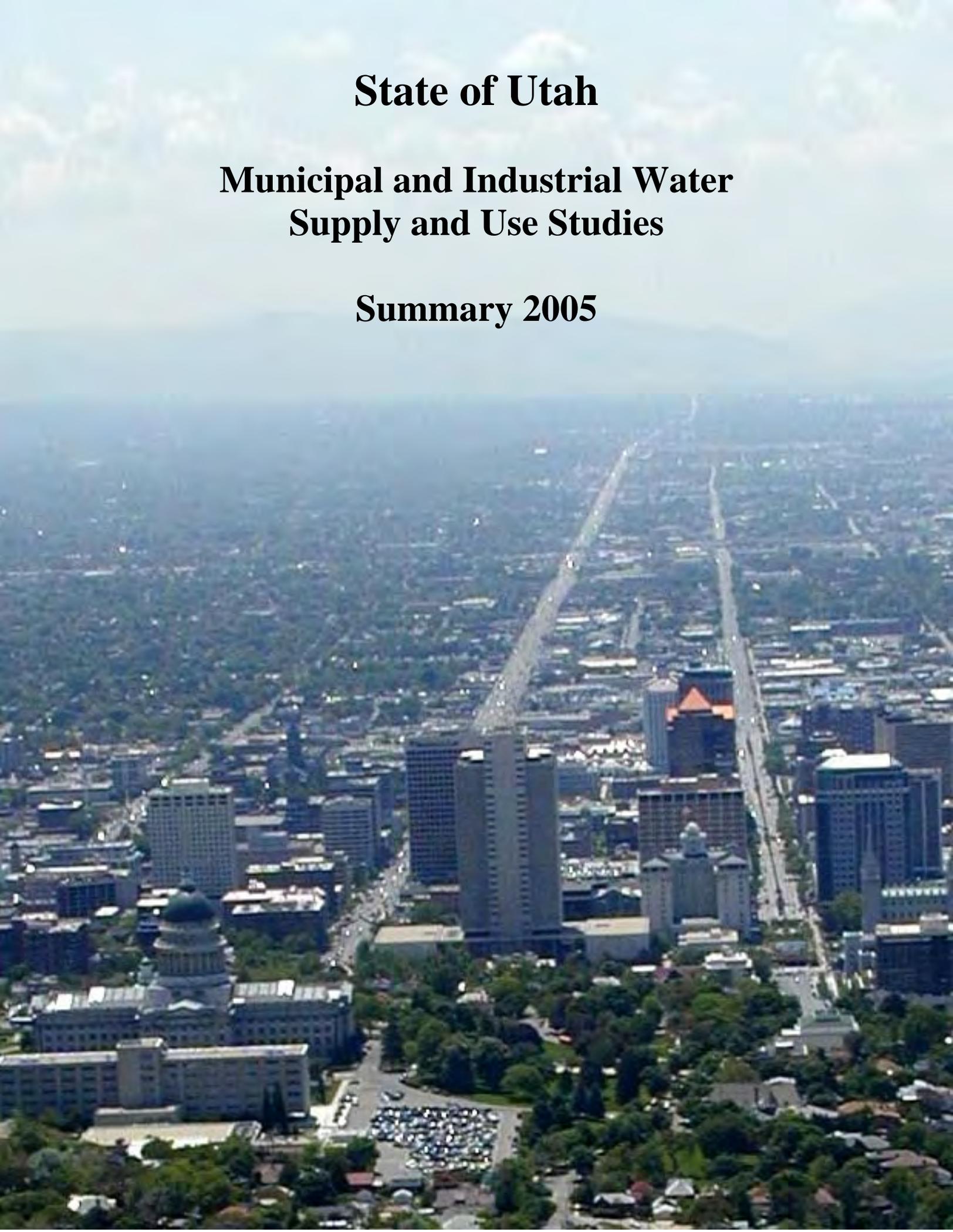


State of Utah

Municipal and Industrial Water Supply and Use Studies

Summary 2005



**MUNICIPAL AND INDUSTRIAL WATER
SUPPLY AND USE STUDIES**

UTAH STATE SUMMARY

2005

Prepared by

**Utah Department of Natural Resources
Division of Water Resources**

October 2009



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This summary report was prepared by Gregory Williams, with illustrations by Barbara Perry.

A handwritten signature in cursive script, appearing to read "Dennis J. Strong", is written above a horizontal line.

Dennis J. Strong, P.E., Director

Utah Division of Water Resources

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EXECUTIVE SUMMARY

After the issuance of the *Utah State Water Plan* in 1990, the Utah Division of Water Resources (the division) recognized the need to specifically address the growing demands for municipal and industrial (M&I) water. Accordingly, the division commenced the effort to quantify all the uses of both potable (drinking) and non-potable M&I water in each of the community, non-community, and private domestic water systems of the state (see **Section 1.3.1** for definitions of the types of water systems). With the completion of the detailed *Municipal and Industrial Water Supply Studies* for the hydrologic basins of the state, the division now offers this statewide summary to enhance the capabilities of water managers of the state to quickly and accurately access information about M&I water use on a statewide level.

The data was collected for the year 2005 from each of the water systems throughout the state. This statewide summary is a compilation of the data and can be considered to be representative of the statewide municipal and industrial water usage for the calendar year of 2005.

Within the state of Utah, more than 950,000 acre-feet of water (an acre-foot is the amount of water required to cover one acre of area, one foot deep or 325,851 gallons) is used annually for M&I purposes. Specifically, the above-mentioned data indicates a total of 951,901 acre-feet of statewide M&I water use. See **Section 3** for a statewide summary. About sixty percent of that total (581,836 acre-feet) is potable (drinking) water, with the remaining forty percent or 370,066 acre-feet being non-potable water. From the standpoint of types of water systems, 90.7% of potable M&I water is delivered by Public Community water systems, 1.0% by Public Non-Community, 5.7% by Self-Supplied Industries and 2.6% by Private Domestic water systems.

For the Public Community water systems, residential uses accounted for the bulk of the total water use at 71% of the total. Commercial businesses accounted for 13% of the total water use. Institutional settings used 12%, while industrial applications used the remaining 4% of the total. Public Community systems serve about 97% of the total population of the state, with the remaining 3% of the population being served by private domestic water systems.

All of the Public Community water systems collectively delivered a statewide total of 717,485 acre-feet of water. Using an estimated 2005 state population of 2,486,290 people for these systems,

the overall per capita water use for these systems is 258 gallons per capita per day (gpcd). Of this total, 190 gpcd is potable and 68 gpcd is non-potable water.

The combined total statewide annual reliable systems capacity of public community water systems is 837,145 acre-feet. This supply breaks down to a total of 51% of their supplies from wells, 14% from springs, and 35% from surface sources. In each section, a table presents a similar breakdown for the counties within each of the basins.

Newly included in the 2005 reports is information on the water deliveries and depletions for each of the counties included in the basins, as well as basin totals. Additionally, there is a comprehensive table at the end of each report that breaks out the deliveries and depletions by water system categories, potable and non-potable water and specific categorical uses. For the entire state, there are 951,901 acre-feet of total water deliveries and 555,310 acre-feet of depletions.

Section 1 INTRODUCTION

1.1 Authority

Since its creation by the Utah State Legislature over forty years ago, The Utah Division of Water Resources (DWRe) has continued the overall responsibility for completing studies, investigations, and plans for the purpose of promoting and facilitating the responsible development and utilization of the water resources within the state of Utah. The *Utah State Water Plan*, prepared and distributed in 1990, further provided a foundation and overall direction to establish and implement the state policy framework of water management. More recently, in the 2004 General Session of the Utah State Legislature, water conservation plans are now required to be submitted to and reviewed by the DWRe for all systems with more than 500 service connections.

Starting with the Bear River Basin (completed in January 1992), detailed River Basin plans have been and are being prepared and/or updated for each of the hydrologic basins in the state. Each basin plan identifies potential conservation and development projects and describes alternatives to satisfy current and future demands. Additionally, as part of this effort, several other data reports have been completed for the hydrologic basins. These include water-related land use reports, water budget reports, and municipal and industrial (M&I) water supply and uses reports. This report summarizes, on a statewide basis, each of the individual M&I reports.

1.2 Scope

The purpose of this report is to provide a 2005 reference summary of the municipal and industrial (M&I) water supplies and use information throughout the state of Utah. The data presented in this report will be used in the *State Water Plan* planning process, as well as other DWRe reports and studies. This report summarizes the individual basin *Municipal and Industrial Water Supply Studies* reports compiled by the Division of Water Resources for each of the hydrologic basins and study areas for the calendar year of 2005.

1.3 Definitions

A number of different types of systems supply water for a variety of users. The general term supply is defined as the amount of water available. Municipalities own most of the individual water supply systems. However, in some cases the owner/operator is a private company, state or federal agency. Thus, a "public" water supply may be either publicly or privately owned and supply treated and/or untreated water.

Water is used in many ways and for several purposes. It is often said that water is "used" when it is diverted, demanded, withdrawn, depleted or consumed. But it is also "used" in place for such things as fish and wildlife habitat, recreation and hydropower production. **Water use in this report is defined as “delivered” water.**

1.3.1 Water System Categories

1.3.1.1 Public Community Water System

Provides potable and/or non-potable water by either a privately or publicly owned water system which serves at least 15 service connections used by year-round residents or regularly serves at least 25 year-round residents. Water from the public community water supplies may be used in both indoor and outdoor applications for residential, commercial, institutional, and industrial purposes.

1.3.1.2 Public Non-Community Water System

This category provides potable and/or non-potable water by either a privately or publicly owned water system of one of two types: transient and non-transient. Transient systems are systems that do not serve 25 of the same non-resident persons per day for more than six months per year. Examples include campgrounds, RV parks, restaurants, convenience stores, etc. Non-transient systems are systems that regularly serve 25 of the same non-resident persons per day for more than six months per year. Examples include churches, schools and industries. This report categorizes industrial non-transient systems as self-supplied industries.

1.3.1.3 Self-Supplied Industrial System

These systems provide potable and/or non-potable water for use by individual privately owned industries (usually from their own wells or springs).

1.3.1.4 Private Domestic System

These systems provide potable and/or non-potable water from privately owned wells and/or springs for use by individual homes.

1.3.2 Types of Water

1.3.2.1 Potable Water

Potable water includes water meeting all applicable Federal, State, and Local drinking water requirements for residential, commercial, institutional and industrial uses. It is also referred to as culinary water supply.

1.3.2.2 Secondary Water

Secondary water Includes water not meeting safe drinking water requirements. It is also referred to as non-potable (non-culinary) water. This water is usually delivered by pressurized or open ditch systems for irrigation of privately and publicly owned landscapes, gardens, parks, cemeteries, golf courses and other open areas. Sometimes called "dual" water systems, they are installed to provide an alternative to irrigating with culinary water for these outdoor areas.

Although Irrigation companies most often provide this water, public community systems may deliver this water as well. Self-supplied industries can also use secondary water for industrial processes.

1.3.3 Water Supply Terms

1.3.3.1 Maximum Developed Potable Water Supply

This supply is the annual volume of potable (culinary) water which is the lesser of the hydrologic capacity of the water source, the physical capacity of the water system, or the amount allowed by the collective water rights. (See pages 9-12 for a more detailed explanation)

1.3.3.2 Reliable Potable Water Supply

This supply is the annual volume within the maximum developed water supply that is available to meet peak demands. This is generally calculated as 100% of the maximum supply from surface water sources, 50% of the maximum yield of wells, and between 50% and 100% of the average annual spring flows. When this number is divided by the average per capita usage, the resulting number represents the theoretical maximum population that the water source can serve. (See pages 9-12 for a more detailed explanation)

1.3.3.3 Municipal and Industrial Water Supply

Includes all water (potable and non-potable) supplied for residential, commercial, institutional, light industry, and self-supplied industries. This supply is delivered by public community systems, public non-community (transient and non-transient) systems, self-supplied industrial systems, unregulated Indian water systems and private wells.

1.3.4 Water Use Terms

1.3.4.1 Commercial Use

Use normally associated with small business operations that may include drinking water, food preparation, personal sanitation, facility cleaning and maintenance and irrigation of facility landscapes. Examples include retail businesses, restaurants and hotels.

1.3.4.2 Industrial Use

Use associated with the manufacturing or production of products. The volume of water used by industrial businesses can be considerably greater than water used by commercial businesses. Examples include manufacturing plants, oil and gas producers, mining companies, mink farms and dairies.

1.3.4.3 Institutional Use

Use normally associated with general operation of various public agencies and institutions (i.e. schools, municipal buildings, churches) including drinking water, personal sanitation, facility cleaning and maintenance and irrigation of parks, cemeteries, playgrounds, recreational areas, golf courses, and other facilities. The amount of water used by cities for outside irrigation of public areas typically is not metered.

1.3.4.4 Residential Use

Use associated with residential cooking, drinking water, washing clothes, miscellaneous cleaning, personal grooming and sanitation, irrigation of lawns, gardens and landscapes, and washing automobiles, driveways and other outside residential facilities. Examples include single-family homes, apartments, duplexes and condominiums.

1.3.5 Other Water Terms

1.3.5.1 Consumption

Water evaporated, transpired or irreversibly bound in either a physical, chemical or biological process. Consumed water results in a loss of the original water supplied.

1.3.5.2 Consumptive Use

Losses of water brought about by human endeavors when used for residential, commercial, institutional, industrial, agricultural, power generation, and recreation. Naturally occurring vegetation and fish and wildlife also consumptively use water.

1.3.5.3 Deliveries

Water already within a system that is being provided to an individual connection, whether potable or non-potable and/or metered or not is considered delivered. The connection can be for residential, commercial, institutional, and/or industrial uses. **For the purpose of this report, the delivered water amount is equivalent to water use.**

1.3.5.4 Depletion

Water consumed and made unavailable for return to a given designated area, river system or basin. It is intended to represent the net loss to a system. The terms consumption and depletion are often used interchangeably but are not the same. For example, water exported from a basin is a depletion to the basin system and it will not be consumed in the basin of origin. The exported water is available for use (consumption) in another basin or system. Water diverted to irrigate crops in a given system, but not returned for later use, is depletion. Precipitation that falls on irrigated crops is not considered a part of the supply like surface water and groundwater diversions. For this reason, precipitation falling on and consumed by irrigated crops is not considered as being depletion from the system.

1.3.5.5 Diversion

Water diverted from supply sources such as streams, lakes, reservoirs or groundwater for purposes such as cropland irrigation, as well as residential, commercial, institutional and industrial uses.

1.3.5.6 Withdrawal

A withdrawal is water taken from supply sources such as lakes, streams, reservoirs or groundwater. This term is normally used in association with groundwater withdrawal. The terms *diversion* and *withdrawal* are often used interchangeably.

1.4 Data Collection Methodology

The DWRe collected information from approximately 1000 water systems, about 450 of which were public community systems. Because of this massive undertaking of collecting water use information from every water user in Utah, there has been a staggered time frame in the issuance of the individual M&I reports. However, the collected water supply and use data for all systems was for the calendar year of 2005.

Due to many boundaries being politically created, county and basin boundaries rarely match. To assist in correlating the county with the basin information, **Table 1-1** shows which of the counties are incorporated within each of the hydrologic basins.

Table 1-1
Hydrologic Basin and County Correlation

Hydrologic Basin	Counties Within Basin (Counties in BOLD are common to multiple basins)
West Desert	Box Elder, Juab, Millard, Tooele
Bear River	Box Elder , Cache, Rich
Weber River	Summit , Morgan, Weber, Davis
Utah Lake	Juab, Summit, Utah, Wasatch
Jordan River	Salt Lake
Sevier River	Garfield, Iron, Juab, Kane, Millard, Piute, Sanpete, Sevier
Cedar/Beaver	Beaver, Iron, Washington
Uintah	Daggett, Duchesne, Summit, Uintah, Wasatch
West Colorado River	Carbon, Emery, Garfield, Grand, Kane, San Juan, Sanpete, Sevier, Utah , Wayne
Southeast Colorado River	Garfield, Grand, Kane, San Juan
Kanab Creek/ Virgin River	Iron, Kane, Washington

1.4.1 Public Community Water Systems

Since 1992, for public community water systems, the DWRe has gathered the annual water use and source information for each system from the Division of Water Rights (DWRi) off the returned Utah Water Use Data Form. The targeted year's information is critically reviewed for accuracy and completeness. Oftentimes, additional information and/or clarifications of the given information are needed.

The DWRe staff will then contact each of the water systems for the additional information or clarification required. Particularly if a water use data form has not been returned, DWRe staff will schedule a meeting with the water system representatives. During these meetings, the information is collected and discussed, as well as assistance provided to the representatives on how to properly complete the forms.

A meeting can also be necessary to discuss the system's particular water use patterns, as well as their water sources and operation. With this information, the total water supply and usage of the system is calculated. If information is still insufficient, all or part of the system use and/or supply will be estimated using standardized acceptable practices, along with the knowledge and experience of current DWRe staff members.

1.4.1.1 Water Supply

1.4.1.1.1 Potable Water

Two factors define the potable water supply for public community water systems: maximum developed potable water supply available under present conditions and reliable potable water supply. The maximum developed potable water supply available under present conditions is defined as the water resource that is presently being utilized. It is limited by a mechanical constraint (such as pump capacity or pipe size), a hydrologic constraint (such as reliable stream flow or groundwater safe yield) or a legal constraint (such as a water right or legal contract). **The lesser amount of water supply, due to these three constraints, is considered to be the maximum developed potable water supply available under present conditions used in this analysis.**

The determination of well pump capacities, average annual spring flow estimates, treatment plant capacities, and water right information aid in the calculation of this value. It should be noted that, due to the complexity of water rights, contracts, exchanges, etc., a detailed search of water right limitations associated with each entity is not within the scope of this study.

The reliable potable water supply is defined as the capacity to meet peak day demands, expressed as an annual volume. It is valuable in determining future water supply capacities of the particular community water system sources (wells, springs, etc.). **The reliable potable water supply is calculated by adding together the maximum developed water supply capacity of surface sources, one-half of the maximum yield of wells or their pump capacities (unless otherwise indicated by the system manager), and a percentage of the average annual flow of spring sources.** The percentage of the spring source flows range between 50% and 100%. The determination of the percentage is based on information provided by the water supplier.

Figure 1-1 graphically presents the relationship between the maximum developed potable water supply and the reliable potable water supply of a system. By quantifying the maximum developed and the reliable potable water supply of a system, the total population that a system may potentially support can be determined. The current total yearly water use is the volume under the lower curve (*Present Water Use Pattern*). The future total yearly water use is the volume under the upper curve (*Future Water Use Pattern*). The latter volume is equivalent to the reliable developed potable water supply.

The maximum developed potable water supply under present conditions is the volume under the upper line (*Maximum Water Supply*) in **Figure 1-1**. This amount is a theoretical annual volume based upon a maximum daily flow rate (limited by the water right or system capacity). Consequently, the peak day demand point on the future water use curve (*Future Peak Day Demand*) cannot exceed this upper limit. Due to the fluctuating nature of some sources (particularly springs), and the fact that most culinary water system storage tanks are designed to store only about one day of water demand, not all of the total maximum developed potable water supply is available to meet future water needs.

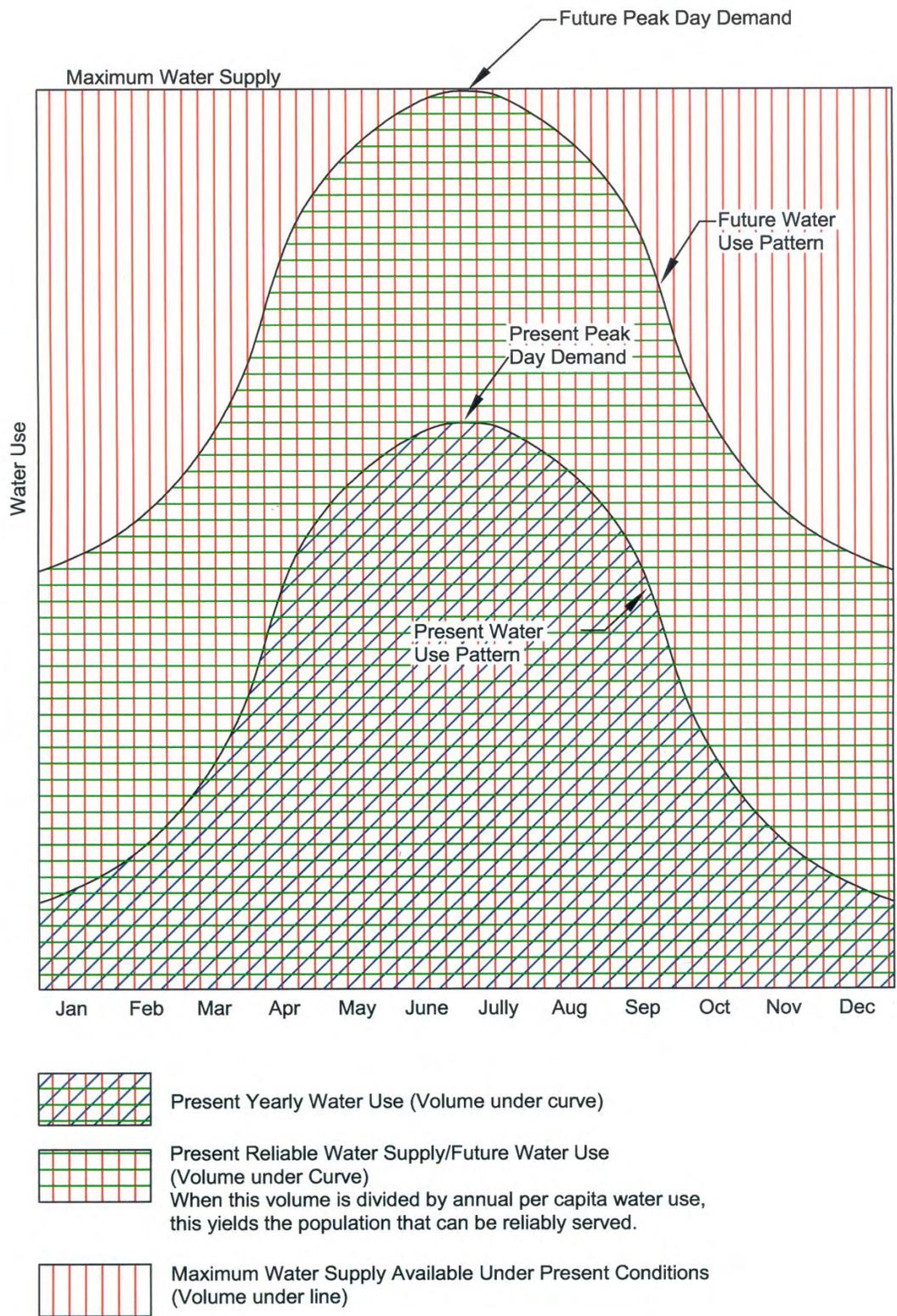


Figure 1-1 Water Supply and Use Hydrograph

It is important to note that the reliable potable water supply is a theoretical annual volume based upon the current daily peak demand flow rate of any one system, under its current demand conditions. Additional supply may be made available by lowering and/or increasing the size of existing well pumps, pumping existing wells for longer durations, increasing storage capacity and/or distribution pipe sizes. However, being based only on current conditions, these systematic changes may cause operational problems during times of peak demand. Therefore, the DWRe uses the reliable potable water supply only as a reference tool to quantify the annual amount of water that can be delivered by each community water system.

