Municipal and industrial water use data collection and analysis have improved over the years.
- The Division posts water data on its Open Water Data website.
- Utah's population is projected to almost double by 2065.
- How we grow matters.
- The Utah Division of Water Resources compares population projections to regional water supplies to help identify where water will be needed.
- The Division works with state and regional partners and communities to proactively plan for future water demands.



Farmer tending peach trees near Mapleton, Utah County
PC: Utah State Historical Society



Daybreak Community Gathering
PC: Cindy Costa



Officials inspecting the Washington-Fields Canal
PC: Washington County Water Conservancy District

Water Is Where You Live

Water availability imposes limitations on what people can do and where they live. Utah settlers first lived where perennial streams provided an abundant water supply. While subsequent settlers resided further from available water sources, settlements were still close enough that water could be transported to crops and gardens through canals and ditches. Available water supply has often dictated what kinds of crops and how much could be grown. Today, vast areas of the state still have few or no residents because water supplies are inadequate to meet even the most basic needs.

The Wasatch Mountains capture water in the form of snow, which supplies water to most Utahns living along the Wasatch Front. Water will not only continue to influence where people live within the state, but how people live.

How Utah Grows Matters

If we continue with traditional suburban development trends, Utah will not have the water needed to meet projected growth. Fortunately, steps are being taken to stretch the water supply. For example, it is becoming more common for planning commissions to approve higher density housing projects and adopt landscape ordinances that require native plants and water-wise landscaping. Smaller lot sizes use less water because outdoor space is reduced, and transitioning from turf-heavy landscapes to a balanced landscape of turf and native plants uses significantly less water. However, higher density growth can lead to an overall increase in water use per acre and the

ultimate water demand at build out. Such impacts need to be carefully considered when land use decisions are made.

Over the years, Utahns have learned to successfully manage the existing water supply by incorporating a variety of tools and techniques.

Powerful management tools like those described below help ensure adequate water supplies:

- Stream flows are altered by storing springtime peak flows in reservoirs for later use.
- Water supplies are moved from places of abundance to places of greater need for safe and reliable water sources.
- Surplus water is stored in aquifers for later withdrawal.
- Water stored in aquifers augments or replaces surface water when it is unavailable.

Ultimately, we are faced with the same dilemma as the early settlers – there is a finite supply of fresh water.

The Utah Division of Water Resources (Division) works with federal, state, regional, and local partners to plan for future water demands. The Division uses the most current data to model and project which areas of the state will need to take action to meet their future water demands. Data reliability is critical for accurate forecasting.

Every New Utahn Needs Water

When planning for Utah's future needs, there are two main elements: water supply (what's available) and demand (what we use). The

Division uses population projections from the Kem C. Gardner Policy Institute (Gardner Policy Institute) and assesses available water supplies and uses to help regions plan for the future.

Utah's historical and projected population growth results from a combination of four components:

- Birth rate
- Death rate
- Inbound migration – people who move into Utah
- Outbound migration – people who move out of Utah

Before 1940, these factors produced a fairly constant growth rate, increasing the state's average population between 4,000 to 9,000 people per year. The growing U.S. economy after World War II fueled a nationwide westward migration. Between 1950 and 1990, Utah experienced significant inbound migration, which resulted in a steepening of the population curve.

Over the past two decades, the state's overall growth rate has stabilized at an average of 2.2% per year. The Gardner Policy Institute projects that Utah's population will increase from approximately 3 million in 2015 to almost 6 million in 2065. This represents an annual average growth rate of 1.3%. Utah's growth rates are projected to continue to exceed national rates over the next 50 years.

*“By failing to prepare,
you are preparing to fail.”*

-Benjamin Franklin

Figure 2-1 shows the statewide population projections. Detailed statewide population projections are presented in Appendix C. Although the state’s population is projected to nearly double by 2065, Figure 2-2 shows that not all areas will experience the same growth rate. Washington County’s population is projected to increase 229% by 2065. Wasatch, Utah, and Juab counties will also experience rapid growth with a nearly 200% increase. More rural counties such as Beaver, Emery, Garfield, Millard, Piute, and Rich are projected to grow more slowly.

One of the more notable trends over the past century is that parts of Utah have transitioned from a rural, agricultural-based society and economy to a more urban society with a diverse economy. Figure 2-3 illustrates Utah’s urban versus rural population trend.

Approximately 20% of Utah’s population resided in rural areas of the state in 1940.

That percentage declined to just below 7% by 2000 and is expected to decline to about 5% by 2060. Today, well over 90% of Utah’s residents reside in an urban setting, or an area transitioning to urban – like the cities of Lehi and Herriman – and rely upon non-agricultural sectors of the state’s economy for their income. This transition creates pressure to move water from agricultural use to municipal and industrial use.

Although Figure 2-3 shows a decline in the percentage of the state’s population residing in rural areas, rural populations in most areas are not actually declining. Urban populations are growing faster than rural populations, and some areas that were formerly considered rural are rapidly becoming urban. This trend has decreased available agricultural lands in recent decades. As a result, careful urban planning is increasingly important to plan for the changing water needs of the growing population.

Figure 2-1 State of Utah Population Projections

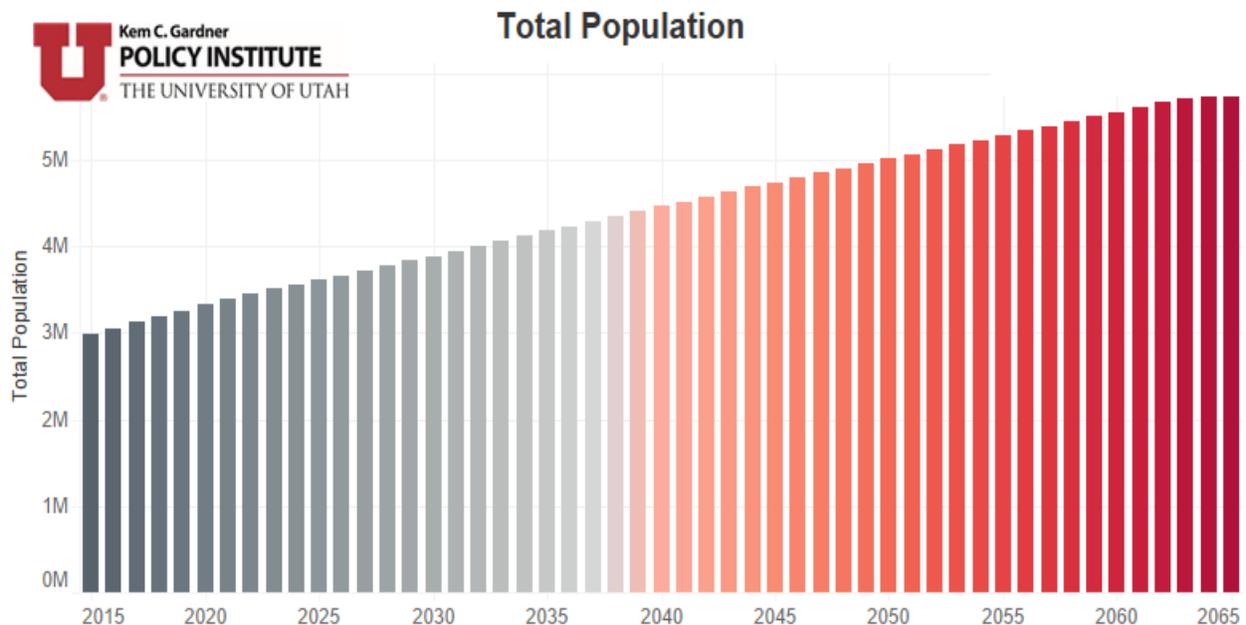
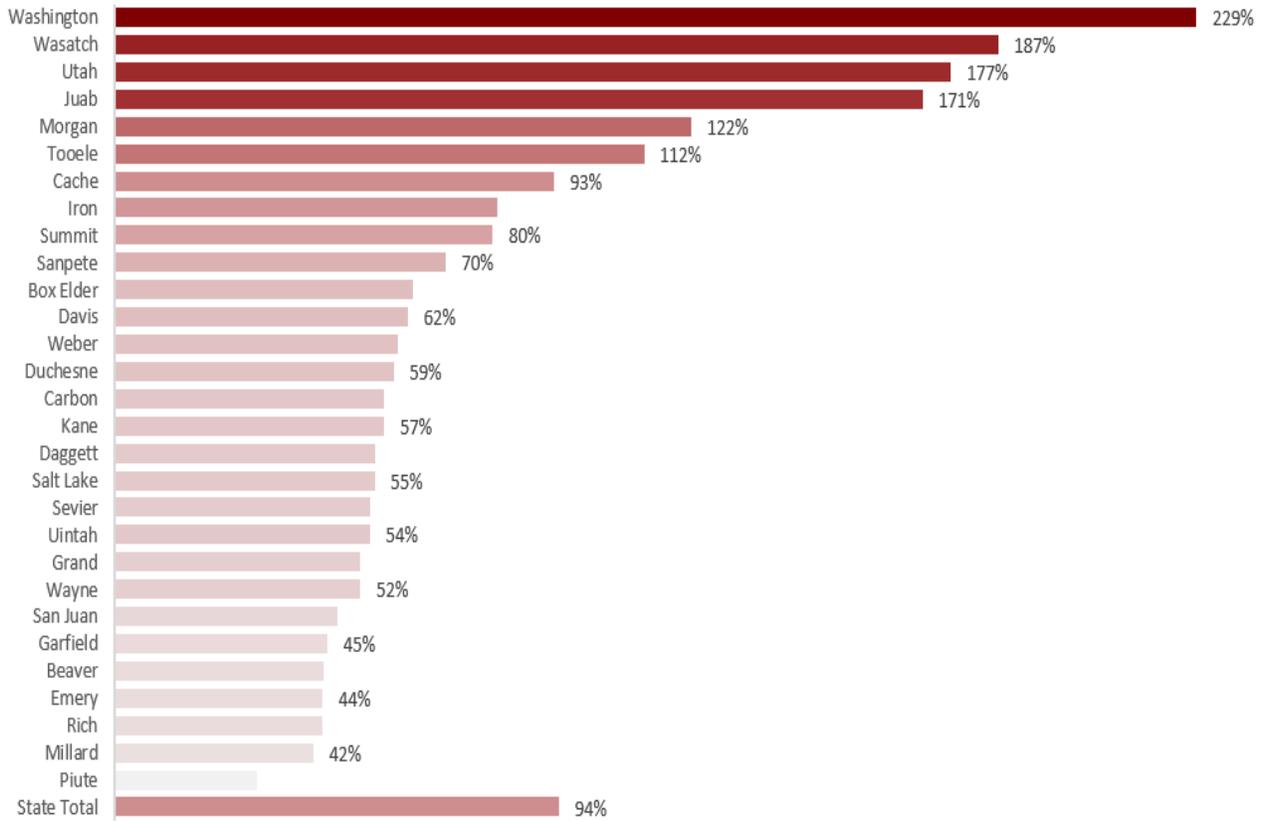
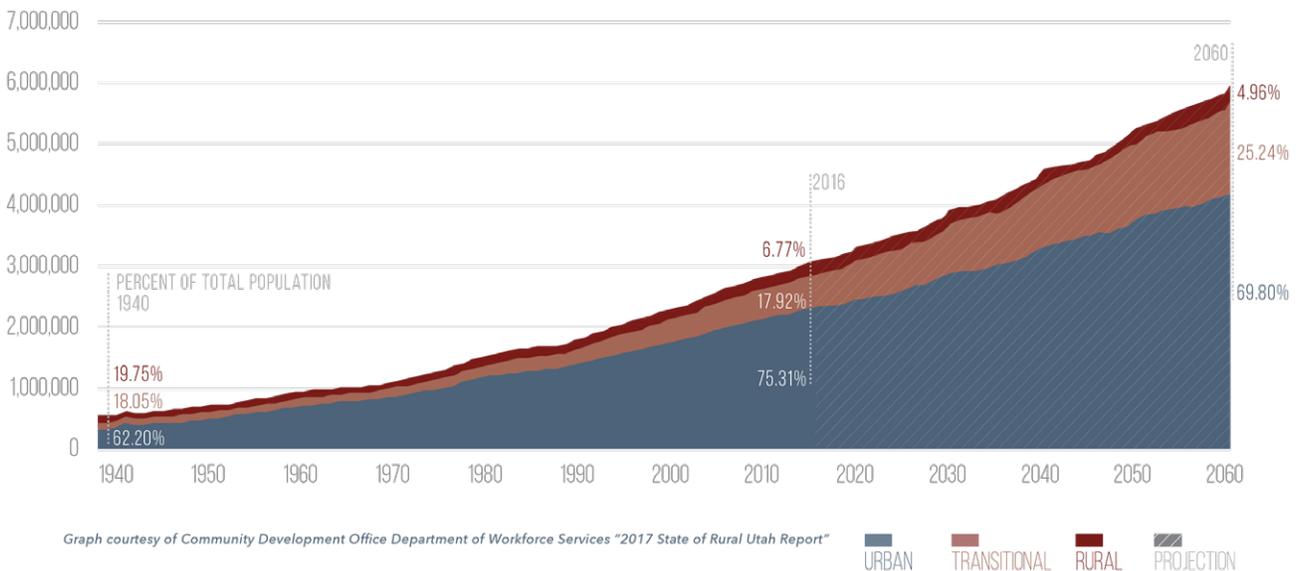