For planning purposes, the reliable potable water supply is essential for estimating what population base each system can theoretically support with current demand patterns. It is also a guideline to help predict the approximate timing of future system improvements in order to meet any increase in demand.

1.4.1.1.2 Secondary Water

Deliveries of non-potable (secondary) water are an important component of the water use within the boundaries of public community water systems. However, quantifying the available supply of this water is extremely difficult, due to the lack of and/or absence of metering, particularly at the level of individual property connections. Many of the secondary water systems are part of a larger agricultural irrigation system. Hence, the theoretical supply includes both agricultural and M&I water. Currently, separating M&I secondary from agricultural water is estimated.

With secondary water use becoming more prevalent for outdoor landscaping, estimating the available supply of this water is becoming increasingly more important. **For planning purposes, the DWRe assumes that the supply for M&I secondary irrigation is simply equal to the current use.**

1.4.1.2 Water Use

Present water use, as defined herein, is the developed water supply that is actually delivered by the distribution system from surface or subsurface sources. Water use is divided into four categories as defined in the following sections.

1.4.1.2.1 Residential

The DWRe staff collects data about the number of residential connections and the amount of water used by those connections from a water system representative. Water use in this category is divided into three subcategories: culinary-outdoor, culinary-indoor, and secondary-outdoor. While most systems will meter the total culinary residential water use, indoor and outdoor use are rarely metered separately. Secondary water use is rarely metered. Therefore, the DWRe usually estimates these subcategory totals for secondary water.

Typically, culinary indoor water use will be determined first. One method to estimate the indoor use is to review residential meter reading totals for the system from the winter months, if available. Since outdoor watering typically does not occur during the winter months, it can be assumed that the water used in winter months is for indoor use only. The winter water use is then used to determine the total yearly indoor use.

When the above method does not yield a reasonable value for indoor use, the per capita indoor water use for a system can be estimated by using an equation that was developed in a detailed residential study, “Identifying Residential Water Use”, completed by the DWRe in 2001. The mathematical equation that was developed is as follows:

$$\text{GPCD}_{\text{Indoor}} = 90.3 / P_{\text{PH}} + 42.3$$

where:

$\text{GPCD}_{\text{Indoor}}$ = gallons per capita day (per capita indoor water use)

P_{PH} = persons per household (US Census Bureau)

The total yearly indoor water use is then calculated for the system by multiplying the result of the above equation by the current population. Outdoor culinary water use can then be estimated by subtracting the total yearly indoor water use from the metered total residential culinary water use.

Because very few entities meter secondary outdoor water use, the DWRe staff estimates the outdoor secondary water use by using the average lot size, percent irrigated, percent of residences that are supplied by separate secondary (pressurized and ditch) irrigation systems, water right-duty rates (volume of water required for turf growth) in the area, and other related information for each system. In determining residential secondary use, care is taken to not include irrigation water use for small pastures or farm fields that can often be found adjacent to residences, particularly in rural communities.

1.4.1.2.2 Commercial

For most systems, the system operator can separate metered commercial water use data from the total water use. In cases where this data is not available, or is extremely difficult to obtain, the DWRe staff attempts to estimate commercial water use by inventorying commercial businesses in the area and using published commercial water use estimates. The DDW and the Utah State Water Lab, among others, publish these estimates. In some rural communities where there are a relatively small number of commercial connections, the businesses are visited individually by the DWRe staff and asked about their water use.

Some commercial facilities use secondary water to irrigate outside landscapes. This is especially typical for commercial golf courses. Again, it is typical that secondary water is not metered. The DWRe staff estimates this use by multiplying the size of the irrigated area by a water right-duty rate or the evapotranspiration (ET) rate with an assumed application efficiency percentage. The ET used is indicative of the amount of water, in inches, necessary for turf growth.

1.4.1.2.3 Institutional

Institutional water use is water used for city, county, state and federal government facilities, parks, municipal golf courses, schools, hospitals, churches, military facilities, as well as fire hydrant testing and other municipal losses in the water system. Because this water use is often not metered, the process to acquire this data is difficult. The system operator is asked to provide information about city facilities such as the number and size (irrigated acreage) of parks, schools, churches, and municipal golf courses. Water right-duty rates and/or the ET, with appropriate efficiencies, are used to calculate the amount of water that is needed to irrigate these areas. Estimates of leakage and water use for testing and flushing are also included in this category.

1.4.1.2.4 Industrial

Industrial water use is defined as water used in the production of a product. Therefore, such commercial establishments as dairies, mink farms, and greenhouses, as well as stockwatering, are included in this category, provided a community water system serves them. Industrial water use within community water systems is calculated with the same process used to calculate commercial water use data discussed earlier.

1.4.2 Public Non-Community Systems

The DWRe staff attempts to contact each non-community system and/or make a personal visit to these systems. Non-community systems rarely meter their water use, so the DWRe staff estimate the annual water use. Questions are asked to determine the types of facilities on the system, population served, water source information, irrigation of outside areas, etc. This data, along with information found in water-related publications, is used to determine water use. The maximum and reliable water supplies for these systems are relatively small, often not available and are therefore not included in this study. However, for planning purposes, the DWRe assumes that the water supply for these systems is equal to their water use.

1.4.3 Self-Supplied Industries

Although self-supplied industries are included in the Non-Community Water Systems category as defined by the DDW, the DWRe has divided them into a separate category due to their importance. The category is equivalent to the DDW's Non-Community, Non-Transient category.

Water use is acquired for self-supplied industries by using data from the DWRi's Industrial Water Use Form and/or electronically submitted data. The DWRi collects annual water use data from most of the major self-supplied industrial water users in the state. This data is confidential. Therefore, the data presented in this M&I study is only presented as county totals. As with other non-community systems, the maximum and reliable water supplies are often not available and are not in the scope of this study. For planning purposes, the DWRe assumes that the water supply for these systems is equal to their water use.

1.4.4 Private Domestic Water Systems

Private domestic systems are residences that are not connected to any public community or non-community water system. They are usually supplied by individual wells. To determine the water use data for this category, the population of those served by private domestic systems is estimated. This population is estimated by subtracting the population served by community water systems from the county population data acquired from the Governor's Office of Planning and Budget (GOPB). The remainder is assumed to be the population that is served by private domestic systems. The per capita water use rate for this category is assumed to be the same as the rate for the public community system residential category for that county. To determine the total water use by private domestic systems, the estimated population is then multiplied by this rate. Again, the maximum and reliable water supplies for private wells, being relatively small, are not in the scope of this study. Similarly, for planning purposes, the DWRe assumes that the water supply for these systems is equal to their water use.

Section 2 MUNICIPAL AND INDUSTRIAL WATER USE BY HYDROLOGIC BASIN

2.1 Basin Delineation

The state of Utah is divided into 12 hydrologic basins. The small portion of the Columbia River Basin that intersects the northwest corner of the state is incorporated into the West Desert Basin. Additionally, please note that the names of the basins may slightly differ from the 1990 *Utah State Water Plan*. The following **Figure 2-1** shows the boundaries of each hydrologic basin.

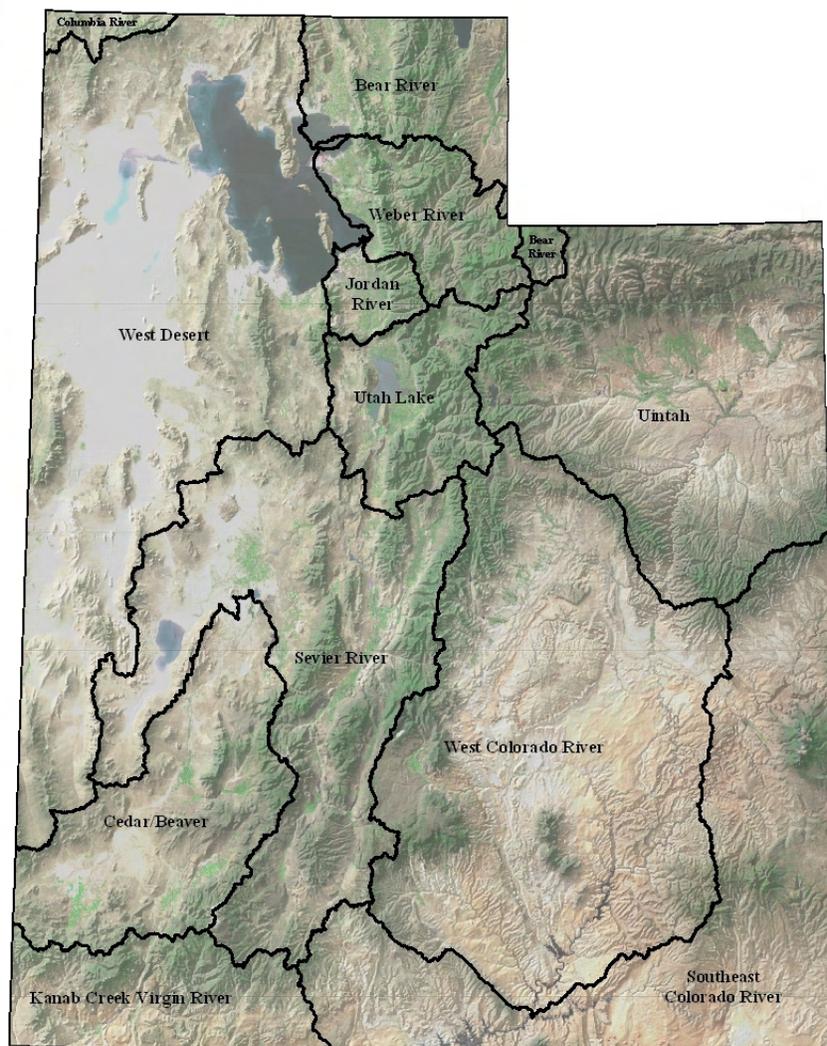


Figure 2-1 Hydrologic Basins of the State of Utah

In the following sections, there are brief physical descriptions of each basin, with maps depicting a listing and location of the water systems within the basin. Overall water use is then discussed, with a table that breaks down the water use by the types of water systems, as well as potable and non-potable water use. The rest of the water use information is on public community water systems, as they are most often the largest users of both potable and non-potable water in each basin.

Water supplies for public community water systems are then discussed. The focus is on the reliable system sources capacities. For estimates of the maximum available water supply for any one system and/or basin, please refer to the individual basin M&I report, as each system has unique limiting factors for this estimated reliable supply. Water supply data for the non-community systems and private domestic systems is beyond the scope of this report.

Water use of the public community water systems is then broken down into the categorical uses of residential (indoor and outdoor), commercial, institutional and industrial. A table presents this information for each of the counties of the basin, along with a calculation of the gallons per capita per day (gpcd) of not only each of the categorical uses, but also for totals of both potable and non-potable. A overall total gpcd is also given for the entire basin.

Information is given on the total M&I deliveries and depletions of each basin. See **Section 1.3** for definitions of the terms associated with this information. The table provided separates the information by county, as well as by indoor and outdoor water.

For further, more in depth information on the data contained within this report, please refer to the individual basins *Municipal and Industrial Water Supply Studies*, published by and made available through the Division of Water Resources. Refer to the DWRe website: www.water.utah.gov

2.2 West Desert Basin

The West Desert Basin covers about 18,000 square miles of the western portion of Utah. Roughly three quarters of the Utah/Nevada state line form the western boundary of the basin in Utah. The crest of the Raft River Mountains coupled with the Utah/Idaho state line form the basin's northern boundary. Features such as the Promontory Mountains, Great Salt Lake, Oquirrh Mountains,



“The Tree of Utah” on I-80 east of Wendover

Wah Wah Mountains, and smaller mountain ranges form the east and southeastern boundaries. See **Figure 2-1** for an illustration of the basin boundaries within Utah.

The basin spans all or part of nine counties in Utah: Beaver, Box Elder, Davis, Iron, Juab, Millard, Salt Lake, Tooele, and Weber. The area is characterized by small north/south trending mountain ranges separated by large areas of low-lying desert. The largest population centers are located in Tooele County, including the cities of Tooele and Grantsville.

2.2.1 Basin Municipal and Industrial Water Use

Of the total combined M&I water use of 16,478 acre-feet in the basin, the majority is potable water at 13,087 acre-feet, with the remaining 3,391 acre-feet being secondary water. The majority of the secondary water is used by self-supplied industries in Tooele County, including Aptus, Barrick Resources, Cargill Salt, Chemical Lime Co., Envirocare of Utah, Laidlaw Environmental, Magnesium Corporation of America, Morton International, and Reilly Industries. Additionally, up to a total of 158,000 acre-feet of saline water (not included in any use numbers) is used by some of these industries.

In contrast, the total water delivered within public community water systems is 13,773 acre-feet or approximately 84 percent of the basin water use. The 19 public community water systems serve 49,800 people (about 95 percent of the 52,530 total population within the basin). See **Figure 2-2** for locations of the public water systems within the basins. The 31 public non-community water systems serve areas such as the Tooele Army Depot and Proving Grounds, Great Salt Lake Marina (state facility), truck stops, isolated schools and churches, and roadside rest areas. **Table 2-1** is a summary of total water use in the basin:

Table 2-1
Water Use of the West Desert Basin
 (Acre-Feet/Year)

Water System Category	Water Use		Total
	Potable	Non-Potable	
Public Community	10,848	2,925	13,773
Public Non-Community	626	25	651
Self-Supplied Industries	1,172	440 *	1,612
Private Domestic	442	0	442
Basin Totals	13,087	3,391	16,478

*An additional 158,000 ac-ft of saline water was used in the basin for mineral recovery.

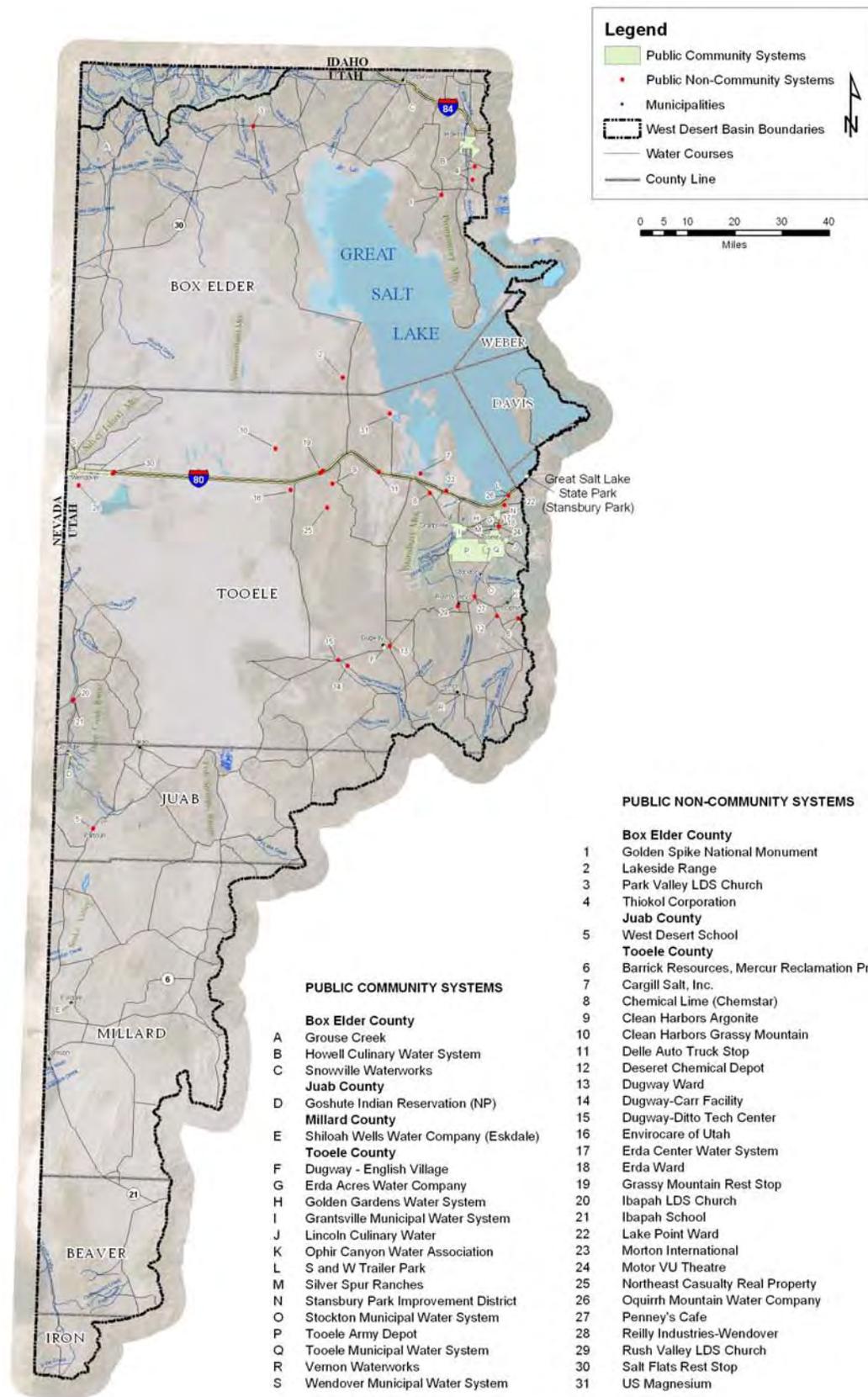


Figure 2-2 Public Water Systems of the West Desert Basin

2.2.2 Public Community Systems - Source of Supply

Potable water for Public Community Water Systems in the West Desert Basin is supplied from groundwater aquifers either naturally through springs, or mechanically with the use of wells. **Table 2-2** illustrates the reliable annual water supply for all public community systems in the West Desert Basin by county and source.

Table 2-2
Reliable Potable Water Supply for Public Community Systems
(Acre-Feet/Year)

County	Springs	Wells	Surface	Total
Box Elder	104.5	349.1	0.0	453.6
Juab	0.0	282.3	0.0	282.3
Millard	0.0	21.7	0.0	21.7
Tooele	2,184.6	13,086.5	0.0	15,271.1
Basin Totals	2,289.1	13,739.6	0.0	16,028.7

The reliable systems source capacity for public community systems is 16,029 acre-feet. Currently, no surface water is used as a potable water source, primarily due to the cost of treatment, as well as the sufficient availability of higher quality groundwater.

2.2.3 Public Community Systems - Water Use

The public community water systems serve water to the majority of the population, as well as to institutional, commercial, and industries other than those previously mentioned. **Table 2-3** shows the categorical total water use and per-capita water use rates for public community systems within the West Desert Basin.

The non-potable water use indicated is that which secondary irrigation systems deliver within the public community water system boundaries. The industrial use category indicates industrial water supplied only by public community systems.

Table 2-3
Total and Per-capita Water Use of Public Community Water Systems
Within The West Desert Basin
(Acre-Feet/Year, unless noted)

	Box Elder County	Juab County	Millard County	Tooele County	Total	GPCD
Potable Use						
Residential Indoor	38.5	11.7	4.0	3,829.9	3,884.1	69.6
Residential Outdoor	82.9	4.4	10.0	3,087.7	3,185.0	57.1
Commercial	28.7	0.0	0.3	745.1	774.1	13.9
Institutional	38.3	0.2	7.4	2,427.3	2,473.2	44.3
Industrial/Stockwater	35.8	0.0	0.0	495.4	531.2	9.5
Total Potable	224.2	16.3	21.7	10,585.4	10,847.6	194.5
Non-Potable Use						
Residential	6.9	0.0	0.0	1,526.6	1,533.5	27.5
Commercial	0.0	0.0	0.0	557.6	557.6	10.0
Institutional	21.0	0.0	0.0	798.6	819.6	14.7
Industrial/Stockwater	0.0	0.0	0.0	14.5	14.5	0.3
Total Non-Potable	27.9	0.0	0.0	2,897.3	2,925.2	52.4
Total Water Use	252.1	16.3	21.7	13,482.7	13,772.8	246.9

Note: Figures may not add exactly due to independent rounding.

2.2.4 M&I Water Deliveries and Depletions

Table 2-4 shows both the deliveries and depletions of all the M&I water use in the basin. This information can be a useful guide for overall water planning purposes. See **Section 1.3** for definitions of the terms related to the information.

Table 2-4
West Desert Basin M&I Deliveries and Depletions
(Acre-Foot/Year)

County	Deliveries			Depletions		
	Indoor Use	Outdoor Use	Total	Indoor Use	Outdoor Use	Total
Beaver	0.4	0.6	1.0	0.0	0.4	0.4
Box Elder	574.0	242.8	816.8	448.7	161.9	610.6
Juab	17.5	25.7	43.2	1.2	17.1	18.3
Millard	16.9	32.8	49.7	3.6	21.9	25.5
Tooele	6,787.3	8,779.8	15,567.1	3,146.1	5,853.2	8,999.3
Basin Totals	7,396.1	9,081.7	16,477.8	3,599.7	6,054.5	9,654.1

For a more detailed description of water use by individual water users, please refer to the report: *Municipal and Industrial Water Supply and Uses in the West Desert and Columbia River Basins*, January 2008, by the Utah Department of Natural Resources, Division of Water Resources. A copy of the report can be accessed at the Division website: <http://www.water.utah.gov/M&I/default.asp>

2.3 Bear River Basin

The Bear River Basin covers portions of three states: Idaho, Wyoming, and Utah. Utah's portion claims approximately 2,163,000 acres of the Bear River Basin. This portion of the basin is bordered on the north by the Utah/Idaho state line and on the east by the Utah/Wyoming state line. The Promontory Mountains largely form the western boundary, while Box Elder,



Aerial view of Bear Lake State Park Marina

Cache, and Rich counties lines largely comprise the basin's southern boundary. See **Figure 2-1** for an illustration of the basin boundaries in Utah.

The Bear River Basin in Utah encompasses all or part of four Utah counties: Box Elder, Cache, Rich, and Summit. The largest population centers are in Box Elder and Cache Counties, including the cities of Brigham City, Tremonton, Logan and Smithfield.

2.3.1 Basin Municipal and Industrial Water Use

Within the Bear River Basin of Utah, 57,061 acre-feet of water is used annually. The majority of the water used is potable water (43,806 acre-feet), with the remaining use being 13,255 acre-feet of non-potable water. Total water use is increasing substantially with growing recreational use around Bear Lake and population growth, particularly in the Brigham City and Logan areas. Utah State University in Logan is a large user of institutional water and growing rapidly. Due to this increasing water use, the *Cache Valley Ground Water Management Plan of 1999* was enacted. This plan, working in conjunction with the Bear River Compact of 1958 (amended 1980), outlines the future appropriations and possible uses of the available water resources in portions of the basin.

The Bear River Basin currently has 56 public community water systems. These systems serve about 140,970 people (most of the 149,246 population total within the basin). The basin also has 52 public non-community systems serving state parks, campgrounds, isolated commercial establishments, roadside rest stops, and self-supplied industries. See **Figure 2-3** for locations of the public water systems within the basin. **Table 2-5** summarizes the water use in the basin of all water systems.

Table 2-5
Water Use of the Bear River Basin
 (Acre-Feet/Year)

Water System Category	Water Use		Total
	Potable	Non-Potable	
Public Community	35,451	12,497	47,948
Public Non-Community	1,061	506	1,567
Self-Supplied Industries	3,784	252	4,036
Private Domestic	3,510	0	3,510
Basin Totals	43,806	13,255	57,061

Note: Figures may not add to totals due to independent rounding.

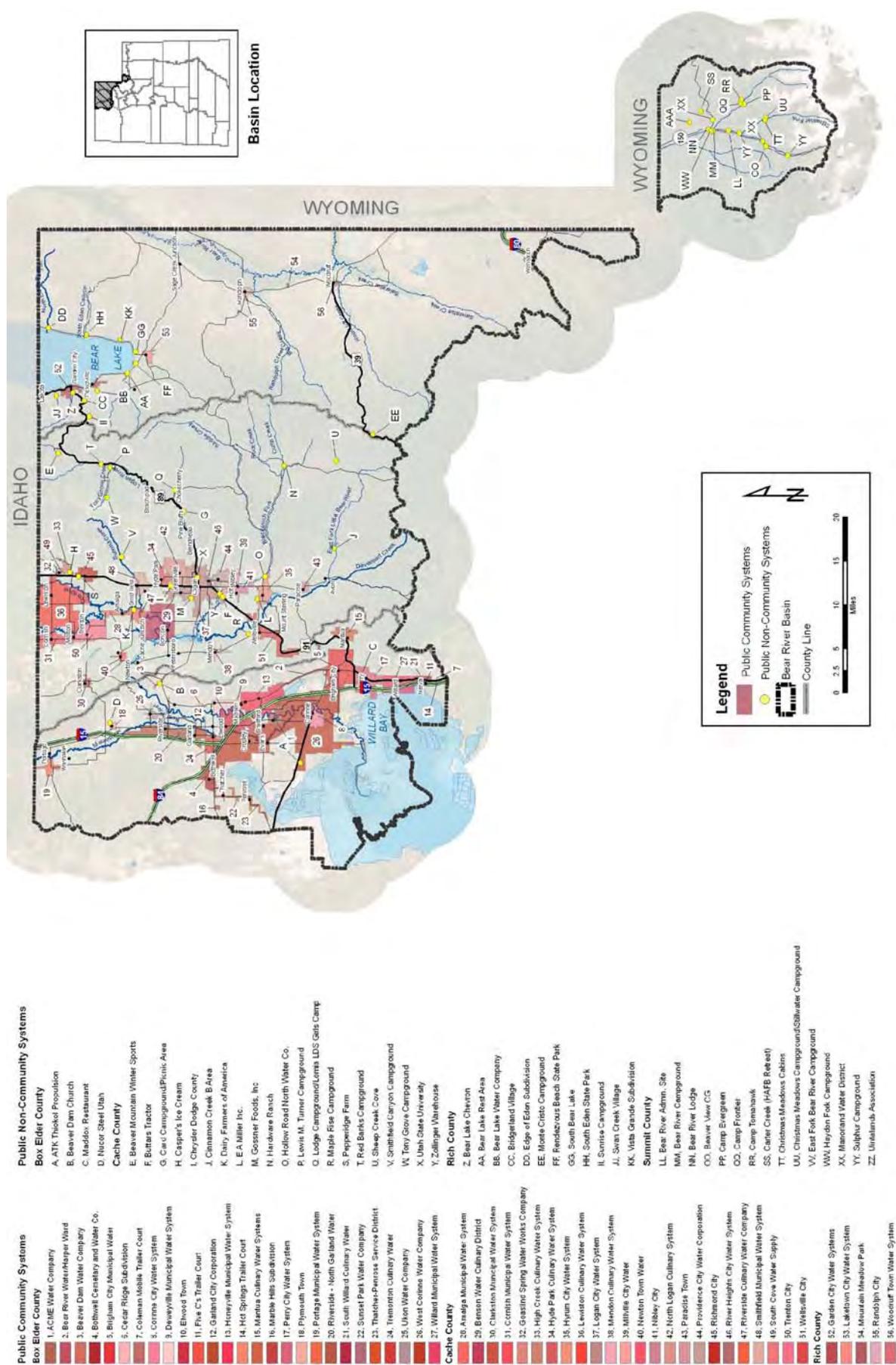


Figure 2-3 Public Water Systems of the Bear River Basin

2.3.2 Public Community Systems - Source of Supply

Potable water for the public community systems in the Bear River Basin is supplied from mostly groundwater aquifers through springs and wells. The reliable systems source capacity for public community systems is 56,596 acre-feet. Only North Logan currently uses surface water as a potable water source. Economic constraints of treating surface water and the abundance of high quality groundwater are the primary reasons for not utilizing more surface water as a potable water source. **Table 2-6** indicates the breakdown of the reliable annual water supply for all public community water systems in the Bear River Basin, by county and by source.

Table 2-6
Reliable Potable Water Supply for Public Community Systems
 (Acre-Feet/Year)

County	Springs	Wells	Surface	Total
Box Elder	5,901.0	10,544.5	0.0	16,445.5
Cache	10,565.5	26,275.0	1,388.0	38,228.5
Rich	832.0	1,090.5	0.0	1,922.5
Summit	0.0	0.0	0.0	0.0
Basin Totals	17,298.5	37,910.0	1,388.0	56,596.5

2.3.3 Public Community Systems - Water Use

Though residential applications are the main use of water supplied by the public community systems, some of the small systems report a large use of water for dairy and stock watering operations. These operations are classified as industrial water use. Rich County is the home of small rural communities that have a large increase in summer population due to tourists. Furthermore, some towns in the Bear Lake area have extremely cold winter months, at times leading to the practice of continuously running water through the system to eliminate pipe-freezing problems. These two challenges result in inflated residential water use numbers among some of the public community water systems in Rich County.

Though potable water is used for indoor and outdoor applications, some communities have secondary water systems, for outdoor irrigation, within the municipal boundaries. Many of these systems are open ditch systems that are serviced by independent irrigation companies. In calculating usage of these irrigation systems, it was assumed that flood irrigation was used for lawn and garden irrigation only to supplement typical lawn watering.

For comparative purposes, **Table 2-7** shows the total and the per-capita water use rates for public communities within the Bear River Basin. The non-potable water use is secondary irrigation water supplied within the public community water system boundaries. The industrial use category indicates industrial water supplied only by the public community systems.

Table 2-7
Total and Per-capita Water Use of Public Community Water Systems
Within the Bear River Basin
 (Acre-Feet/Year, unless noted)

	Box Elder County	Cache County	Rich County	Summit County	Total	GPCD
Potable Use						
Residential Indoor	3,203.6	7,679.4	248.7	0.0	11,131.7	70.5
Residential Outdoor	5,316.8	6,963.6	1,194.1	0.0	13,474.5	85.3
Commercial	1,200.6	3,867.3	308.4	0.0	5,376.3	34.0
Institutional	713.4	1,460.3	44.3	0.0	2,218.0	14.0
Industrial/Stockwater	782.6	2,447.3	20.3	0.0	3,250.2	20.6
Total Potable	11,217.0	22,417.9	1,815.8	0.0	35,450.7	224.5
Non-Potable Use						
Residential	924.3	8,624.6	57.8	0.0	9,606.7	60.8
Commercial	187.9	380.2	156.0	0.0	724.1	4.6
Institutional	721.2	1,018.1	18.0	0.0	1,757.3	11.1
Industrial/Stockwater	30.1	356.8	22.0	0.0	408.9	2.6
Total Non-Potable	1,863.5	10,379.7	253.8	0.0	12,497.0	79.1
Total Water Use	13,080.5	32,797.6	2,069.6	0.0	47,947.7	303.7

Note: Figures may not add exactly due to independent rounding.

2.3.4 M&I Water Deliveries and Depletions

Table 2-8 indicates both the deliveries and depletions of all the M&I water use in the basin. This information is often used for overall future water supply planning. See **Section 1.3** for the definitions of the terms that relate to the information shown.

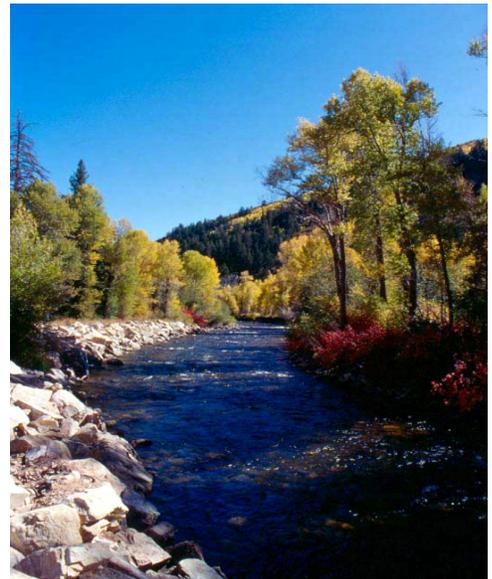
Table 2-8
Bear River Basin M&I Deliveries and Depletions
 (Acre-Feet/Year)

County	Deliveries			Depletions		
	Indoor Use	Outdoor Use	Total	Indoor Use	Outdoor Use	Total
Box Elder	6,856.6	8,819.1	15,675.7	2,598.3	5,879.4	8,477.7
Cache	16,950.0	21,622.6	38,572.6	7,133.6	14,415.1	21,548.6
Rich	725.8	1,911.7	2,637.4	124.4	1,274.4	1,398.9
Summit	62.8	112.2	175.0	4.3	74.8	79.1
Basin Totals	24,595.1	32,465.6	57,060.7	9,860.6	21,643.8	31,504.4

For a more detailed description of water use by individual water users, please refer to *Municipal and Industrial Water Supply and Uses in the Bear River Basin, November 2007*, by the Utah Department of Natural Resources, Division of Water Resources. A copy of the report can be accessed at the Division website: <http://www.water.utah.gov/M&I/default.asp>

2.4 Weber River Basin

The Weber River Basin encompasses about 2400 square miles in northern Utah. Within the basin the Wasatch Mountains run from the southern to northern boundaries, rising in places to over 11,000 feet above sea level. The southern boundary is the Salt Lake and Wasatch County borders, while the northern boundary follows the borders of Weber, Morgan, and Summit counties. The basin extends from the Great Salt Lake at its western edge to the Uinta Mountains in the east, spanning all or part of four counties: Morgan, Summit, Weber, and Davis. See **Figure 2-1** for an illustration of the basin boundaries within Utah.



Weber River above Oakley

The Weber River Basin is continuing to experience rapid growth. Agricultural land is being replaced by new residential areas, causing water to be moved from agricultural to municipal use. Davis County is rapidly urbanizing, particularly in the areas adjacent to the Salt Lake City metropolitan area. Additionally, the Park City area has recently seen population growth rates nearly double the basin and/or state average. The largest population centers are in Davis and Weber Counties, including the cities of Layton, Bountiful, Clearfield, Ogden, and Roy.

2.4.1 Basin Municipal and Industrial Water Use

The total annual combined water use in the basin is 206,389 acre-feet, of which 98,508 acre-feet is potable water, with the remainder being non-potable water at 107,881 acre-feet. With urbanization, secondary (non-potable) water is now being utilized for irrigation of parks, golf courses, and residential landscaping instead of pasture and farmland. The Weber River Basin has the largest use of secondary water for residential outdoor irrigation in the state. Additionally, there are also self-supplied industries that utilize secondary water.

The Weber River Basin currently has 75 public community water systems. These systems serve approximately 526,950 people (about 98 percent of total population within the basin). See **Figure 2-4** for location of the public community water systems within the basin. The basin also has over 60 public non-community systems serving self-supplied industries, ski resorts, forest service campgrounds and picnic areas, as well as summer home subdivisions. **Table 2-9** summarizes the overall water use in the basin.

Table 2-9
Water Use of the Weber River Basin
 (Acre-Feet/Year)

Water System Category	Water Use		Total
	Potable	Non-Potable	
Public Community	92,262	101,121	193,383
Public Non-Community	2,079	1,203	3,282
Self-Supplied Industries	3,238	5,556	8,794
Private Domestic	930	0	930
Basin Totals	98,508	107,881	206,389

Note: Figures may not add to totals due to independent rounding.

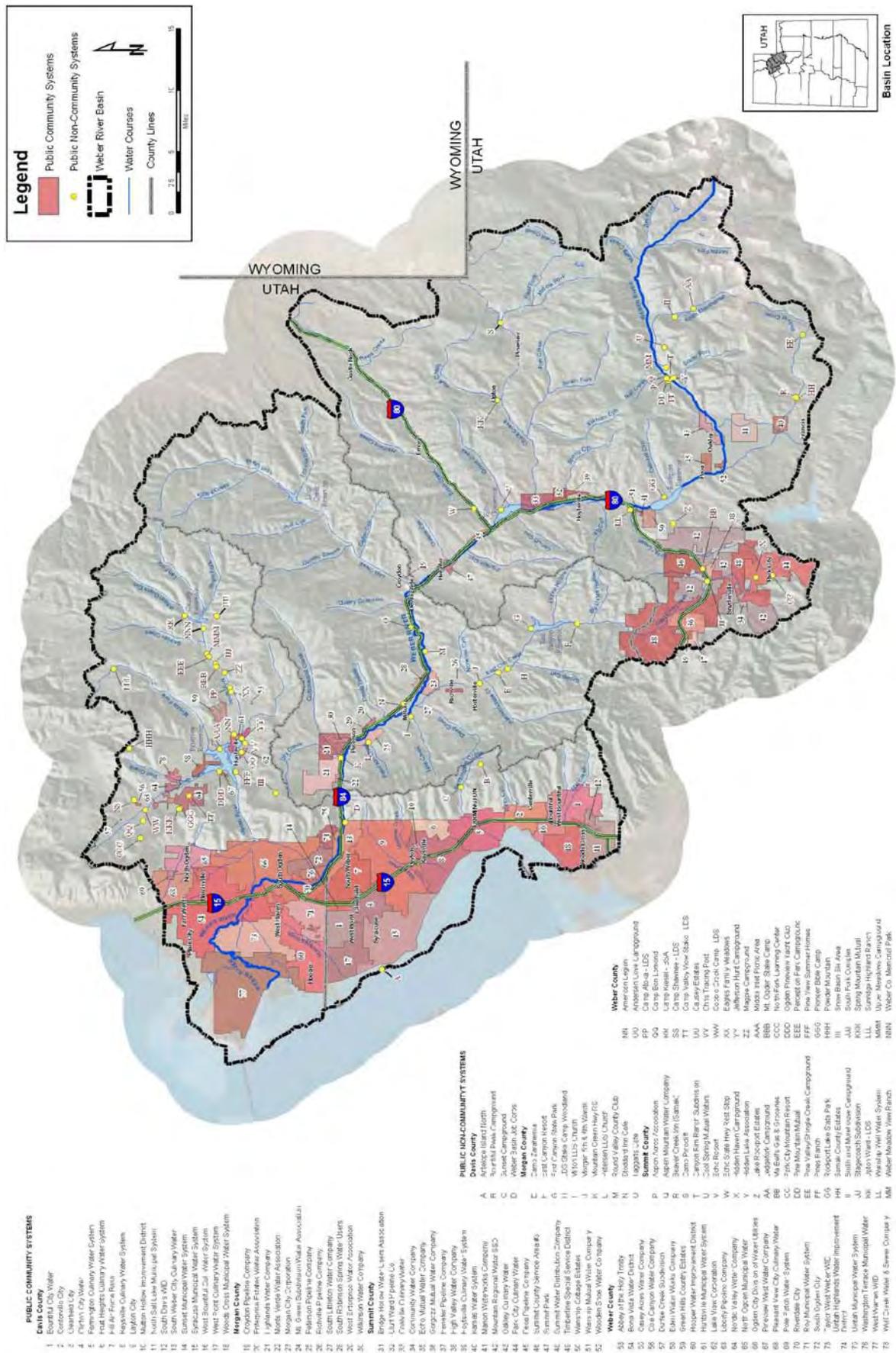


Figure 2-4 Public Water Systems of the Weber River Basin

2.4.2 Public Community Systems - Source of Supply

Potable water for public community water systems in the Weber River Basin is mostly supplied from groundwater supplies through natural springs or pumped wells, with an additional 10% supplied through surface water storage facilities (reservoirs). **Table 2-10** illustrates the reliable annual water supply for all public community systems in the Weber River Basin by county and source.

Table 2-10
Reliable Potable Water Supply for Public Community Systems¹
(Acre-Foot/Year)

County	Springs	Wells	Surface	Total
Davis	230.0	37,771.9	1,120.0	39,121.9
Morgan	705.9	583.6	0.0	1,289.5
Summit	4,105.8	10,283.2	2,690.3	17,079.3
Weber	5,018.9	28,011.4	8,085.5	41,115.8
Basin Totals	10,060.6	76,650.1	11,895.8	98,606.5

¹In addition, Weber Basin Water Conservancy District has a combined potable and non-potable M&I reliable supply of 133,875 acre-feet/year. See the M&I report referenced at the end of this section for more information on the District and its supply.

2.4.3 Public Community Systems - Water Use

Residential water use accounts for the major use of water within the public community water systems of the Weber River Basin. The majority of water used within these public community systems is non-potable water for outdoor irrigation and supplied by Weber Basin Water Conservancy District (WBWCD) and other entities. More expensive potable water is reserved for indoor use.

Table 2-11 shows the categorical total water use and per-capita water use rates for public community systems within the basin. The non-potable water use indicated is that which secondary irrigation systems supply within the public community water system boundaries. The industrial use category indicates industrial water supplied only by public community systems.