Figure 2-2 Projected Growth Rate by County (2015-2065)



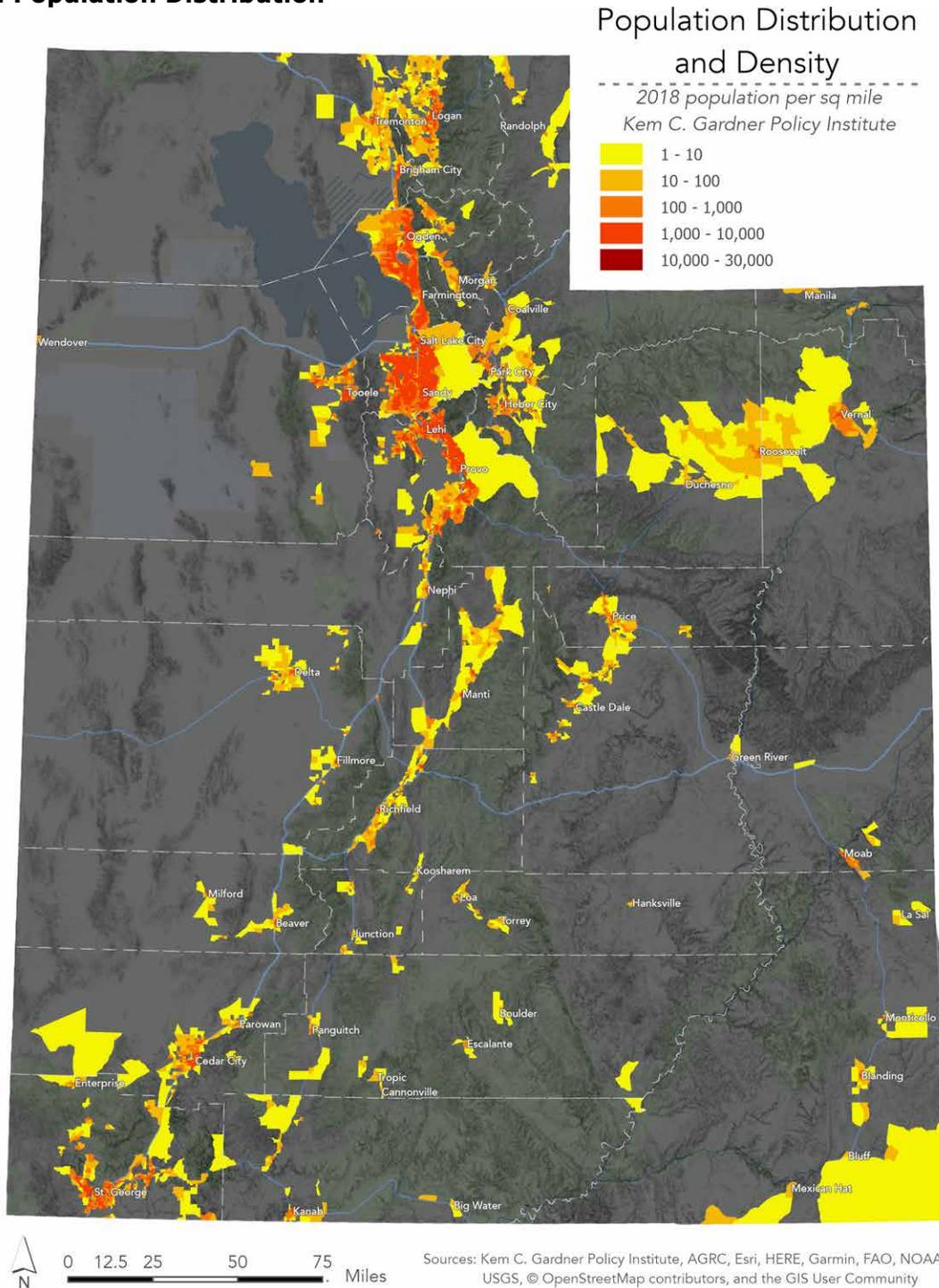
Source: Figures 2-1 and 2-2 courtesy of the Kem C. Gardner Policy Institute. Trends indicate Utah’s population is on target to reach over 5.8 million people by 2065.