Table 2-11
Total and Per-capita Water Use of Public Community Water Systems
Within the Weber River Basin
(Acre-Feet/Year, unless noted)

	Davis County	Morgan County	Summit County	Weber County	Total	GPCD
Potable Use						
Residential Indoor	20,382.8	505.3	3,224.2	16,976.4	41,088.7	69.6
Residential Outdoor	9,160.3	476.8	4,687.0	13,493.2	27,817.3	47.1
Commercial	5,588.8	83.8	2,180.4	2,342.5	10,195.5	17.3
Institutional	4,709.7	212.4	499.9	4,878.6	10,300.6	17.5
Industrial/Stockwater	1,478.7	23.3	93.9	1,264.0	2,859.9	4.8
Total Potable	41,320.3	1,301.6	10,685.4	38,954.7	92,262.0	156.3
Non-Potable Use						
Residential	51,118.0	320.0	801.4	30,365.0	82,604.4	139.9
Commercial	3,497.0	150.0	1,240.0	2,620.0	7,507.0	12.7
Institutional	6,510.0	60.0	190.0	3,095.0	9,855.0	16.7
Industrial/Stockwater	0.0	0.0	5.0	1,150.0	1,155.0	2.0
Total Non-Potable	61,125.0	530.0	2,236.4	37,230.0	101,121.4	171.3
Total Water Use	102,445.3	1,831.6	12,921.8	76,184.7	193,383.4	327.6

Note: Figures may not add exactly due to independent rounding.

2.4.4 M&I Water Deliveries and Depletions

Table 2-12 indicates both the deliveries and depletions of all the M&I water use in the basin. This information is often used for overall future water planning. See **Section 1.3** for the definitions of the terms associated with the information shown.

Table 2-12
Weber River Basin M&I Deliveries and Depletions
 (Acre-Foot/Year)

County	Deliveries			Depletions		
	Indoor Use	Outdoor Use	Total	Indoor Use	Outdoor Use	Total
Davis	31,157.7	75,788.5	106,946.2	6,068.2	50,525.6	56,593.8
Morgan	1,061.2	1,865.1	2,926.3	341.4	1,243.4	1,584.8
Summit	5,231.7	8,050.7	13,282.4	374.7	5,367.1	5,741.8
Weber	27,622.2	55,611.8	83,234.0	8,419.7	37,074.5	45,494.2
Basin Totals	65,072.8	141,316.1	206,388.9	15,204.0	94,210.6	109,414.6

For a more detailed description of water use by individual water users, please refer to *Municipal and Industrial Water Supply and Uses in the Weber River Basin*, December 2008, by the Utah Department of Natural Resources, Division of Water Resources. A copy of the report can be accessed at the Division website: <http://www.water.utah.gov/M&I/default.asp>

2.5 Utah Lake Basin

The Utah Lake Basin covers about 3,040 square miles of the north central portion of Utah and makes up the majority of the Utah Lake Drainage Study Area. The area is bounded on all sides by a series of mountain ranges including the Traverse Mountains to the north, the Wasatch Mountains to the east, the Mount Nebo Wilderness Area to the south, and the Oquirrh Mountains to the west. Elevations of the area range from 11,877 feet at Mount Nebo to 4,488 feet at Utah Lake. See **Figure 2-1** for an illustration of the area boundaries in Utah.



Utah Lake near West Mountain

The Utah Lake Basin spans all or part of five counties: Utah, Wasatch, Summit, Juab and Sanpete. The Sanpete County portion of the area contains no significant water users and reflects no water use in this report. The Utah Lake Basin is one of the more densely populated and developed areas in the state, behind only the Jordan River Basin and the Weber River Basin. The largest population centers are the cities of Provo and Orem, in Utah County.

2.5.1 Basin Municipal and Industrial Water Use

Total annual water use in this area is 141,748 acre-feet. The majority of use is potable water (101,551 acre-feet), with the remaining 40,196 acre-feet being non-potable water. Some of this non-potable water is supplied by several irrigation companies and is utilized by residential developments for landscape irrigation. Because the area is experiencing some of the highest population growth rates in the state, total residential water use has been increasing at a substantial rate.

Within the area, there are 55 public community water systems serving about 476,710 people. See **Figure 2-5** for location of the public community water systems within the study area. More than

50 public non-community water systems serve such facilities as Timpanogos Cave National Monument and state parks including: Utah Lake, Jordanelle, Deer Creek, and Wasatch Mountain; campgrounds in the Wasatch, Ashley, and Uintah national forests; isolated commercial establishments; self-supplied industries; and road rest stops. **Table 2-13** summarizes water use in the basin.

Table 2-13
Water Use of the Utah Lake Basin
 (Acre-Feet/Year)

Water System Category	Water Use		Total
	Potable	Non-Potable	
Public Community	94,767	29,418	124,185
Public Non-Community	384	887	1,271
Self-Supplied Industries	690	9,892	10,582
Private Domestic	5,710	0	5,710
Basin Totals	101,551	40,196	141,748

Note: Figures may not add to totals due to independent rounding

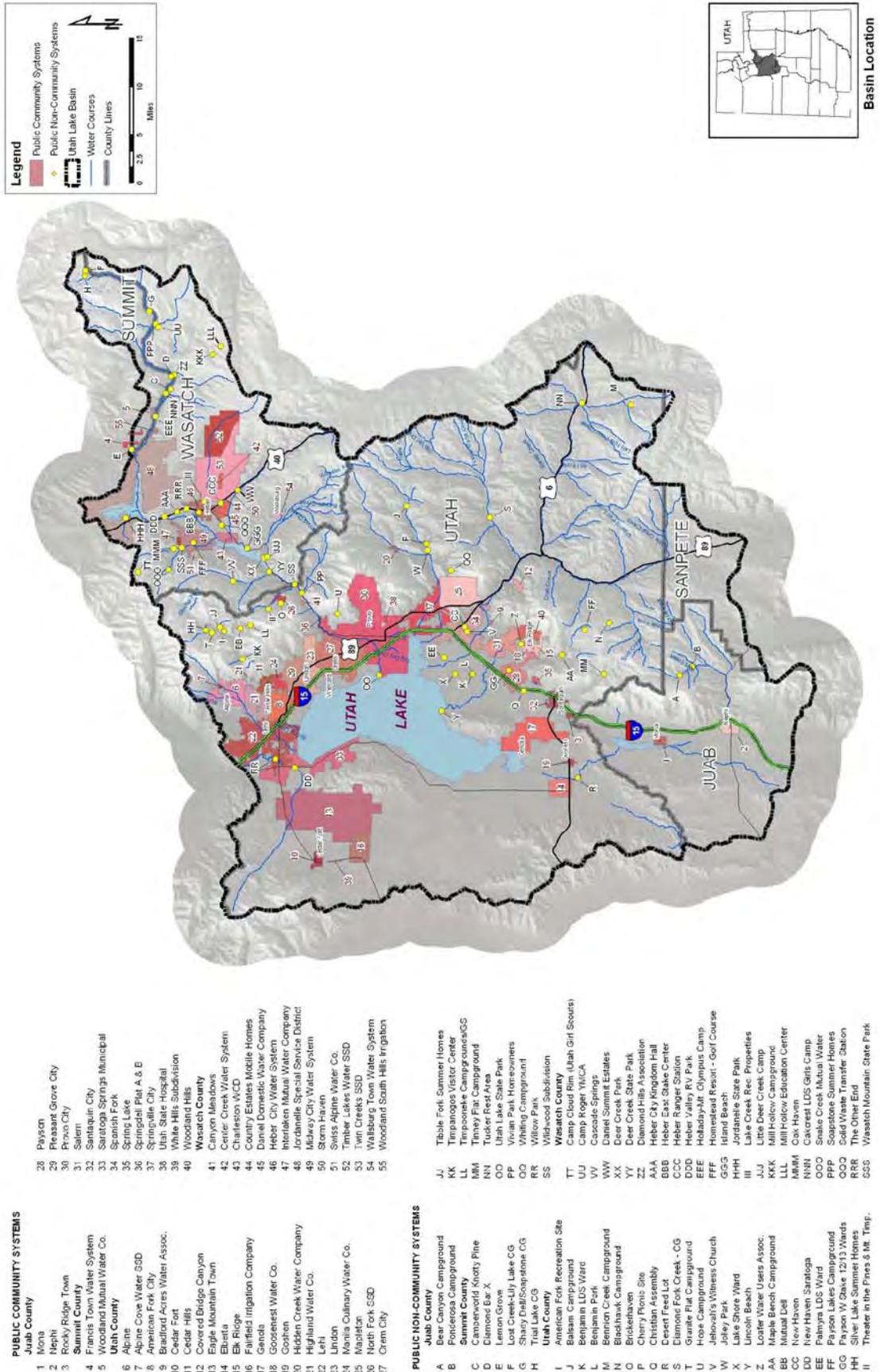


Figure 2-5 Public Water Systems of the Utah Lake Basin

2.5.2 Public Community Systems - Source of Supply

Potable water for public community water systems in the Utah Lake Basin is supplied from both groundwater and treated surface water. Table 2-14 illustrates the reliable annual water supply for all public community systems in the Utah Lake Basin.

Table 2-14
Reliable Potable Water Supply for Public Community Systems
 (Acre-Feet/Year)

County	Springs	Wells	Surface	Total
Juab	1,156.0	1,619.0	0.0	2,775.0
Summit	221.0	180.0	0.0	401.0
Utah	32,204.0	91,010.0	26,350.0	149,564.0
Wasatch	4,171.0	1,821.0	4,500.0	10,492.0
Basin Totals	37,752.0	94,630.0	30,850.0	163,232.0

2.5.3 Public Community Systems - Water Use

Public community systems account for the majority of water used within the area. Potable water is used extensively indoors and outdoors throughout the area with a few systems providing secondary water for outdoor watering. Table 2-15 details the total and per-capita water use for public community water systems within the Utah Lake Basin. Please note that the non-potable water use value is based on water that secondary irrigation systems supply within the public community water systems boundaries. The industrial use category indicates only industrial water that is supplied by the public community systems.

Table 2-15
Total and Per-capita Water Use of Public Community Water Systems
Within the Utah Lake Basin
(Acre-Feet/Year, unless noted)

	Juab County	Summit County	Utah County	Wasatch County	Total	GPCD
Potable Uses						
Residential Indoor	520.3	69.0	31,414.9	1,342.4	33,346.6	62.4
Residential Outdoor	720.5	140.0	27,586.2	1,323.3	29,770.0	55.8
Commercial	10.5	5.4	15,518.2	350.4	15,884.5	29.7
Institutional	118.0	10.6	10,686.4	270.0	11,085.0	20.8
Industrial/Stockwater	350.5	5.0	4,235.2	90.0	4,680.7	8.8
Total Potable	1,719.8	230.0	89,440.9	3,376.1	94,766.8	177.5
Non-Potable Uses						
Residential	450.0	55.0	21,222.9	833.0	22,560.9	42.3
Commercial	0.0	0.0	3,090.0	250.0	3,340.0	6.3
Institutional	50.0	10.0	3,135.0	70.0	3,265.0	6.1
Industrial/Stockwater	0.0	0.0	252.0	0.0	252.0	0.5
Total Non-Potable	500.0	65.0	27,699.9	1,153.0	29,417.9	55.1
Total Water Use	2,219.8	295.0	117,140.8	4,529.1	124,184.7	232.6

Note: Figures may not add exactly due to independent rounding.

The town of Eureka is not located within the study area but maintains wells within the boundaries of the Utah Lake Basin. However, these withdrawals are not reflected in the Utah Lake Basin's tables and figures. Please refer to the Sevier River Basin section for the water use of Eureka.

2.5.4 M&I Water Deliveries and Depletions

Table 2-16 shows both the deliveries and depletions of all the M&I water use in the basin. This information can be useful in overall future water planning. See **Section 1.3** for the definitions of the terms used in association with the information shown.

Table 2-16
Utah Lake Basin M&I Deliveries and Depletions
(Acre-Foot/Year)

County	Deliveries			Depletions		
	Indoor Use	Outdoor Use	Total	Indoor Use	Outdoor Use	Total
Juab	1,175.2	1,451.6	2,626.8	765.4	967.7	1,733.1
Summit	85.0	234.1	319.1	10.5	156.1	166.6
Utah	61,554.4	71,247.7	132,802.1	15,941.6	46,935.2	62,876.8
Wasatch	1,965.7	4,033.8	5,999.5	376.7	2,689.2	3,065.9
Basin Totals	64,780.3	76,967.2	141,747.5	17,094.2	50,748.2	67,842.4

For a more detailed description of water use by individual water users, please refer to *Municipal and Industrial Water Supply and Uses in the Utah Lake Basin*, May 2008, by the Utah Department of Natural Resources, Division of Water Resources. A copy of the report can be accessed at the Division website: <http://www.water.utah.gov/M&I/default.asp>

2.6 Jordan River Basin

The Jordan River Basin covers about 3,800 square miles of the north-central portion of Utah. The boundaries of the basin consist of the Traverse Mountains on the south, the Wasatch Mountains on the east, the Great Salt Lake on the north, and the Oquirrh Mountains on the west. Elevations within the basin range from approximately 4,200 feet at the shores of the Great Salt Lake to



Aerial view of Salt Lake City, looking south

over 11,000 feet above sea level at the top of Twin Peaks in the nearby Wasatch Mountain Range. See **Figure 2-1** for an illustration of the basin boundaries within Utah.

The area entirely encompasses Salt Lake County, the most populated county of the state. The area encompasses not only the capital city of Salt Lake City, but also two of the larger cities in the state, Sandy City and West Valley City. With several other incorporated cities, as well as a large population in unincorporated areas, there is a large amount and variety of water use.

2.6.1 Basin Municipal and Industrial Water Use

With total water use of 333,719 acre-feet per year, this basin has the highest total M&I water use in Utah. Potable water use is 213,061 acre-feet/year, the vast majority of water type used. Non-potable water use within this area is 120,658 acre-feet, the most of which is used by large self-supplied industries such as Kennecott Utah Copper and Utah Power.

Over the last two to three decades, agricultural water use has steadily declined as urban water use has increased at an even greater rate. This has required a more rigorous accounting of general water use and the management of all water resources. However, due to the many complex

agreements, exchanges, and management plans of the area, discussion of water rights and their uses are beyond the scope of this report.

The Jordan River Basin currently has 32 public community water systems serving approximately 967,150 people. Additionally, 41 public non-community water systems serve various facilities, including Salt Lake County parks, forest service campgrounds and picnic areas, Solitude Ski Resort, numerous small businesses and summer home subdivisions located in various canyons surrounding the Salt Lake Valley. **Table 2-17** is a summary of the water use in the Jordan River Basin. See **Figure 2-6** for locations of the public water systems within the basin.

Table 2-17
Water Use of the Jordan River Basin
 (Acre-Feet/Year)

Water System Category	Water Use		Total
	Potable	Non-Potable	
Public Community	205,954	18,066	224,020
Public Non-Community	384	1,451	1,835
Self-Supplied Industries	6,123	101,142	107,265
Private Domestic	600	0	600
Basin Totals	213,061	120,658	333,719

Note: Figures may not add to totals due to independent rounding.

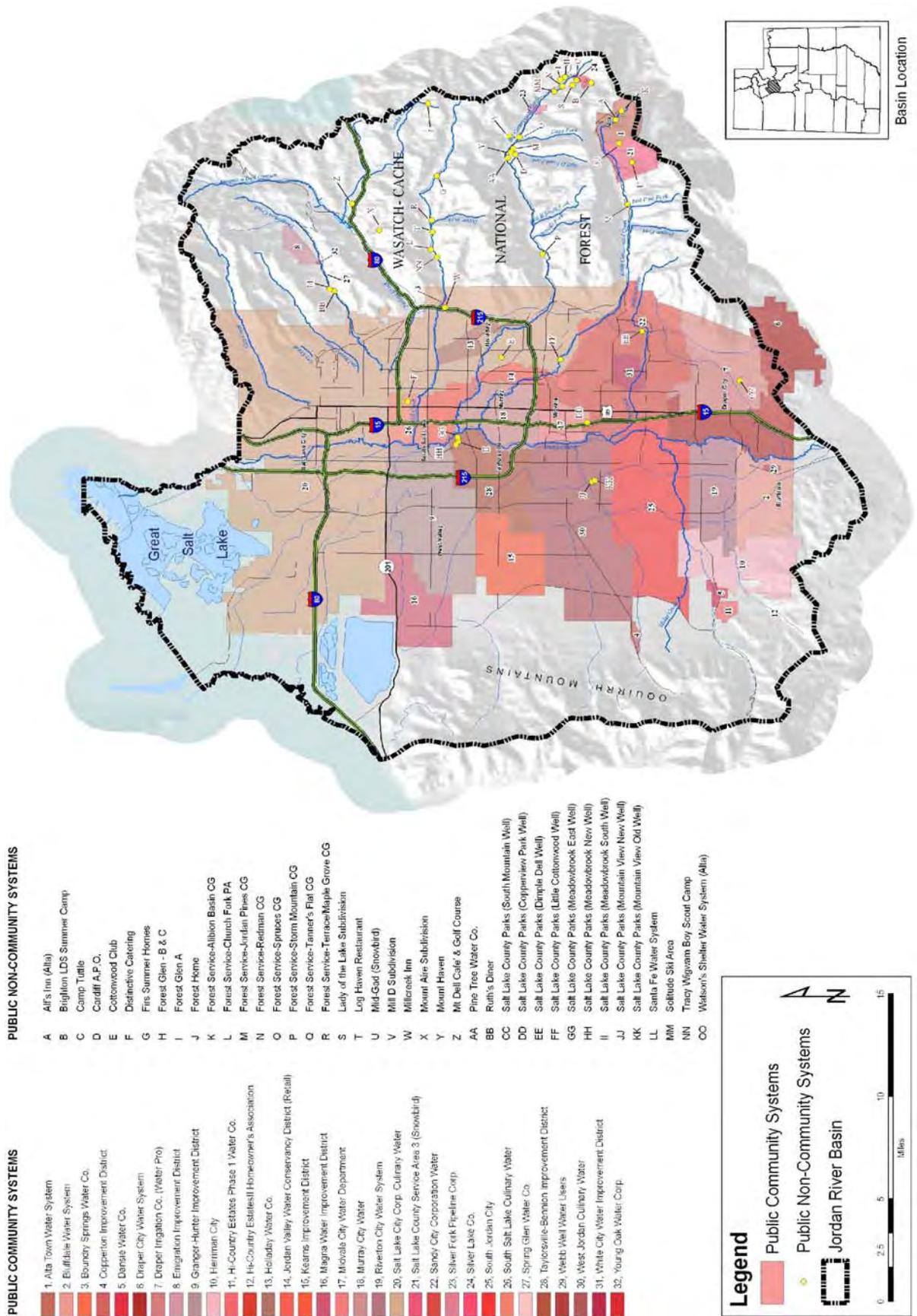


Figure 2-6 Public Water Systems of the Jordan River Basin

2.6.2 Public Community Systems - Source of Supply

Over half of the potable water in the Jordan River Basin is supplied by surface water runoff, which is treated at several water treatment plants within the area prior to distribution and use. A large source of water also comes from wells and springs. However, specific to this basin, the State Engineer has limited total groundwater withdrawals to 165,000 acre-feet.

A large percentage of the surface water used within the Jordan River Basin is supplied from the Utah Lake Basin through extensive pipelines and canal systems. The major sources of this imported water include the Welby-Jacob Exchange (29,400 ac-ft.), the Central Utah Project (70,000-84,000 ac-ft.), as well as Deer Creek and Jordanelle reservoirs (61,700 ac-ft.). **Table 2-18** gives the breakdown of the total reliable potable annual water supply for the basin.

Table 2-18
Reliable Potable Water Supply for Public Community Systems
(Acre-Foot/Year)

County	Springs	Wells	Surface	Total
Salt Lake	6,069.0	123,119.0	159,465.0	288,653.0
Basin Totals	6,069.0	123,119.0	159,465.0	288,653.0

2.6.3 Public Community Systems -Water Use

Public community water systems account for the majority of the water use within the area, with potable water as the major type of water used. **Table 2-19** shows details of the total and per-capita water use for public communities within the area. The non-potable water use is that which secondary systems supply within the public community water system boundaries. The industrial water use is industrial water supplied only by the public community water systems.

Table 2-19
Total and Per-capita Water Use of Public Community Water Systems
Within the Jordan River Basin
(Acre-Feet/Year, unless noted)

	Salt Lake County	Total	GPCD
Potable Uses			
Residential Indoor	66,898.8	66,898.8	61.8
Residential Outdoor	76,495.0	76,495.0	70.6
Commercial	33,543.0	33,543.0	31.0
Institutional	19,609.8	19,609.8	18.1
Industrial/Stockwater	9,407.3	9,407.3	8.7
Total Potable	205,953.9	205,953.9	190.1
Non-Potable Uses			
Residential	12,177.7	12,177.7	11.2
Commercial	2,020.0	2,020.0	1.9
Institutional	3,867.9	3,867.9	3.6
Industrial/Stockwater	0.0	0.0	0.0
Total Non-Potable	18,065.6	18,065.6	16.7
Total Water Use	224,019.5	224,019.5	206.8

Note: Figures may not add exactly due to independent rounding.

2.6.4 M&I Water Deliveries and Depletions

Table 2-20 shows both the deliveries and depletions of all the M&I water use in the basin. The information contained can be valuable for overall future water planning. See **Section 1.3** for definitions of the terms used in association with the information of the table.

Table 2-20
Jordan River Basin M&I Deliveries and Depletions
(Acre-Feet/Year)

County	Diversions			Depletions		
	Indoor Use	Outdoor Use	Total	Indoor Use	Outdoor Use	Total
Salt Lake	214,751.0	118,968.2	333,719.2	120,556.1	79,312.1	199,868.2
Basin Totals	214,751.0	118,968.2	333,719.2	120,556.1	79,312.1	199,868.2

For more detailed information on M&I water supplies and uses, refer to the *Municipal and Industrial Water Supply and Uses in the Jordan River Basin, March 2009*, by the Department of Natural Resources, Division of Water Resources. A copy of the report can be accessed at the Division website: <http://www.water.utah.gov/M&I/default.asp>

2.7 Sevier River Basin

The Sevier River Basin covers approximately 10,522 square miles (about 12.5 percent of Utah) in the central-south portion of Utah. The shape of the basin generally resembles a large upside-down horseshoe and consists of high plateaus, narrow valleys, and expansive deserts. Mountain ranges of the basin generally trend from southwest to northeast. Valleys in



Territorial State House in Fillmore, Millard County

the basin are generally long and narrow, except where the Sevier River flows into Sevier Lake. Drainage in the basin is primarily to the north and west. Because the basin offers no outward drainage, precipitation received remains in the basin. See **Figure 2-1** for an illustration of the basin boundaries.

The Sevier River Basin covers all or part of eight counties: Garfield, Iron, Juab, Kane, Millard, Piute, Sanpete, and Sevier. Furthermore, the basin encroaches into the Delta, East Fork Sevier, Fillmore, Gunnison, San Pitch, Sevier, Sevier Lake, and Upper Sevier subareas. The largest population centers are in Millard and Sevier Counties, including the cities of Delta and Richfield.

2.7.1 Basin Municipal and Industrial Water Use

The 48,340 acre-feet of water used in this basin is closely split between potable and non-potable water applications. The greater amount of total water is used by several industries in Millard County, including Brush-Wellman Incorporated, Intermountain Power Project, and Delta Valley Farms. These industries utilize almost 50 percent of all water used within the basin. Most of this water is secondary water. Stock watering is another significant use of non-potable water in the area.

The 55 community water systems in the basin serve 56,250 people (about 88 percent of the 63,550 total basin population). See **Figure 2-7** for locations of the public water systems in the basin. Non-community use, including the above-mentioned industries, accounts for almost one-third of the potable water use. Sixty-seven public non-community water systems are located within the basin. These systems serve Bryce Canyon National Park, Yuba and Palisade State parks, campgrounds in the Fishlake and Manti-Lasal National Forests and other areas, roadside rest areas, and isolated commercial establishments. Other than potable water for industrial and commercial purposes, most of the potable water is utilized for residential applications. **Table 2-21** summarizes the water use in the Sevier River Basin.

Table 2-21
Water Use of the Sevier River Basin
 (Acre-Feet/Year)

Water System Category	Water Use		Total
	Potable	Non-Potable	
Public Community	14,963	6,684	21,646
Public Non-Community	455	570	1,025
Self-Supplied Industries	3,737	19,993	23,730
Private Domestic	1,939	0	1,939
Basin Totals	21,094	27,246	48,340

Note: Figures may not add to totals due to independent rounding.

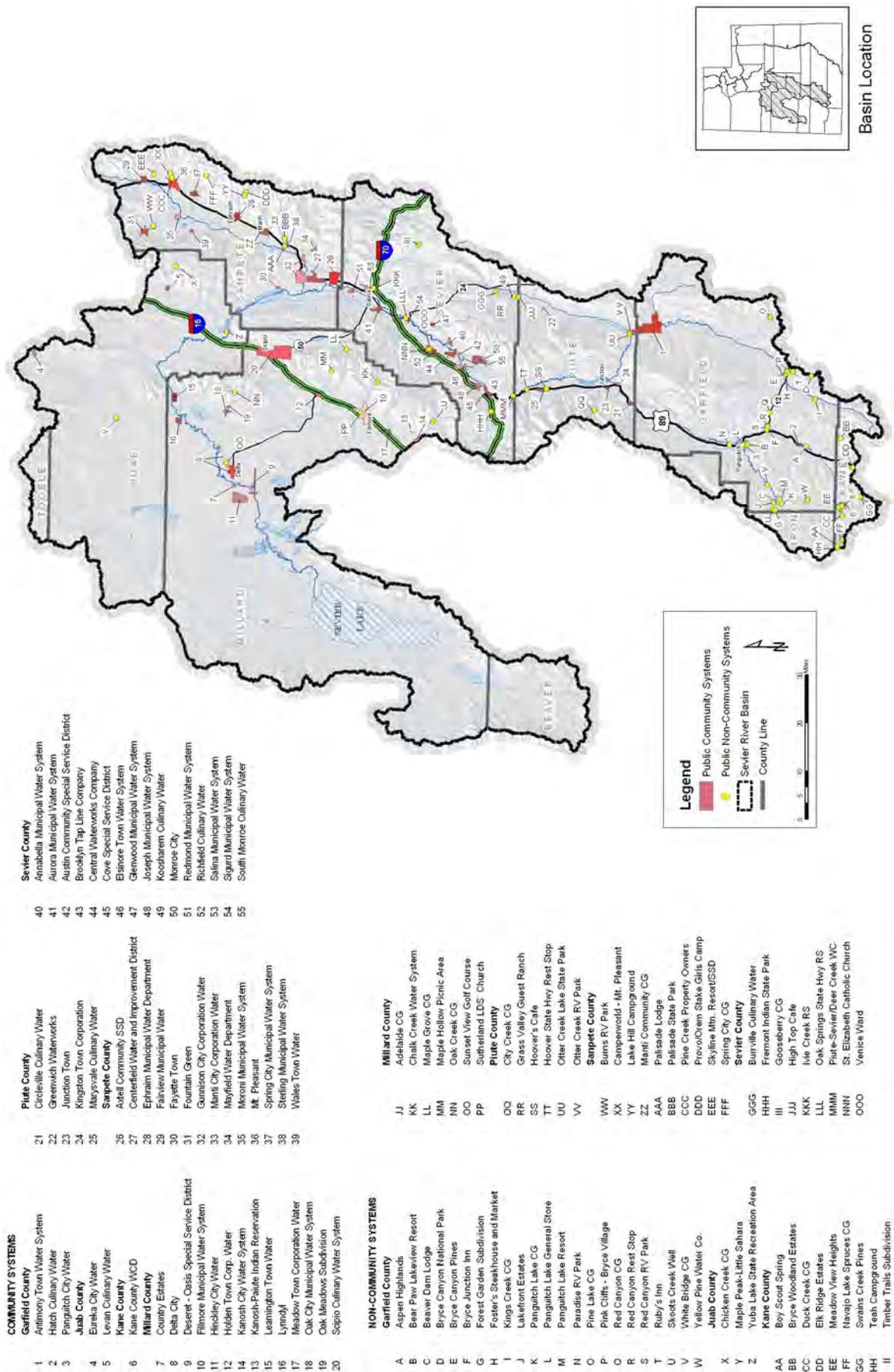


Figure 2-7 Public Water Systems of the Sevier River Basin

2.7.2 Public Community Systems - Source of Supply

Potable water in the Sevier River Basin is supplied from groundwater aquifers either naturally through springs, or mechanically with the use of wells. No surface water is currently used as a potable water source. Economical constraints of treating surface water and the abundance of high quality groundwater supply are the primary reasons for not utilizing surface water as a potable water source. **Table 2-22** shows the reliable annual water supply for public community systems in the Sevier River Basin.

Table 2-22
Reliable Potable Water Supply for Public Community Systems
 (Acre-Feet/Year)

County	Springs	Wells	Surface	Total
Garfield	492.0	346.4	0.0	838.4
Juab	362.9	448.7	0.0	811.6
Kane	0.0	150.0	0.0	150.0
Millard	1,773.0	7,552.2	0.0	9,325.2
Piute	540.3	581.2	0.0	1,121.5
Sanpete	3,266.0	6,218.8	0.0	9,484.8
Sevier	4,010.6	4,901.3	0.0	8,911.9
Basin Totals	10,444.8	20,198.5	0.0	30,643.3

2.7.3 Public Community Systems -Water Use

Though the public community water systems serve the population majority, the largest water users are the several industries previously mentioned. A significant amount of potable and non-potable water is supplied to these industries by public community water systems. **Table 2-23** indicates the total and per-capita water use rates for public community water systems within the Sevier River Basin. The non-potable water use indicated is that which secondary irrigation systems supply within the public community water system boundaries. The industrial use category indicates industrial water supplied only by the public community water systems. Values of **Table 2-23** do not include the large volumes of water used by self-supplied industries within the Sevier River Basin.

Table 2-23
Total and Per-capita Water Use of Public Community Water Systems
Within the Sevier River Basin
(Acre-Feet/Year, unless noted)

	Garfield County	Juab County	Kane County	Millard County	Piute County	Sanpete County	Sevier County	Total	GPCD
Potable Use									
Residential Indoor	190.4	123.4	35.0	814.3	98.1	1,925.9	1,448.2	4,635.3	73.6
Residential Outdoor	80.2	294.7	2.5	1,625.7	212.1	1,087.9	1,929.3	5,232.4	83.0
Commercial	65.5	2.3	12.0	364.9	52.8	393.8	695.8	1,587.1	25.2
Institutional	51.0	64.6	0.0	984.2	79.6	582.4	612.9	2,374.7	37.7
Industrial	0.5	15.4	0.0	298.4	181.4	336.4	300.9	1,133.0	18.0
Total Potable	387.6	500.4	49.5	4,087.5	624.0	4,326.4	4,987.1	14,962.5	237.5
Secondary Use									
Residential	197.7	0.0	0.0	1,012.7	68.0	2,525.6	1,457.2	5,261.2	83.5
Commercial	1.1	0.0	0.0	0.0	0.0	0.0	0.0	1.1	0.0
Institutional	16.8	0.0	0.0	63.6	56.3	915.0	369.2	1,420.9	22.6
Industrial	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0
Total Non-Potable	215.9	0.0	0.0	1,076.3	124.3	3,440.6	1,826.4	6,683.5	106.1
Total Water Use	603.5	500.4	49.5	5,163.8	748.3	7,767.0	6,813.5	21,646.0	343.5

Note: Figures may not add exactly due to independent rounding.

2.7.4 M&I Water Deliveries and Depletions

Table 2-24 indicates both the deliveries and depletions of all the M&I water use in the basin. This information can be useful for future overall water planning for the entire area. For definitions of the terms associated with this information, please see **Section 1.3** of this report.

Table 2-24
Sevier River Basin M&I Deliveries and Depletions
(Acre-Foot/Year)

County	Deliveries			Depletions		
	Indoor Use	Outdoor Use	Total	Indoor Use	Outdoor Use	Total
Garfield	456.1	519.8	975.9	47.0	346.5	393.5
Iron	2.0	0.0	2.0	0.1	0.0	0.1
Juab	162.3	783.4	945.7	36.1	659.5	695.6
Kane	52.6	27.1	79.7	3.7	18.0	21.7
Millard	5,027.1	23,836.5	28,863.6	3,862.2	22,389.1	26,251.3
Piute	376.1	486.5	862.6	194.8	324.4	519.2
Sanpete	3,511.9	5,911.4	9,423.3	1,530.9	3,940.9	5,471.8
Sevier	2,609.6	4,577.5	7,187.1	946.5	3,051.6	3,998.1
Basin Totals	12,197.7	36,142.2	48,339.9	6,621.3	30,730.0	37,351.3

For a more detailed description of water use by individual water users, please refer to *Municipal and Industrial Water Supply and Uses in the Sevier River Basin*, December 2008, by the Utah Department of Natural Resources, Division of Water Resources. A copy of the report can be accessed at the Division website: <http://www.water.utah.gov/M&I/default.asp>

2.8 Cedar/Beaver Basin

The Cedar/Beaver Basin covers approximately 5,560 square miles. With the exception of 38,500 acres in Nevada, whose water use (if any) is not included, the basin is located in southwestern Utah, bounded on the east by the Tushar Mountains and the Markagunt Plateau. The northern perimeter of the basin is defined by Black Rock Cap and the northern side of Clear Lake.



View of I-15 in Cedar City, Iron County

The physical boundaries of the basin on the west are a series of mountain ranges including the Cricket Mountains, the San Francisco Mountains, the Wah Wah Mountains, and the Indian Peak Mountains in Nevada. The basin is contained on the south by the Bull Valley Mountains and the Harmont Mountains. See **Figure 2-1** for an illustration of the basin boundaries.

The basin spans all or part of five counties including Millard, Beaver, Iron, Washington, and a small portion of Garfield County. The largest population centers are in Beaver and Iron Counties, including the cities of Beaver and Cedar City.

2.8.1 Basin Municipal and Industrial Water Use

Of the total of 22,552 acre-feet of water used in this basin, the potable use of 14,233 acre-feet/year is almost double the non-potable water use of 8,320 acre-feet/year. Throughout the basin, secondary water systems provide non-potable water for outside irrigation. Additionally, industries providing their own water, such as Intermountain Geothermal and Mother Earth Industries, also utilize large volumes of non-potable water.

The basin currently has 29 public community water systems serving 43,350 people. **Figure 2-8** illustrates the location of the public water systems within the basin. Thirty-two non-community water systems provide nearly 40 percent of the water used in this basin. In addition to serving many small subdivisions, these systems also provide the water used in campgrounds in the Fishlake and Dixie National forests and elsewhere, recreation areas such as the Cedar Breaks National Monument, as well as roadside rest areas. **Table 2-25** summarizes total water use in the Cedar/Beaver Basin.

Table 2-25
Water Use of the Cedar/Beaver Basin
 (Acre-Feet/Year)

Water System Category	Water Use		Total
	Potable	Non-Potable	
Public Community	10,705	2,890	13,595
Public Non-Community	172	6	179
Self-Supplied Industries	2,657	5,423	8,080
Private Domestic	699	0	699
Basin Totals	14,233	8,320	22,552

Note: Figures may not add exactly due to independent rounding

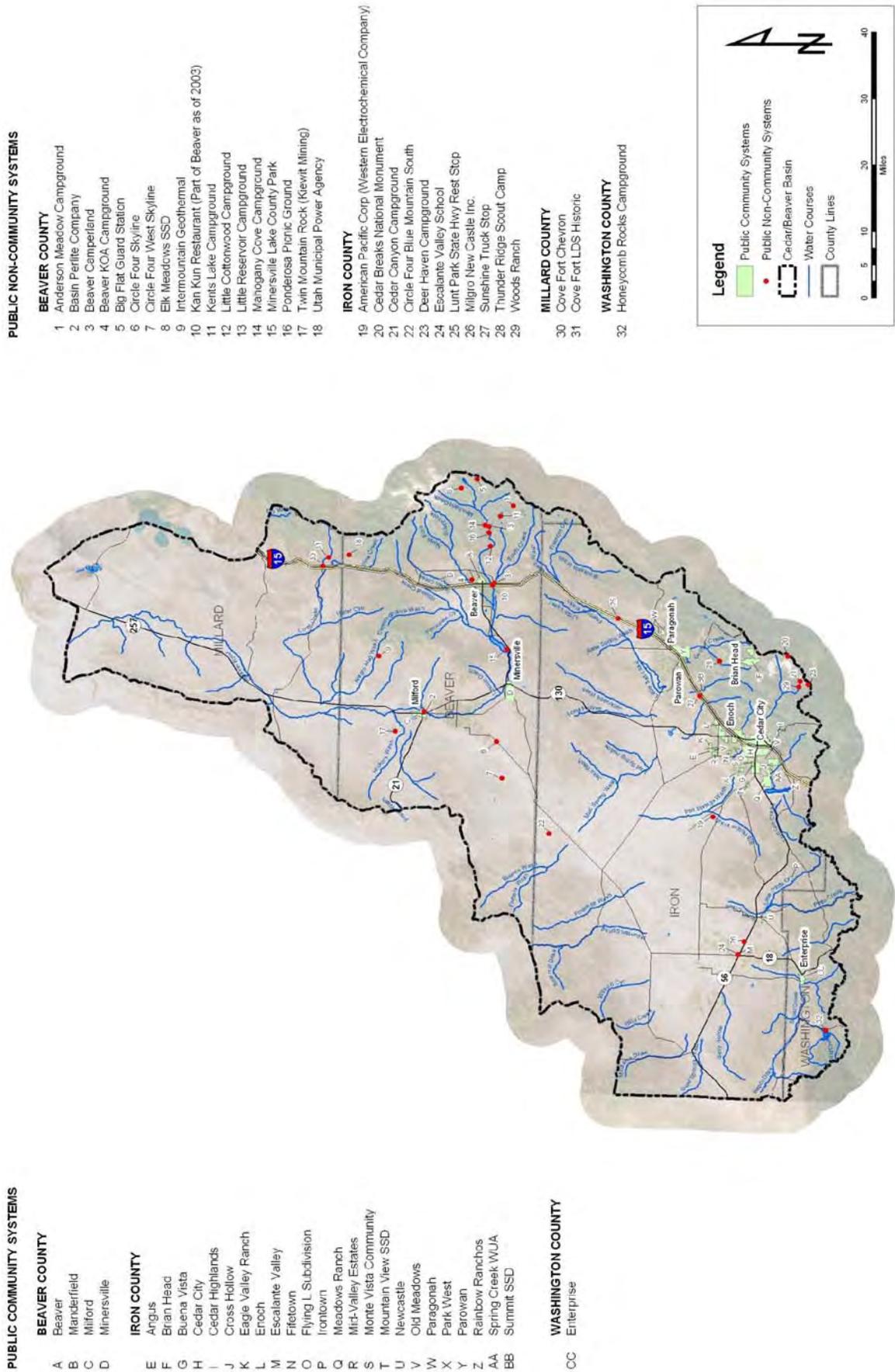


Figure 2-8 Public Water Systems of the Cedar/Beaver Basin

2.8.2 Public Community Systems – Source of Supply

In the Cedar/Beaver Basin, potable water is supplied from groundwater aquifers either naturally through springs, or mechanically with the use of wells. No surface water is currently used as a potable water source. Economical constraints of treating surface water and higher quality groundwater are the primary reasons for not utilizing surface water sources. **Table 2-26** illustrates the reliable annual water supply for public community water systems in the Cedar/Beaver Basin.

Table 2-26
Reliable Potable Water Supply for Public Community Systems
(Acre-Feet/Year)

County	Springs	Wells	Surface	Total
Beaver	1,369.2	2,423.0	0.0	3,792.2
Iron	4,739.7	8,575.2	0.0	13,314.9
Millard	0.0	0.0	0.0	0.0
Washington	277.4	354.1	0.0	631.5
Basin Totals	6,386.3	11,352.3	0.0	17,738.6

2.8.3 Public Community Systems - Water Use

Public community water systems account for the majority of the water use, both potable and non-potable, in the basin. **Table 2-27** indicates the total and per-capita use for public communities within the basin. The use values are divided into the categories of residential, commercial, institutional, and industrial. The non-potable water use value is the water that secondary irrigation systems supply only within communities. Similarly, the industrial use category indicates industrial water supplied only by the public community systems.

Table 2-27
Total and Per-capita Water Use of Public Community Water Systems
Within the Cedar/Beaver Basin
(Acre-Feet/Year, unless noted)

	Beaver County	Iron County	Millard County	Washington County	Total	GPCD
Potable Use						
Residential Indoor	418.3	3,006.8	0.0	123.4	3,548.5	73.1
Residential Outdoor	323.6	3,200.7	0.0	348.5	3,872.8	79.8
Commercial	147.5	1,425.0	0.0	31.3	1,603.8	33.0
Institutional	187.7	788.6	0.0	146.5	1,122.8	23.1
Industrial/Stockwater	132.1	424.2	0.0	0.5	556.8	11.5
Total Potable	1,209.2	8,845.3	0.0	650.2	10,704.7	220.5
Non-Potable Use						
Residential	786.4	1,084.3	0.0	0.0	1,870.7	38.5
Commercial	0.0	0.0	0.0	0.0	0.0	0.0
Institutional	593.9	425.8	0.0	0.0	1,019.7	21.0
Industrial/Stockwater	0.0	0.0	0.0	0.0	0.0	0.0
Total Non-Potable	1,380.3	1,510.1	0.0	0.0	2,890.4	59.5
Total Water Use	2,589.5	10,355.4	0.0	650.2	13,595.1	280.0

Note: Figures may not add exactly due to independent rounding.

2.8.4 M&I Water Deliveries and Depletions

Table 2-28 shows the deliveries and depletions of all the M&I water use in the basin. The information contained in the table can be useful for future water planning of the area. For definitions of the associated terms, see **Section 1.3** of this report.

Table 2-28
Cedar/Beaver Basin M&I Deliveries and Depletions
(Acre-Feet/Year)

County	Deliveries			Depletions		
	Indoor Use	Outdoor Use	Total	Indoor Use	Outdoor Use	Total
Beaver	6,474.1	2,012.1	8,486.2	6,020.1	1,341.4	7,361.5
Iron	7,312.6	6,038.9	13,351.5	4,247.2	4,025.9	8,273.1
Millard	15.1	46.2	61.3	1.1	30.8	31.9
Washington	179.4	474.0	653.4	65.5	317.0	382.5
Basin Totals	13,981.2	8,571.2	22,552.4	10,333.9	5,715.1	16,049.0

For a more detailed description of water use, refer to *Municipal and Industrial Water Supply and Uses in the Cedar/Beaver Basin*, January 2008, by the Utah Department of Natural Resources, Division of Water Resources. A copy of the report can be accessed at the Division website: <http://www.water.utah.gov/M&I/default.asp>

2.9 Uintah Basin

The Uintah Basin is composed of approximately 10,890 square miles (6,969,600 acres) of land. The Utah/Wyoming and the Utah/Colorado state lines form much of the basin's northern and eastern boundaries respectively. Portions of the Wasatch Mountain Range and the Roan Cliffs comprise the southern and western boundaries. The Uintah Basin contains



Oil Well in the Uintah Basin

a wide variety of valleys and mountains. The basin has a low elevation of 4,040 feet above mean sea level at a point along the Green River and gradually increases through several valleys into the higher mountains and plateaus of the Uinta Mountains. Kings Peak, in the Uinta Mountains stands at 13,528 feet above mean sea level. See **Figure 2-1** for an illustration of the basin boundaries within the state of Utah.