Figure 2-3 Historic & Projected Population



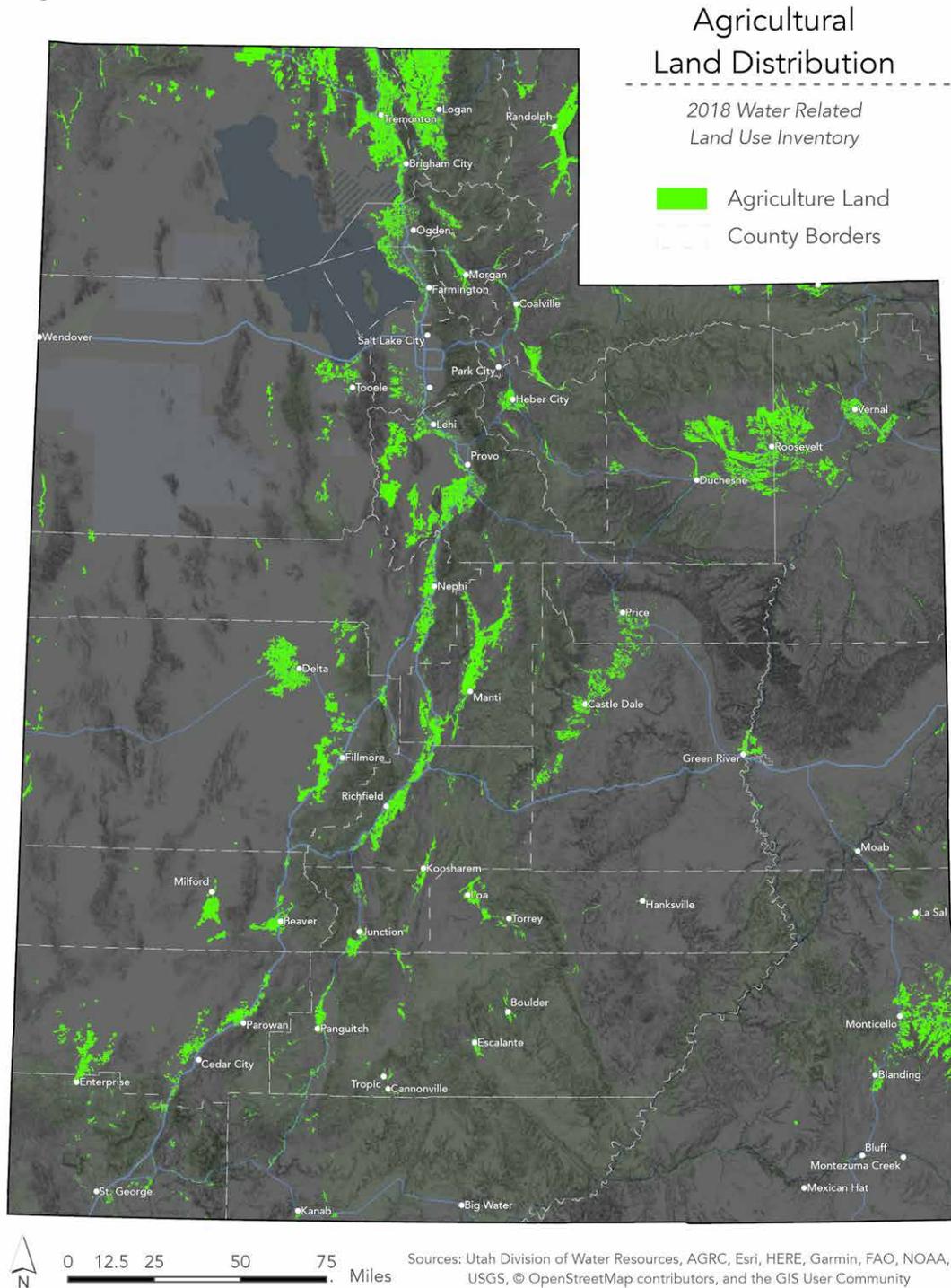
Source: Courtesy of Community Development Office, Department of Workforce Services.