The basin spans all or part of nine counties: Carbon, Daggett, Emery, Duchesne, Grand, Summit, Uintah, Utah and Wasatch. The portions of Carbon, Emery, Grand and Utah counties within the basin contain no public water systems and are not included as part of this report. The largest population centers, in the basin, are located in Uintah and Duchesne Counties, including the cities of Vernal and Duchesne.

2.9.1 Basin Municipal and Industrial Water Use

Of the 26,885 acre-feet of water use in this basin, almost 90 percent of the water is potable water. Potable water is also used extensively by self-supplied industries in Uintah County including American Gilsonite Co.; Chevron USA, Inc.; CNG Producing, Inc.; Deseret Generation and Transport Co-op.; and Flying J, Inc., among others.

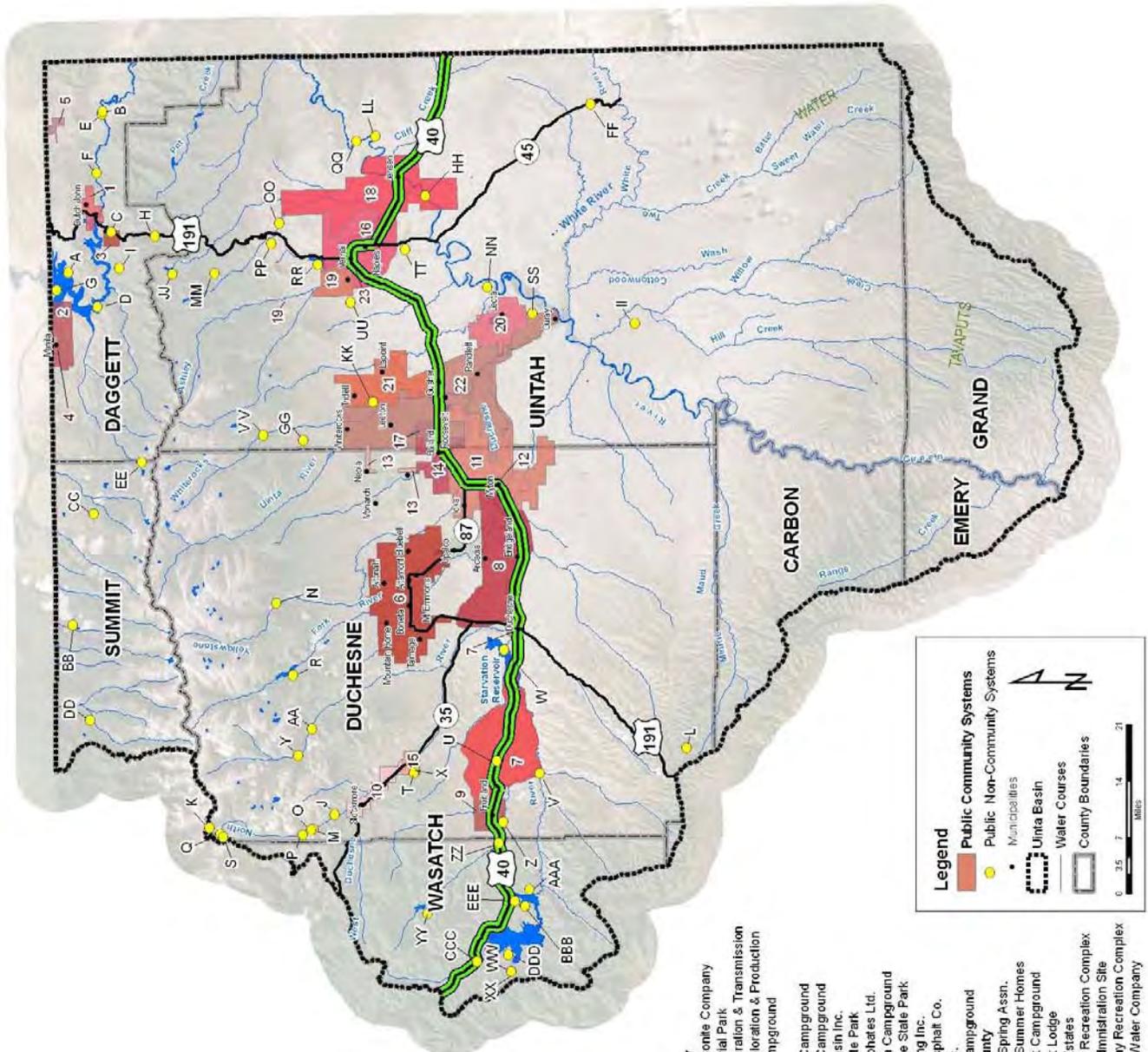
In the basin, there are currently 23 public community water systems, including one unregulated Indian water system. These systems serve 40,690 people (about 96 percent of the 42,330 total population of the basin). **Figure 2-9** indicates the locations of the public water systems.

Fifty-seven public non-community water systems serve other areas including Flaming Gorge National Recreation area, state parks at Steinaker and Starvation reservoirs, campgrounds in the Wasatch, Ashley, and Uintah National forests, isolated commercial recreational areas, and roadside rest areas. **Table 2-29** summarizes total water use in the basin.

Table 2-29
Water Use of the Uintah Basin
 (Acre-Feet/Year)

Water System Category	Water Use		Total
	Potable	Non-Potable	
Public Community	13,100	2,911	16,011
Public Non-Community	107	30	137
Self-Supplied Industries	10,608	0	10,608
Private Domestic	129	0	129
Basin Totals	23,944	2,941	26,885

Note: Figures may not add exactly due to independent rounding.



PUBLIC COMMUNITY SYSTEMS

- Daggett County**
- 1 Dutch John
- 2 Daggett County Water & Sewer
- 3 Greendale Water Company
- 4 Manila Municipal Water System
- 5 Quesar Pipeline Company
- Duchesne County**
- 6 Duchesne County Upper Country
- 7 Duchesne Water System
- 8 East Duchesne Improvement District
- 9 Fruitland Water SSD
- 10 Hanna
- 11 Johnson Water District
- 12 Mayton Municipal Water System
- 13 Neola Water District
- 14 Roosevelt Municipal Water System
- 15 Tabiona Water System
- Uinta County**
- 16 Ashley Valley Water & Sewer
- 17 Ballard WID
- 18 Jensen Water Improvement District
- 19 Maaser Water Improvement District
- 20 Ouray Park Water Improvement District
- 21 Tridell-Lapoint Water Improvement District
- 22 Ute Indian Tribe Water System
- 23 Vernal Municipal Water System

PUBLIC NON-COMMUNITY SYSTEMS

- Daggett County**
- A Antelope Flat Campground
- B Bridge Hollow Campground
- C Greendale & Bootleg Campground
- D Hideout Canyon Campground
- E Jarvie Historical Site
- F Little Hole Boat Ramp & Campground
- G Lucerna Valley Campground & Marina
- H Red Springs Lodgepole Campground
- I Ross Springs Water System
- Duchesne County**
- J Aspen Grove Campground
- K Buttery Campground & Trailhead
- L Camp Timberlane
- M Defas Dude Ranch
- N Grants Springs Water System
- O Hades Campground
- P Iron Mine Campground
- Q Mirror Lake Campground
- R Moon Lake Campground
- S Moosehorn Campground
- T Mount Tabby Springs Subdivision
- U Pinion State Hwy Rest Stop
- V Pinnacle Resort
- W Starvation Reservoir State Park
- X Tabby Mountain Estates
- Y Upper Stillwater Campground
- Z Valle Dei Padres Subdivision
- Summit County**
- AA Yellowpine Campground
- BB Bridger Lake Campground
- CC Hoop Lake Campground
- DD Little Lyman Lake Campground
- EE Spirit Lake Lodge

- Uinta County**
- FF American Gilsolite Company
- GG Bacon Memorial Park
- HH Desert Generation & Transmission
- II Dominion Exploration & Production
- JJ East Park Campground
- KK Flying J, Inc.
- LL Green River Campground
- MM Iron Springs Campground
- NN OEP Uinta Basin Inc.
- OO Red Fleet State Park
- PP Simplot Phosphates Ltd.
- QQ Spill Mountain Campground
- RR Steinhaker Lake State Park
- SS Target Trucking Inc.
- TT The Native Asphalt Co.
- UU WEMBCCO Inc.
- VV Whiterocks Campground
- Wasatch County**
- WW Bryants Fork Spring Assn.
- XX Bryants Fork Summer Homes
- YY Current Creek Campground
- ZZ Current Creek Lodge
- AAA Pine Hollow Estates
- BBB Soldier Creek Recreation Complex
- CCC Strawberry Administration Site
- DDD Strawberry Bay Recreation Complex
- EEE Windy Ridge Water Company

Figure 2-9 Public Water Systems of the Uintah Basin

2.9.2 Public Community Systems- Source of Supply

Potable water in the Uintah Basin is supplied from surface runoff and groundwater aquifers. In addition to their own supplies, many systems receive wholesale water from districts such as the Central Utah and Uintah Water Conservancy districts. **Table 2-30** illustrates the reliable systems source capacity for public community water systems in the basin.

Table 2-30
Reliable Potable Water Supply for Public Community Systems
 (Acre-Feet/Year)

County	Springs	Wells	Surface	Total
Daggett	290.0	1,461.0	645.2	2,396.2
Duchesne	773.4	3,690.0	4,480.0	8,943.3
Summit	0.0	0.0	0.0	0.0
Uintah	10,315.0	1,488.1	24,324.0	36,127.0
Wasatch	0.0	0.0	0.0	0.0
Basin Totals	11,378.4	6,639.0	29,449.2	47,466.6

2.9.3 Public Community Systems – Water Use

Potable water accounts for the vast majority of water used through public community systems. **Table 2-31** shows the total and the per-capita use rates for public communities within the Uintah Basin. The use categories of residential, commercial, institutional, and industrial are shown. The non-potable water use value indicated is that which secondary irrigation systems supply within the public community water system boundaries. The industrial use category indicates industrial water used that is supplied by the public community water systems.

Table 2-31
Total and Per-Capita Water Use of Public Community Water Systems
Within the Uintah Basin
(Acre-Feet/Year, unless noted)

	Daggett County	Duchesne County	Summit County	Uintah County	Wasatch County	Total	GPCD
Potable Uses							
Residential Indoor	78.8	1,086.9	0.0	2,146.8	0.0	3,312.5	72.7
Residential Outdoor	196.4	1,487.7	0.0	2,826.2	0.0	4,510.3	99.0
Commercial	196.6	540.4	0.0	1,054.5	0.0	1,791.5	39.3
Institutional	98.8	617.8	0.0	1,378.9	0.0	2,095.5	46.0
Industrial/Stockwater	7.1	1,071.3	0.0	312.3	0.0	1,390.7	30.5
Total Potable	577.6	4,804.1	0.0	7,718.6	0.0	13,100.4	287.4
Non-Potable Uses							
Residential	11.6	480.9	0.0	1,196.1	0.0	1,688.6	37.0
Commercial	15.0	3.0	0.0	0.0	0.0	18.0	0.4
Institutional	66.0	536.2	0.0	602.0	0.0	1,204.2	26.4
Industrial/Stockwater	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Non-Potable	92.6	1,020.1	0.0	1,798.1	0.0	2,910.8	63.9
Total Water Use	670.2	5,824.2	0.0	9,516.7	0.0	16,011.1	351.3

Note: Figures may not add exactly due to independent rounding.

2.9.4 M&I Water Deliveries and Depletions

Table 2-32 has information on the deliveries and depletions of all the M&I water use in the basin. This information can be useful in the future planning of water needs and resources. For the definitions of the terminology associated with the information, see Section 1.3 of this report.

Table 2-32
Uintah Basin M&I Deliveries and Depletions
(Acre-Foot/Year)

County	Deliveries			Depletions		
	Indoor Use	Outdoor Use	Total	Indoor Use	Outdoor Use	Total
Daggett	270.2	421.0	691.2	160.0	280.7	440.7
Duchesne	2,773.0	3,205.7	5,978.7	1,772.3	2,137.1	3,909.4
Summit	1.2	1.8	3.0	0.1	1.2	1.3
Uintah	14,033.4	6,125.8	20,159.2	11,028.8	4,083.9	15,112.7
Wasatch	14.8	38.0	52.8	1.0	25.4	26.4
Basin Totals	17,092.5	9,792.4	26,884.9	12,962.2	6,528.2	19,490.4

For a more detailed description of water use by individual water users, please refer to *Municipal and Industrial Water Supply and Uses in the Uintah Basin*, December 2007, by the Utah Department of Natural Resources, Division of Water Resources. A copy of the report can be accessed at the Division website: <http://www.water.utah.gov/M&I/default.asp>

2.10 West Colorado River Basin

The West Colorado River Basin covers 15,411 square miles (9,863,040 acres) of land. The boundary starts with Soldier Summit and follows a clockwise path containing the Roan Cliffs, followed by a south-trending line toward Elk Ridge, the Clay Hills, the Straight Cliffs of the Kaiparowits Plateau, the Aquarius Plateau, the Awapa Plateau, and finally the Wasatch Plateau and back up to Soldier Summit. The West



Velvet Ridge, Wayne County

Colorado River Basin contains a widely varied topography. Elevations begin at less than 4,000 feet above mean sea level at the southern tip and gradually increase throughout several valleys into the higher mountains and plateaus of the basin. Notably, Mt. Ellen of the Henry Mountains stands 11,522 feet above mean sea level. See **Figure 2-1** for an illustration of the basin boundaries in Utah.

The basin spans all or part of 12 counties: Carbon, Duchesne, Emery, Garfield, Grand, Kane, San Juan, Sanpete, Sevier, Utah, Wasatch and Wayne. Duchesne and Wasatch counties contain no public water systems within the basin and are not included in this report. The main population centers are located in Emery and Carbon counties, including the cities of Green River, Orangeville, Huntington, Price and Wellington.

2.10.1 Basin Municipal and Industrial Water Use

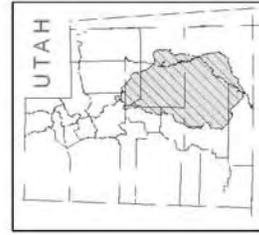
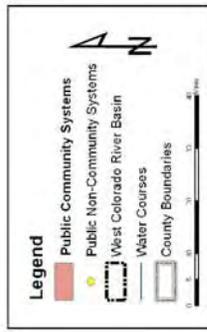
Of the 44,029 acre-feet of total water use in this basin, the largest categorical use, at 32,395 acre-feet, is non-potable self-supplied water used mostly for various mining and other industries in Carbon and Emery counties. Additionally, many of the communities have secondary water systems using non-potable water for outside watering.

The West Colorado River Basin currently has 26 public community water systems serving 33,580 people (about 97 percent of the 34,560 total population of the basin). See **Figure 2-10** for the location of the public water systems. The basin also has 46 public non-community water systems that serve national parks and/or monuments, including: Canyonlands, Capitol Reef, Arches, Glen Canyon, and the new Grand Staircase-Escalante; state parks such as: Escalante, Goblin Valley, Green River, and Anasazi; camping and rest areas; and isolated commercial establishments. **Table 2-33** summarizes the total overall water use in the basin.

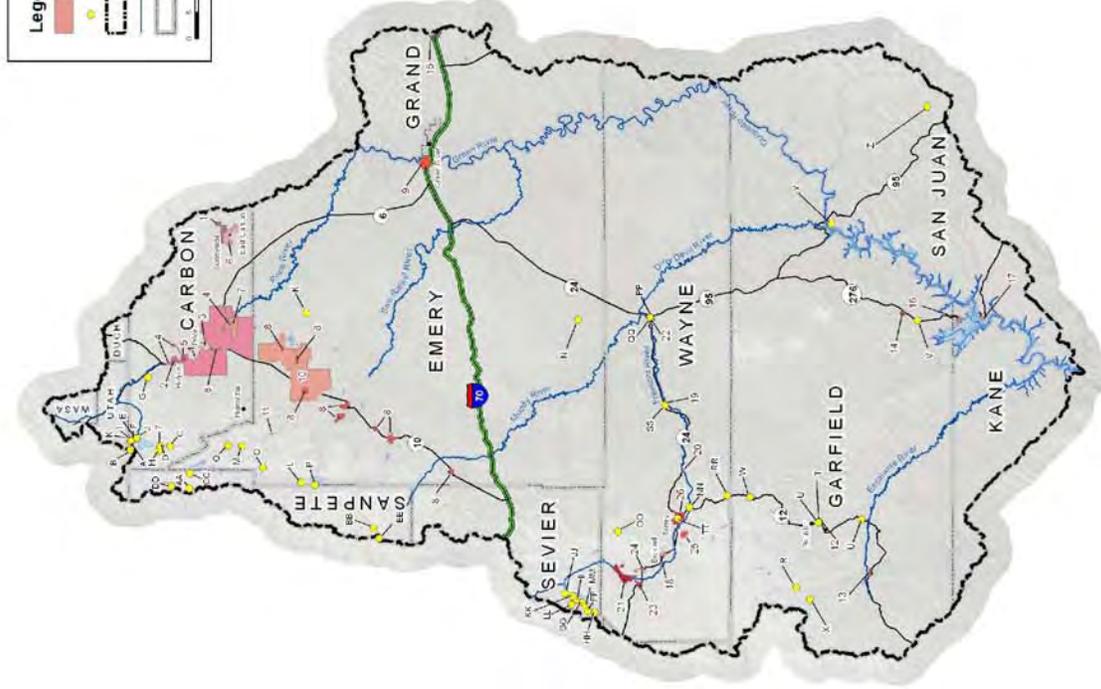
Table 2-33
Water Use of the West Colorado River Basin
 (Acre-Foot/Year)

Water System Category	Water Use		Total
	Potable	Non-Potable	
Public Community	7,416	3,518	10,933
Public Non-Community	138	0	138
Self-Supplied Industries	447	32,395	32,842
Private Domestic	116	0	116
Basin Totals	8,116	35,913	44,029

Note: Figures may not add exactly due to independent rounding.



Basin Location



PUBLIC COMMUNITY SYSTEMS

- 1 Carbon County
- 2 East Carbon & Columbia Municipal
- 3 Helper Municipal Water System
- 4 Price Municipal Water System
- 5 Price River WID
- 6 Spring Glen Water Company
- 7 Sunnyside City Water
- 8 Wellington Culinary Water
- 9 Emery County
- 10 Castle Valley SSD
- 11 Green River Municipal Water
- 12 North Emery Water Users
- 13 Trail Canyon Residential System
- 14 Garfield County
- 15 Boulder Farmstead Water Company
- 16 Escalante Culinary Water
- 17 Ticaoboo Special Service District

- 18 Grand County
- 19 Thompson WID
- 20 Kane County
- 21 National Park Service, Bullfrog
- 22 San Juan County
- 23 National Park Service, Halls Cross
- 24 Wayne County
- 25 Bicknell Culinary Water System
- 26 Caineville SSD
- 27 Capitol Reef National Park
- 28 Fremont Waterworks Company
- 29 Hanksville Culinary Water Work
- 30 Loa Water Works Company
- 31 Lyman Culinary Water System
- 32 Teasdale SSD
- 33 Torrey Culinary Water System

PUBLIC NON-COMMUNITY SYSTEMS

- A Carbon County
- B Aspen Cove
- C Aspen View
- D Clear Creek Camp
- E Clear Creek Utilities
- F Madsen Bay
- G Mountain View
- H Price Cyn. Rec. Area
- I Scofield (town)
- J Scofield Frontier Camp
- K Scofield Res. Camp
- L Emery County
- M Cleveland Lloyd Quarry
- N Filmore Subdivision
- O Forks of Huntington CG
- P Goblin Valley State Park
- Q Indian Creek CG
- R Joes Valley Campground
- S Old Folks Flat CG
- T Garfield County
- U Blue Spruce CG
- V Boulder Mountain Lodge
- W Boulder School
- X Calif Creek CG
- Y Lake Powell Management
- Z Pleasant Creek CG
- AA Posy Lake CG

- Y San Juan County
- Z Hite Marina
- AA Natural Bridges
- BB San Pete County
- CC Fairview Lakes Development
- DD Ferron Reservoir CG
- EE Flat Canyon CG
- FF Mammoth Guard Station
- GG Twelve Mile Flat CG
- HH Sevier County
- II Bowers Haven Resort
- JJ Bowers Springs CG
- KK Doctor Spring CG
- LL Fish Lake Lodge
- MM Frying Pan CG
- NN Lakeside Resort
- OO Lakeview Subdivision
- PP Twin Creeks CG
- QQ Wayne County
- RR Boulder Mountain Homestead RV Park
- SS Elkhorn CG & GS
- TT Hollow Mountain
- UU Red Rock Cafe
- VV Single Tree CG
- WW Sleepy Hollow CG
- XX Thousand Lakes RV Park

Figure 2-10 Public Water Systems of the West Colorado River Basin

2.10.2 Public Community Systems - Source of Supply

Potable water in the West Colorado River Basin is supplied from both groundwater aquifers and diversions from local streams and rivers. **Table 2-34** illustrates the reliable systems source capacity for public community systems.

Table 2-34
Reliable Potable Water Supply for Public Community Systems
 (Acre-Feet/Year)

County	Springs	Wells	Surface	Total
Carbon	2,642.4	2,161.0	9,954.7	14,758.1
Emery	72.8	362.0	10,072.6	10,507.4
Garfield	231.3	842.3	0.0	1,073.6
Grand	362.0	0.0	0.0	362.0
Kane	0.0	120.9	0.0	120.9
San Juan	0.0	105.7	0.0	105.7
Sanpete	0.0	0.0	0.0	0.0
Sevier	0.0	0.0	0.0	0.0
Utah	0.0	0.0	0.0	0.0
Wayne	1,768.8	731.4	0.0	2,500.2
Basin Totals	5,077.2	4,323.4	20,027.3	29,427.8

2.10.3 Public Community Systems - Water Use

The public community water systems water use is over 25 percent of the total use in the basin. Of this, about 70 percent is potable and 30 percent is non-potable. **Table 2-35** illustrates the total and per-capita use rates for public communities within the basin. The use categories are for residential, commercial, institutional, and industrial. The industrial use category indicates industrial water supplied only by the public community water systems.

Table 2-35
Total and Per-capita Water Use of Public Community Water Systems
Within the West Colorado River Basin
(Acre-Feet/Year, unless noted)

	Carbon County	Emery County	Garfield County	Grand County	Kane County	San Juan County	Wayne County	Total	GPCD
Potable Uses									
Residential Indoor	1,616.1	852.4	87.1	7.0	43.6	22.2	216.2	2,844.6	75.6
Residential Outdoor	1,771.6	792.3	64.9	6.5	22.8	32.9	122.7	2,813.5	74.8
Commercial	363.8	179.8	73.6	5.5	189.1	9.7	57.4	879.0	23.4
Institutional	582.5	41.0	22.1	11.9	0.0	0.0	20.9	678.4	18.0
Industrial/Stockwater	89.1	43.8	5.8	0.0	0.0	0.0	61.3	200.0	5.3
Total Potable	4,423.1	1,909.2	253.5	30.9	255.5	64.9	478.5	7,415.5	197.1
Non-Potable Uses									
Residential	1,261.7	581.6	255.6	0.0	0.0	0.0	450.0	2,548.9	67.8
Commercial	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Institutional	410.4	518.2	0.0	0.0	0.0	0.0	40.0	968.6	25.8
Industrial/Stockwater	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Non-Potable	1,672.1	1,099.8	255.6	0.0	0.0	0.0	490.0	3,517.5	93.5
Total Water Use	6,095.2	3,009.0	509.1	30.9	255.5	64.9	968.5	10,933.0	290.7

Notes: 1. There are no public community systems in Sanpete, Sevier, or Utah Counties.
2. Figures may not add exactly due to independent rounding.

2.10.4 M&I Water Deliveries and Depletions

Table 2-36 presents information on the deliveries and depletions of all the M&I water use in the basin. The information contained in the table can be useful to water managers in the future planning of water requirements and resources. For the definitions of the terms used, see **Section 1.3** of this report.

Table 2-36
West Colorado River Basin M&I Deliveries and Depletions
(Acre-Foot/Year)

County	Deliveries			Depletions		
	Indoor Use	Outdoor Use	Total	Indoor Use	Outdoor Use	Total
Carbon	2,205.5	7,841.5	10,046.9	427.8	6,507.2	6,934.9
Emery	1,444.8	30,532.2	31,977.0	1,226.6	29,873.7	31,100.4
Garfield	176.2	362.5	538.7	114.1	241.7	355.7
Grand	13.8	17.1	30.9	1.0	11.4	12.3
Kane	194.9	60.6	255.5	79.1	40.4	119.5
San Juan	33.8	35.4	69.3	30.2	23.6	53.8
Sanpete	3.2	2.2	5.4	0.2	1.4	1.7
Sevier	28.3	22.2	50.5	18.0	14.8	32.7
Utah	3.9	1.0	4.9	0.3	0.7	0.9
Wasatch	1.4	0.3	1.7	0.1	0.2	0.3
Wayne	387.0	660.6	1,047.6	83.8	440.4	524.2
Basin Totals	4,492.8	39,535.6	44,028.4	1,981.0	37,155.5	39,136.5

For a more detailed description of water use by individual water users, please refer to *Municipal and Industrial Water Supply and Uses in the West Colorado River Basin*, July 2008, by the Utah Department of Natural Resources, Division of Water Resources. A copy of the report can be accessed at the Division website: <http://www.water.utah.gov/M&I/default.asp>

2.11 Southeast Colorado River Basin

The Southeast Colorado River Basin covers 10,876 square miles (6,960,629 acres) of land in Utah and spans part of four counties: Grand, San Juan, Kane, and Garfield. Elevations within the basin peak at 12,721 feet above mean sea level in the La Sal Mountains east of Moab. Lake Powell has the lowest elevation at an average of 3,700 feet above mean sea level.



The Colorado River near Grand Junction, Colorado

The Book Cliffs stand as the basin's northern boundary. Roughly half of the Utah/Colorado state line forms the eastern boundary, while two-thirds of the Utah/Arizona state line forms the southern boundary. The eastern boundary follows the Timber Mountains between the Paria drainage and Johnson Creek drainage. It then follows the Pink Cliffs in Bryce Canyon and then diverts in a southwesterly direction on the Kaiparowits Plateau and Fiftymile Mountain to the confluence of the San Juan River and the Colorado River (now in Lake Powell). The boundary continues along the Clay Hills and Elk Ridge to the confluence of the Green and Colorado rivers. Above this, the boundary follows the drainage divide between these two rivers and Book Cliffs over to the Utah-Colorado state line. See **Figure 2-1** for an illustration of the basin boundaries in Utah.

The basin spans all or part of three counties: Grand, San Juan and Garfield. The largest population centers are in Grand and San Juan Counties, including the cities of Moab, Blanding and Monticello.

2.11.1 Basin Municipal and Industrial Water Use

This basin has the lowest total water use in the state at 8,217 acre-feet. Total non-potable water use is 2,182 acre-feet, with public community water systems using over half of the amount, at 1,477 acre-feet. **Table 2-37** summarizes total water use in this basin.

The Southeast Colorado River Basin currently has 22 public community water systems serving 17,440 people. The basin also has 27 public non-community systems. These systems serve national parks and/or monuments including Arches, Canyonlands, Natural Bridges, Monument Valley, as well as the new Grand Staircase-Escalante; state parks including Kodachrome Basin, Goosenecks, and Dead Horse Point; campgrounds in the Manti-Lasal National Forest; isolated commercial establishments; and roadside rest stops. **Figure 2-11** illustrates locations of the public water systems within the basin.

Table 2-37
Water Use of the Southeast Colorado River Basin
 (Acre-Feet/Year)

Water System Category	Water Use		Total
	Potable	Non-Potable	
Public Community	4,401	1,477	5,879
Public Non-Community	287	29	316
Self-Supplied Industries	525	675	1,200
Private Domestic	823	0	823
Basin Totals	6,036	2,182	8,217

Note: Figures may not add exactly due to independent rounding

PUBLIC COMMUNITY SYSTEMS

- Garfield County**
- 1 Cannonville Town
- 2 Henrieville
- 3 Tropic
- Grand County**
- 4 Day Star Adventist Academy
- 5 Moab City Water
- 6 Spanish Valley Water & Sewer
- Kane County**
- 7 Church Wells SSD
- 8 Glen Canyon SSD No. 1 (Big Water)
- San Juan County**
- 9 Aneth Community
- 10 Blanding City Municipal Water
- 11 Bluff Water & Sewer Users Assoc.
- 12 Eastland SSD
- 13 Holly Village Community
- 14 Mexican Hat/Halchita Community
- 15 Monticello Municipal Water System
- 16 Montezuma Creek
- 17 Monument Valley High School
- 18 Oljato Community
- 19 Red Mesa Community
- 20 San Juan County SSD No. 1 (Mexican Hat)
- 21 Todohaidekani Community
- 22 White Mesa (Ute Mtn. Ute Tribe)

PUBLIC NON-COMMUNITY SYSTEMS

- Grand County**
- A Arches National Park HQ
- B Arches Natl. Pk. - Devils Garden
- C Archview Partners LLC (Campground)
- D Bucks Grill House
- E Canyonlands Field (Airport)
- F Dead Horse Point State Park
- G Matrimony Spring
- H Moab KOA Campground
- I Slick Rock Campground
- J Sorrel River Ranch
- K Warner Campground & G. S.
- Kane County**
- L Dangling Rope Marina
- M Kodachrome Basin State Park
- N Paria Contact Station
- San Juan County**
- O Canyonlands NP-Island in the Sky
- P Canyonlands NP-Needles
- Q Dalton Springs Campground
- R Devils Canyon Campground
- S Hatch Point Campground
- T Hovenweep National Monument
- U Kane Springs Hwy Rest Stop
- V Montezuma Trailer Park
- W Monument Valley Hospital/Trading Post
- X Nizhoui Campground
- Y Pack Creek Ranch
- Z Sand Island
- AA Wind Whistle Campground

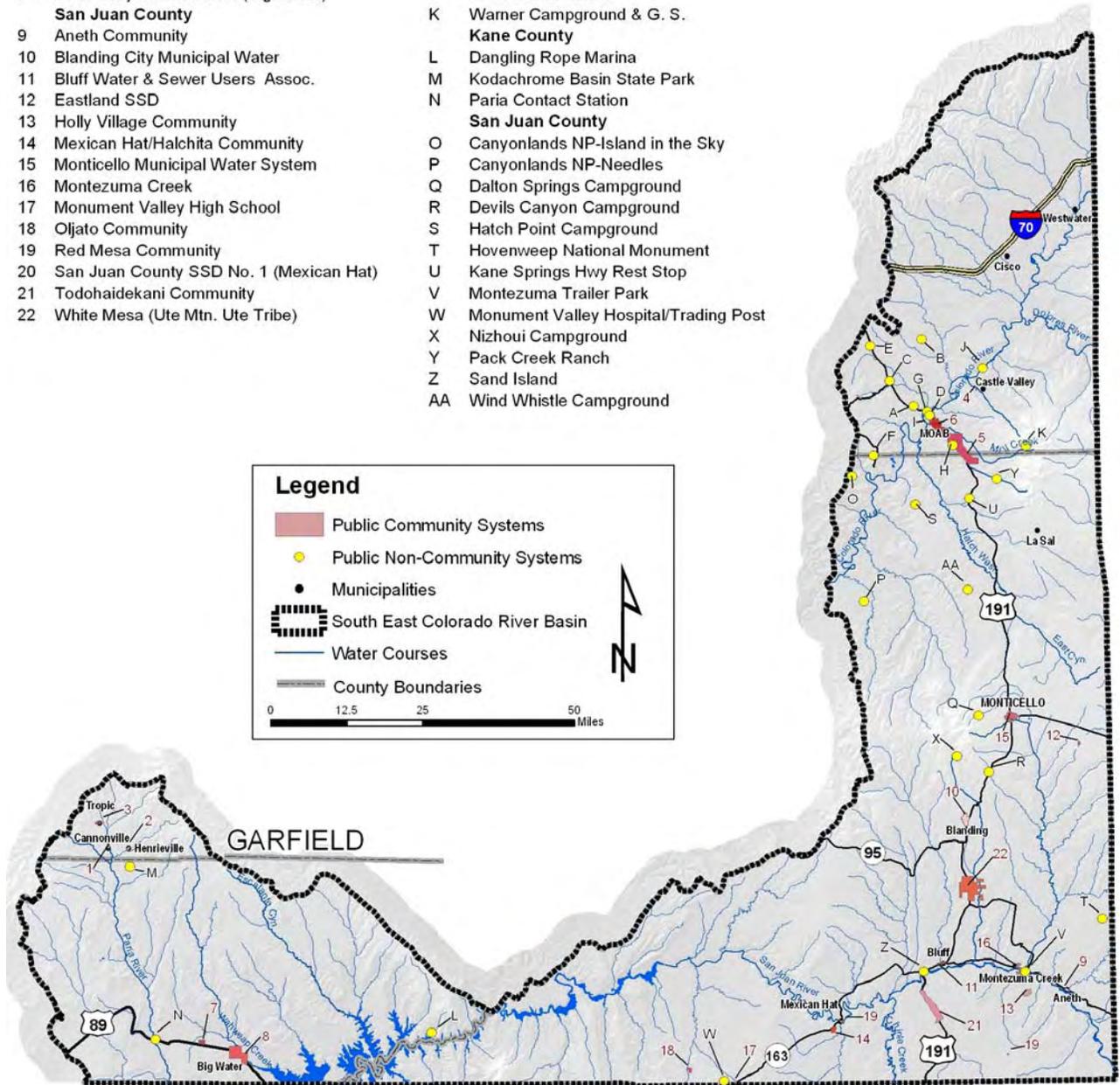


Figure 2-11 Public Water Systems of the Southeast Colorado River Basin

2.11.2 Public Community Systems - Source of Supply

Potable water in the Southeast Colorado River Basin is supplied mostly from groundwater. The majority of the supply is from well fields around populated areas such as Moab, the Castle Valley, and the Spanish Valley. The remainder of the supply comes from natural springs. **Table 2-38** illustrates the reliable systems source capacity for public community water systems.

Table 2-38
Reliable Potable Water Supply for Public Community Systems
 (Acre-Feet/Year)

County	Springs	Wells	Surface	Total
Garfield	274.3	358.1	0.0	632.4
Grand	676.5	5,015.6	0.0	5,692.1
Kane	0.0	542.9	0.0	542.9
San Juan	1,062.2	2,541.2	2,010.4	5,613.7
Basin Totals	2,013.1	8,457.7	2,010.4	12,481.1

2.11.3 Public Community Systems -Water Use

The 22 public community water systems serve water to the majority of the population (17,440 of 24,180 total in the basin), as well as to institutional facilities, commercial establishments, and area industries.

Table 2-39 indicates the breakdown of the total and the per-capita water use rates for public communities within the Southeast Colorado River Basin. The non-potable water use value is that which secondary irrigation systems supply within the public community water system boundaries. The industrial use category indicates the amount of industrial water, which is only supplied by the public community water systems.

Table 2-39
Total and Per-Capita Water Use of Public Community Water Systems
Within the Southeast Colorado River Basin
(Acre-Feet/Year, unless noted)

	Garfield County	Grand County	Kane County	San Juan County	Total	GPCD
Potable Use						
Residential Indoor	82.8	718.4	46.0	589.2	1,436.4	73.5
Residential Outdoor	38.4	814.1	88.8	343.3	1,284.7	65.8
Commercial	52.8	352.9	7.1	194.0	606.7	31.1
Institutional	31.4	859.0	14.2	102.6	1,007.1	51.6
Industrial/Stockwater	5.2	1.0	32.0	28.0	66.3	3.4
Total Potable	210.6	2,745.3	188.1	1,257.0	4,401.1	225.3
Non-Potable Uses						
Residential	309.5	31.0	0.0	396.0	736.5	37.7
Commercial	18.8	0.0	0.0	0.0	18.8	1.0
Institutional	29.5	479.8	0.0	212.8	722.1	37.0
Industrial/Stockwater	0.0	0.0	0.0	0.0	0.0	0.0
Total Non-Potable	357.8	510.8	0.0	608.8	1,477.4	75.6
Total Water Use	568.4	3,256.1	188.1	1,865.8	5,878.5	300.9

Note: Figures may not add exactly due to independent rounding.

2.11.4 M&I Water Deliveries and Depletions

Table 2-40 indicates the deliveries and depletions of all the M&I water use in the basin. This information can be useful for the future planning of water requirements and resources. For the definitions of the terms associated with the table, see **Section 1.3** of this report.

Table 2-40
Southeast Colorado River Basin M&I Deliveries and Depletions
(Acre-Foot/Year)

County	Deliveries			Depletions		
	Indoor Use	Outdoor Use	Total	Indoor use	Outdoor Use	Total
Garfield	138.2	435.3	573.4	29.7	290.2	319.9
Grand	1,923.2	2,266.4	4,189.6	727.6	1,510.9	2,238.5
Kane	121.0	173.0	294.0	36.6	115.3	151.9
San Juan	1,603.2	1,557.4	3,160.5	809.9	1,038.2	1,848.1
Basin Totals	3,785.6	4,432.0	8,217.6	1,603.8	2,954.6	4,558.4

For a more detailed description of water use by individual water users, please refer to *Municipal and Industrial Water Supply and Uses in the Southeast Colorado River Basin*, June 2008, by the Utah Department of Natural Resources, Division of Water Resources. A copy of the report can be accessed at the Division website: <http://www.water.utah.gov/M&I/default.asp>

2.12 Kanab Creek/Virgin River Basin

The Utah portion of the Kanab Creek/Virgin River Basin includes approximately 3,500 square miles of land in the southwest corner of the state. Utah's portion of the basin extends from the Utah/Arizona state line on the south to the Bull Valley and Harmony Mountains to the north. On the west, the basin extends from the Utah/Nevada state line east to the divide between Johnson Wash and Kaibab Gulch Tributaries. See **Figure 2-1** for an illustration of the basin boundaries in Utah.



View of St. George from atop the airport bluff

Elevations within the basin vary from a high of 10,375 feet at Black Mountain in the Cedar Mountains and 10,365 feet at Signal Peak in the Pine Valley Mountains to 2,297 feet and 2,461 feet where the Beaver Dam Wash and Virgin River cross the Utah/Arizona state line. Notable features of the basin include Zion National Park, Snow Canyon State Park, Coral Pink Sand Dunes State Park, and a portion of the Grand Staircase-Escalante National Monument.

The basin spans all or part of three counties: Washington, Iron and Kane. The main population centers are located in Washington and Kane Counties, including the cities of St. George, Washington, Ivins, Santa Clara and Kanab.

2.12.1 Basin Municipal and Industrial Water Use

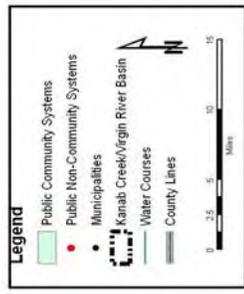
The total water use of 46,484 acre-feet annually in this basin is almost entirely through public community systems. The majority of this use is potable water at 38,401 acre-feet/year. Non-potable water use is limited mostly to landscape irrigation for golf courses, parks, and some residential developments at a total of 8,083 acre-feet. Having one of the drier climates, high population growth, and many second homes, this basin has the highest per-capita water use in the state.

The basin has 43 public community water systems listed, including Freedonia, Arizona, serving 133,400 people (almost all of the 133,780 total basin population). Freedonia is included due to all of its water sources being located in Kane County. **Figure 2-12** locates the public water systems within the basin. The basin also has 18 public non-community water systems serving national parks (Zion and the new Grand Staircase-Escalante); state parks including Snow Canyon, Coral Pink Sand Dunes, and Quail Creek; campgrounds in Dixie National Forest and elsewhere; isolated commercial establishments; and roadside rest stop areas. **Table 2-41** summarizes the total water use in this basin.

Table 2-41
Water Use of the Kanab Creek/Virgin River Basin
 (Acre-Feet/Year)

Water System Category	Water Use		Total
	Potable	Non-Potable	
Public Community	38,111	8,001	46,113
Public Non-Community	109	82	191
Self-Supplied Industries	97	0	97
Private Domestic	84	0	84
Basin Totals	38,401	8,083	46,484

Note: Figures may not add exactly due to independent rounding.