Map 2-1 Population Distribution



Map 2-1 shows Utah's population distribution and density. The dark orange and red identify the most densely populated areas of the state with more than 1,000 people per square mile. Every county and basin have high-density areas, signifying an urban setting. Within these areas, the water-related issues are primarily about finding and delivering adequate, high-quality drinking water for residential, commercial, industrial, and institutional uses. The yellow and orange colors identify Utah's rural areas of 1-1,000 people per square mile.

Map 2-2 Agriculture Land



Map 2-2 illustrates how Utah's agricultural land aligns closely with the rural communities and areas of low population identified in Map 2-1. Rural communities are typically very concerned with maintaining an adequate supply of irrigation water for agriculture in addition to delivering adequate potable water supplies. Water-related issues may differ somewhat between urban and rural Utah, but both of these settings exist throughout the state.

How Utah Reports Water Use

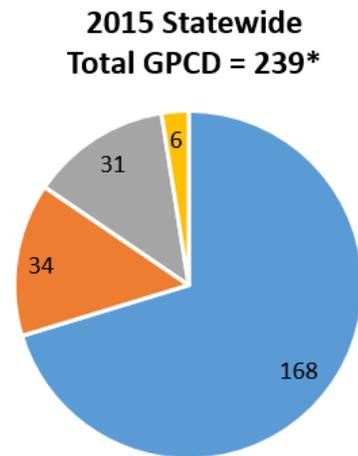
In 2017, as required by the legislature, an independent third-party evaluated the methodology the Division used to report the state's 2015 water use. The third-party review concluded that the potable data was accurate and had only a 0.03% margin of error. However, it also found the Division was underestimating secondary use by nearly 30% and that its methodology should be updated.

Now, the Division uses spatial data to determine lot size, infrared technology to determine green space, and gridded ET (evapotranspiration) to estimate water demand. The Division also reduced irrigation efficiency from 50% to 40% to evaluate water needs. These changes have improved secondary water use estimates.

The 2015 M&I data is the baseline for comparison and planning and was updated to include the new methodology for estimating secondary water use. Figure 2-4 summarizes the 2015 M&I water use by public systems in gallons per capita per day (GPCD). Since 2015, the Division has reported public system M&I data every year instead of every five years. This information is available on the Division's [Open Water Data](#) website.

The Division, the Division of Water Rights (Water Rights), and the Division of Drinking Water have worked together to improve the water use data collection and reporting process. Water Rights meets with each water system to train them on how to report system data on the updated water use data form. After the water systems submit their

Figure 2-4 2015 Statewide Total M&I Water Use in Public Systems (GPCD)



* Includes secondary water, which accounts for 75 GPCD.

■ Residential ■ Commercial ■ Institutional ■ Industrial

Source: DWRe 2015 M&I Water Use Report

data to Water Rights, the Division looks over the data and flags anything that appears questionable. Water Rights contacts the water system and corrects any mistakes. This process keeps the data in one dataset. Graphic 2-1 shows the process for collecting and validating M&I water use data.

Tracking water use is an essential part of the state's water planning. These numbers are used to set goals and demonstrate accountability. The Division often reports water use in GPCD, which is calculated by dividing water use by the permanent resident population and dividing by 365 (the number of days in a year).

There isn't a national standard for calculating water use. Some cities and states only report certain types of water use and/or may apply a credit for water that is returned to the system. Or, some cities and states may only report single-family residential potable water use and exclude

multi-family residential use, commercial, institutional, industrial, secondary and/or recycled water.

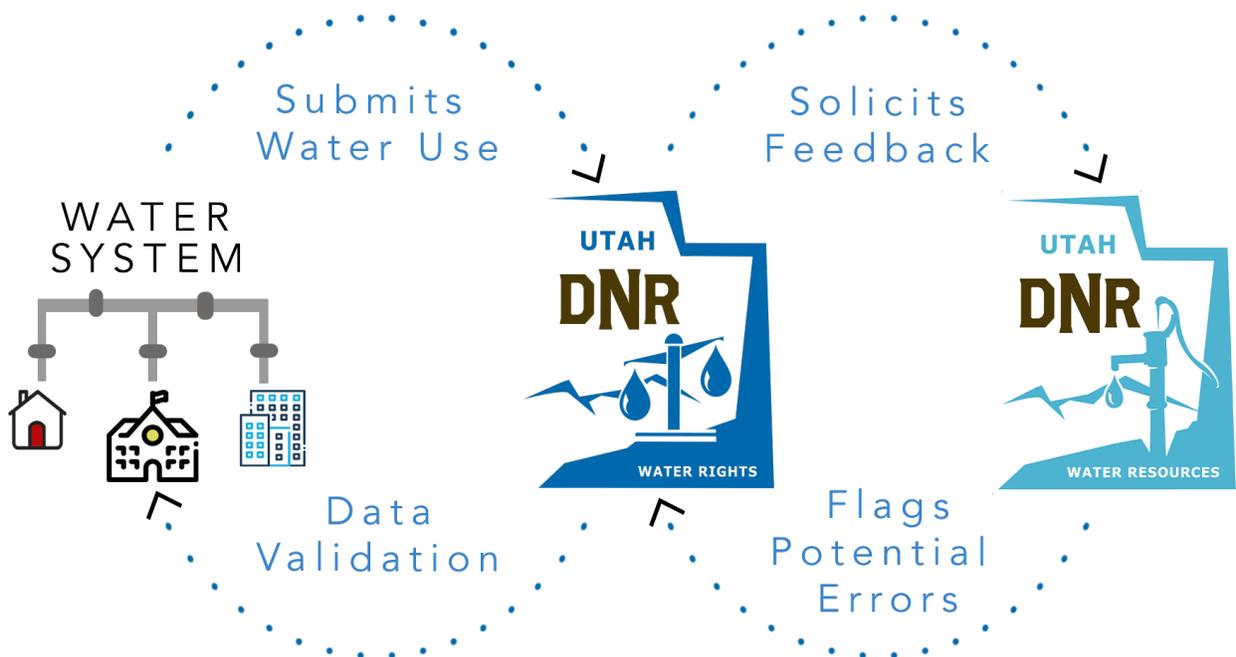
Utah accounts for all water use types (potable, secondary, and recycled water) by all industries (residential, commercial, institutional, and industrial) and doesn't apply credits for flows returned to the system. This comprehensive process may give the false impression that Utahns use more water than people in other states.

Utah's water use is often compared to that of other western cities and states that don't use the same calculation method or even collect the same data. The result can be an "apples-to-oranges" comparison. (For example, the city of St. George compared to the entire state of Nevada or New Mexico or the State of Utah compared to cities such as Tucson, Las Vegas, and Albuquerque.) It's more relevant

to compare current numbers against past performance and ensure the state sees improved conservation and efficiency.

Since GPCD is impacted by population, how a city or state calculates population also affects water reporting. Some calculate population by applying the average person per household to all residential units rather than using the U.S. Census Bureau (Census Bureau) population estimates. Utah uses the Census Bureau's estimated permanent resident population, adjusted to water provider service area boundaries. Many of Utah's counties, including Washington, Rich, Grand, Kane, and Summit, have a high number of second homes and are popular tourist destinations. However, seasonal residents and visitors are not included in the Census Bureau population, so this water use is added to the permanent population's use, showing a higher GPCD than for those states

Graphic 2-1 M&I Data Collection and Validation Process



and cities that use the average person per household calculation method. The different methods aren't good or bad – just different. That's why it's important to understand how water use, water use accounting, and population impact results. Table 2-1 shows total water use in Utah's public water systems in both acre-feet and GPCD.

The majority of secondary water use is estimated by the Division. Water Rights collects metered secondary water data where available. The Division updated its secondary water use assumptions, but the combination of more systems reporting and a large number of unmetered systems results in data fluctuations. This is likely not the result of more use but rather evolving data sources and estimation methods.

Universal secondary metering would greatly enhance the reliability and credibility of secondary water use numbers. Where

secondary meters have been installed, not only are water use numbers more reliable but overall water use is reduced. Implementing universal secondary metering may be cost-prohibitive for some water providers and systems that need to be retrofitted. However, [Utah Code 73-10-34](#) (SB52) which passed during the 2019 Utah Legislative session, requires a meter on all new connections in Utah's urban counties (class I and II – populations above 125,000). Additional legislation will likely be needed to achieve universal secondary water metering across the state.

Major self-supplied industrial water users report their water use to Water Rights. Water that is self-supplied is diverted by the owner of a water right for their own purpose. The amount of water used by self-supplied industries can be substantial. Table 2-2 shows the total reported self-supplied industry water use.

Table 2-1 Total Public System Water Use* and GPCD

Year	Population	Total Public System Use (ac-ft)	Total Public System (GPCD)
2015	2,948,080	790,122	239
2016	3,131,205	858,593	245
2017	3,184,064	870,158	244
2018	3,231,494	871,084	241
2019	3,281,630	811,838	221

*Total public system water use is water delivered to residential, municipal, industrial, and institutional user connections by a public water provider.

Table 2-2 Self-Supplied Industry Water Use (ac-ft)

Year	ac-ft
2015	579,591
2016	513,685
2017	566,493
2018	598,223

The Importance of Water Planning

Water planning is a cornerstone to successful water management. Data is used to drive informed decisions and set the state and water systems up for success. The Division utilizes data to evaluate water conservation progress, track population projections, compare water supply and demand projections, and help identify what actions, if taken now, will benefit current and future generations. The Division focuses heavily on water planning because, without it, families and communities wouldn't be able to grow and prosper. The Division's water planning efforts help Utah communities to thrive.

Chapter 2 Links

Open Water Data Website - dwre-utahdnr.opendata.arcgis.com

Kem C. Gardner Policy Institute Population Estimates - <https://gardner.utah.edu/demographics/population-projections/>

2015 Legislative Audit: A Performance Audit of Projections of Utah's Water Needs - https://le.utah.gov/audit/15_01rpt.pdf

Third-party Review - <https://water.utah.gov/wp-content/uploads/2019/12/WaterUseDataCollectionReport2018.pdf>