- PUBLIC COMMUNITY SYSTEMS**
- Washington County**
1. Angel Springs SSD Company
 2. Central Canyon Water Company
 3. Central Canyon Water Company
 4. Diamond Ranch Academy
 5. Diamond Valley Acres
 6. Elsie Users SSD
 7. Elsie Users SSD
 8. Elsie Users SSD
 9. Elsie Users SSD
 10. Harmony Farms Water Users
 11. Harmony Heights
 12. Hibah, UT/Colorado City, AZ
 13. Hunsinger Village Water Company
 14. Hunsinger Village Water Company
 15. Inks
 16. Kayenta Water Users Inc.
 17. La Veran
 18. Leets Domestic Water Users
- Kans County**
39. Alder
 40. Alton
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- Iron County**
1. Little Plains
 2. New Harmony Water Company
 3. New Harmony Water System
 4. Pine Valley Water Works
 5. Pine Valley Mt. Farms
 6. Rockville Pipeline Company
 7. Sand Clara
 8. Sand Clara SSD
 9. Sand Clara SSD
 10. Sand Clara SSD
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- Washington County**
- A. Home Valley Peak Subdivision
 - B. Little Creek Transit Center
 - C. Pine Valley Rct (Juniper)
 - D. Pine Valley Rct (Juniper)
 - E. Zone NP North Valley Creek
 - F. Zone NP Staunona Temple
 - G. Zone Panorama Subdivision
- Kans County**
- H. Best Friends Sanctuary
 - I. Bryce Zion KOA
 - J. Clear Creek Family Ranch (East Zion SSD)
 - K. Clear Creek Family Ranch (East Zion SSD)
 - L. Clear Creek Family Ranch (East Zion SSD)
 - M. Clear Creek Family Ranch (East Zion SSD)
 - N. Clear Creek Family Ranch (East Zion SSD)
 - O. Clear Creek Family Ranch (East Zion SSD)
 - P. Clear Creek Family Ranch (East Zion SSD)
 - Q. Clear Creek Family Ranch (East Zion SSD)
 - R. Clear Creek Family Ranch (East Zion SSD)
- Iron County**
- R. Adamson State Hwy RS

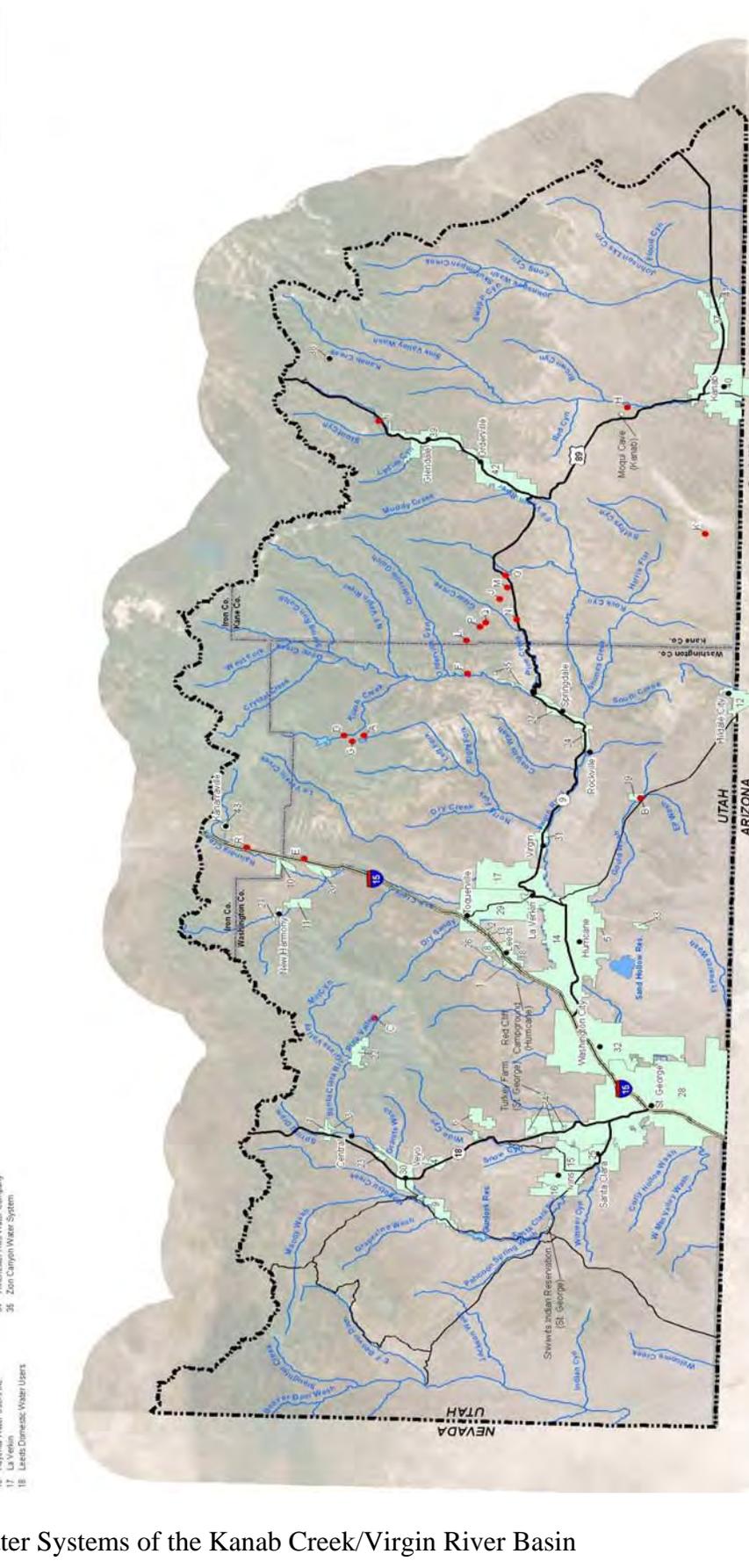


Figure 2-12 Public Water Systems of the Kanab Creek/Virgin River Basin

2.12.2 Public Community Systems - Source of Supply

Potable water in the Kanab Creek/Virgin River Basin is supplied from groundwater through withdrawals from wells and the use of natural springs. Surface runoff is diverted to treatment plants for processing to culinary standards. The Washington County Water Conservancy District operates a treatment plant below Quail Creek Reservoir that delivers culinary water to the St. George area. **Table 2-42** provides the reliable systems source capacity for all public community water systems in the Kanab Creek/Virgin River Basin.

Table 2-42
Reliable Potable Water Supply for Public Community Systems
(Acre-Feet/Year)

County	Springs	Wells	Surface	Total
Iron	64.5	68.2	0.0	132.7
Kane	685.5	2,894.1	0.0	3,579.6
Washington	5,387.5	26,973.2	40,198.0	72,558.7
Basin Totals	6,137.5	29,935.5	40,198.0	76,271.0

2.12.3 Public Community Systems - Water Use

The public community water systems are the major users of water within the basin. Secondary water systems, providing non-potable water for irrigation to the public community, are used extensively in this basin. Most of the institutional and commercial non-potable water use is for the several private and public golf courses within the basin.

Potable water is the major type of water used in the basin. **Table 2-43** shows the total and per-capita water use for public communities within the basin. The non-potable water use indicated is that

which secondary irrigation systems supply within the public community water system boundaries. The industrial use category includes only industrial water supplied by the public community systems.

Table 2-43
Total and Per-capita Water Use of Public Community Water Systems
Within the Kanab Creek/Virgin River Basin
 (Acre-Feet/Year, unless noted)

	Iron County	Kane County	Washington County	Total	GPCD
Potable Use					
Residential Indoor	28.6	504.3	10,235.3	10,768.2	72.1
Residential Outdoor	125.0	846.2	13,871.2	14,842.4	99.3
Commercial	2.7	273.7	8,743.0	9,019.4	60.4
Institutional	8.6	716.9	2,208.7	2,934.2	19.6
Industrial/Stockwater	0.0	18.9	528.2	547.1	3.7
Total Potable	164.9	2,360.0	35,586.4	38,111.3	255.0
Non-Potable Uses					
Residential	58.8	405.1	2,252.9	2,716.8	18.2
Commercial	0.0	0.0	1,353.5	1,353.5	9.1
Institutional	0.0	91.8	3,699.5	3,791.3	25.4
Industrial/Stockwater	0.0	0.0	139.7	139.7	0.9
Total Non-Potable	58.8	496.9	7,445.6	8,001.3	53.5
Total Water Use	223.7	2,856.9	43,032.0	46,112.6	308.6

Note: Figures may not add exactly due to independent rounding.

2.12.4 M&I Water Deliveries and Depletions

Table 2-44 shows the total deliveries and depletions of all the M&I water use in the basin. The information given can be useful in the future planning of water requirements and resources. For definitions of terms associated with the information, see **Section 1.3** of this report.

Table 2-44
Kanab Creek/Virgin River Basin M&I Deliveries and Depletions
(Acre-Foot/Year)

County	Deliveries			Depletions		
	Indoor Use	Outdoor Use	Total	Indoor Use	Outdoor Use	Total
Iron	41.6	221.5	263.1	2.9	147.6	150.5
Kane	942.6	2,093.2	3,035.8	456.0	1,395.5	1,851.5
Washington	18,314.3	24,870.7	43,185.0	1,858.6	16,580.5	18,439.1
Basin Totals	19,298.5	27,185.4	46,483.9	2,317.5	18,123.6	20,441.1

For a more detailed description of water use by individual water users, please refer to *Municipal and Industrial Water Supply and Uses in the Kanab Creek/Virgin River Basin*, January 2009, by the Utah Department of Natural Resources, Division of Water Resources. A copy of the report can be accessed at the Division website: <http://www.water.utah.gov/M&I/default.asp>

Section 3 STATEWIDE SUMMARY

Within the state of Utah there is over 54,000,000 acres of land area, about 1,700,000 of which is covered by various bodies of water (most notably the Great Salt Lake). As indicated in the introduction, there are 12 hydrologic basins within the state boundaries (see **Figure 2-1**). The previous section presented a summary of the data contained in the individual *Municipal and Industrial Water Supply Studies* for the hydrologic basins. This section presents a summary of the combined data for a statewide overview of the year 2005.

3.1 Statewide Municipal and Industrial Water Use

The Division of Water Resources (DWRe) has comprehensively surveyed close to 1,000 water systems, throughout the state, in collecting the 2005 base year M&I water use data summarized in this report. Each water system was individually surveyed and all data concerning the system water deliveries was carefully reviewed, often in person with the system managers and/or operators. The data associated with water deliveries (water use) are as accurate as possible for each of the hydrologic basins and is representative of the calendar year of 2005 total water use statewide. The data is also representative of the current M&I water use patterns and trends in the state. **Table 3-1** shows the detail of this 2005 statewide water use by all categories of water systems of this report.

Table 3-1
2005 Total Water Use of All Water Systems
(Acre-Feet/Year)

Water System Category	Water Use		Total
	Potable	Non-Potable	
Public Community	527,977	189,508	717,485
Public Non-Community	5,801	4,789	10,590
Self-Supplied Industries	33,077	175,768 *	208,845
Private Domestic	14,982	0	14,982
Statewide Totals	581,836	370,066	951,901

Note: Columns and rows may not total exactly due to independent rounding.

*Up to 180,000 ac-ft of saline water is additionally used, but not included in any totals.

The total 2005 combined M&I water use of the state, potable and non-potable is 951,901 acre-feet annually. Non-potable water deliveries account for over one-third of overall water use, at 370,066 acre-feet of water annually. Additionally, up to 180,000 acre-feet of non-potable saline water is used from and around the Great Salt Lake for industrial purposes. However, due to the nature of this water and the large quantities involved, it is not included in any of the figures in this report. Among other reasons, any calculated gallons per capita per day use numbers for the counties and/or hydrologic basins where this use occurs would be unreasonably skewed and non-representative of the most commonly tracked water uses.

Potable water use in the state totals 581,836 acre-feet per year. The public community water systems surveyed over the course of the studies account for the majority of potable water at a total of 527,977 acre-feet annually. As can be seen in **Table 3-1**, the combined categories of public community and self-supplied industries account for nearly all the municipal and industrial water use within the state.

With the illustrated fact that the vast majority of water for M&I purposes is delivered through public community water systems, the remaining sections will focus exclusively on these systems by summarizing, statewide, the data of the individual basin M&I reports and/or the previous section.

3.2 Public Community Systems - Statewide Source of Supply

As was shown **Section 2** of this report, water for public community systems generally is of three sources. Water withdrawn from wells is groundwater. Natural springs or artesian wells also have groundwater as their source and are considered as a separate source category, regardless of the technical classification of their source waters. The remaining source of water is surface water. Surface water is that which is collected from rivers or through the impounded water of dams on the rivers, streams, lakes, and natural or constructed reservoirs along watercourses. **Table 3-2** illustrates the reliable source waters, by basin, for all public community water systems of the state.

Table 3-2
Reliable Potable Water Supply for Public Community Systems
 (Acre-Feet/Year)

Basin	Springs	Wells	Surface	Total
West Desert	2,289.1	13,739.6	0.0	16,028.7
Bear River	17,298.5	37,910.0	1,388.0	56,596.5
Weber River	10,060.6	76,650.1	11,895.8	98,606.5
Utah Lake	37,752.0	94,630.0	30,850.0	163,232.0
Jordan River	6,069.0	123,119.0	159,465.0	288,653.0
Sevier River	10,444.8	20,198.5	0.0	30,643.3
Cedar/Beaver	6,386.3	11,352.3	0.0	17,738.6
Uintah	11,378.4	6,639.0	29,449.2	47,466.6
West Colorado River	5,077.2	4,323.4	20,027.3	29,427.8
Southeast Colorado River	2,013.1	8,457.7	2,010.4	12,481.1
Kanab Creek/ Virgin River	6,137.5	29,935.5	40,198.0	76,271.0
Statewide Totals	114,906.4	426,955.1	295,283.6	837,145.2

Over half of the reliable water supply for public community systems in the state comes from groundwater, withdrawn from wells. Although most areas of the state are not depleting their groundwater resources, some developing and/or expanding communities are approaching and/or at times, exceeding the “safe” yield of the ground-water aquifers. For more specific and comprehensive information on the ground-water conditions of the state, please refer to the annual report entitled *Ground-Water Conditions in Utah* by the Utah Division of Water Resources, Utah Division of Water Rights, and the U.S. Geological Survey. Refer to the website www.ut.water.usgs.gov under the publications tab.

These sources of water for the public community systems must then be made available for use in the distribution systems. Whether the sources involve treatment of surface water, distribution of spring waters, or the withdrawal of groundwater by wells, all have legal and/or physical limitations. Additionally, there can also be a host of other limiting factors on water use for specific systems and/or areas. Consequently, only the reliable water supply is addressed in this statewide summary. For information on the estimated maximum water supply for public community systems of any one basin or area, please refer to the applicable individual M&I reports, as previously referenced.

Regardless of the source or sources of water that the public community water system has, the water must then be distributed to the individual customers. The distribution system is designed to deliver the demanded flow of water during all times of the day, as well as the different seasons of the year. The highest demand time period is defined as the peak demand. Depending on the component of the delivery system being designed, differing peak time periods are considered. The peak instantaneous, peak hour, and peak day demands (including fire fighting requirements) control the planning and design of the pumps, distribution piping, and storage requirements of any water distribution system.

In the M&I reports, as well as this summary, the peak day demand is used as the basis for evaluating the capacity of a water system and/or the collective capacity of all the public community water systems of a hydrologic basin or county in the state. This capacity, defined as the reliable system source capacity, is the annual amount of water deliverable by the water system, on a consistent basis, according to demand. As shown in **Table 3-2**, the estimated combined total reliable system source capacities of all the public community water systems of the state is 837,145 acre-feet of water annually.

These maximum and reliable capacity or supply figures, when individually analyzed and/or compared with each other, give a snapshot view of the ability of water systems to provide for current and future customers. Using the reliable system source capacity, one can estimate a future service population, if further source development is necessary, and/or when system improvements may be needed. This information can also be used as a guide in establishing or reviewing long-term plans and objectives of their water systems and their service areas.

3.3 Public Community Systems - Statewide Water Use

Collectively, the public community water systems of the state provide (or use) the combined single largest total annual amount of water at 717,485 acre-feet. These water systems provide the necessary water supply to about 98 percent of the total population in the state.

Particularly for public water supply systems, the amount of water delivered to or used per person per day is considered to be a standard comparative value. The overall statewide figures for the year 2005 indicate an average statewide water usage rate of 258 gpcd for public community water systems. Of this, 182 gpcd is for residential uses, both indoor and outdoor. **Table 3-3** shows the categorical total water use and the per-capita water use rates for public community water systems in the state of Utah.

As for each of the individual water systems, counties or basins, the non-potable water use indicated in the tables is that which secondary irrigation systems supply only within the boundaries of the public community water system. The industrial use category indicates the industrial water supplied only by public community water systems and does not include the water used by non-community non-transient water systems, previously categorized as self-supplied industries.

In the overall picture, it can be seen that residential water use is not only the single largest categorical use of water from public community water systems, but is also greater than all other categorical uses combined. Therefore, all issues involving the supply or demand of the state's water resources for public community water systems need to include the collective water use and patterns of water use of all types of residential dwellings.

Table 3-3
2005 Statewide Water Use
Public Community Systems
(continued on following page)

Hydrologic River Basin	Bear		Weber		Jordan		Utah Lake		Uintah		West Colorado	
WATER USE CATEGORY	Population (2005)											
	Ac-Ft/Yr	GPCD										
POTABLE												
Residential: Indoor	11,132	70	41,089	70	66,899	62	33,347	62	3,313	73	2,845	76
Outdoor	13,475	85	27,817	47	76,495	71	29,770	56	4,510	99	2,814	75
Total	24,606	156	68,906	117	143,394	132	63,117	118	7,823	172	5,658	150
Commercial: Indoor	4,301	27	8,156	14	26,834	25	12,708	24	1,433	31	703	19
Outdoor	1,075	7	2,039	3	6,709	6	3,177	6	358	8	176	5
Total	5,376	34	10,196	17	33,543	31	15,885	30	1,792	39	879	23
Institutional: Indoor	444	3	2,060	3	3,922	4	2,217	4	419	9	136	4
Outdoor	1,774	11	8,240	14	15,688	14	8,868	17	1,676	37	543	14
Total	2,218	14	10,301	17	19,610	18	11,085	21	2,096	46	678	18
Industrial: Total	3,250	21	2,860	5	9,407	9	4,681	9	1,391	31	200	5
Subtotal	35,451	225	92,262	156	205,954	190	94,767	177	13,101	287	7,416	197
NON-POTABLE												
Residential: Outdoor	9,607	61	82,604	140	12,178	11	22,561	42	1,689	37	2,549	68
Commercial: Outdoor	724	5	7,507	13	2,020	2	3,340	6	18	0	0	0
Institutional: Outdoor	1,757	11	9,855	17	3,868	4	3,265	6	1,204	26	969	26
Industrial: In/Out	409	3	1,155	2	0	0	252	0	0	0	0	0
Subtotal	12,497	79	101,121	171	18,066	17	29,418	55	2,911	64	3,518	94
STATEWIDE TOTALS	47,948	304	193,383	328	224,020	207	124,185	233	16,011	351	10,933	291

Notes:

1. The water use given for each hydrologic basin is calculated from data of the indicated year and associated population.
2. All population figures are estimates from the Governor's Office of Planning and Budget.

Table 3-3
2005 Statewide Water Use
Public Community Systems
(continued from previous page)

Hydrologic River Basin	Southeast Colorado		Sevier		West Desert		Cedar/Beaver		Kanab/Virgin		STATEWIDE TOTAL		
WATER USE CATEGORY	Population (2005) 17,440		Population (2005) 56,250		Population (2005) 49,800		Population (2005) 43,350		Population (2005) 133,400		Population (2005) 2,486,290		
	Ac-Ft/Yr	GPCD	Ac-Ft/Yr	GPCD	Ac-Ft/Yr	GPCD	Ac-Ft/Yr	GPCD	Ac-Ft/Yr	GPCD	AC-Ft/Yr	GPCD	
POTABLE													
Residential:	Indoor	1,436	74	4,635	74	3,884	70	3,549	73	10,768	72	182,895	66
	Outdoor	1,285	66	5,233	83	3,185	57	3,873	80	14,842	99	183,299	66
	Total	2,721	139	9,868	157	7,069	127	7,421	153	25,611	171	366,194	131
Commercial:	Indoor	485	25	1,270	20	619	11	1,283	26	7,216	48	65,009	23
	Outdoor	121	6	317	5	155	3	321	7	1,804	12	16,252	6
	Total	607	31	1,587	25	774	14	1,604	33	9,019	60	81,261	29
Institutional:	Indoor	201	10	475	8	495	9	225	5	587	4	11,180	4
	Outdoor	806	41	1,900	30	1,979	35	898	18	2,347	16	44,719	16
	Total	1,007	52	2,375	38	2,473	44	1,123	23	2,934	20	55,899	20
Industrial:	Total	66	3	1,133	18	531	10	557	11	547	4	24,623	9
	Subtotal	4,401	225	14,963	237	10,848	194	10,705	220	38,111	255	527,977	190
NON-POTABLE													
Residential:	Outdoor	737	38	5,261	83	1,534	27	1,871	39	2,717	18	143,306	51
Commercial:	Outdoor	19	1	1	0	558	10	0	0	1,354	9	15,540	6
Institutional:	Outdoor	722	37	1,421	23	820	15	1,020	21	3,791	25	28,692	10
Industrial:	In/Out	0	0	0	0	15	0	0	0	140	1	1,970	1
	Subtotal	1,477	76	6,683	106	2,925	52	2,890	60	8,001	54	189,508	68
STATEWIDE TOTALS		5,879	301	21,646	344	13,773	247	13,595	280	46,113	309	717,485	258

Notes:

1. The water use given for each hydrologic basin is calculated from data of the indicated year and associated population.
2. All population figures are estimates from the Governor's Office of Planning and Budget.

3.4 Statewide M&I Deliveries and Depletions

In an effort to provide additional useful information for water managers, the division included a short discussion and a summary table of the total water deliveries and depletions of the counties within each basin in the **Executive Summary**. Additionally, at the end of each of the reports is an extensively detailed table that includes specific information for each of the water systems, as well as all the various uses for both potable and non-potable water. This was done as a leading step towards preparing water budgets for the basins and the state as a whole.

Water budgets are an extremely valuable planning tool for evaluating the capability of supporting further development. A water budget balances all the incoming water, available groundwater, all uses, and all the losses within the targeted area. As can be envisioned, collecting all this data is an intensive, tedious and time consuming process. The collected data then forms the base to begin all the calculations necessary to compile a water budget.

Table 3-4 provides a summary of all the total water delivery and depletion amounts of each of the basins. **Table 3-5** provides the equivalent information exclusively for the public community water systems. Please refer to the individual basin M&I reports for further details, at the website <http://www.water.utah.gov/M&I/default.asp> . Additionally, see **Section 1.3** for definitions of the terms associated with this information.

Table 3-4
State of Utah Total M&I Deliveries and Depletions
(Acre-Feet/Year)

Basin	Deliveries			Depletions		
	Indoor Use	Outdoor Use	Total	Indoor Use	Outdoor Use	Total
West Desert	7,396.1	9,081.7	16,477.8	3,599.7	6,054.5	9,654.2
Bear River	24,595.1	32,465.6	57,060.7	9,860.6	21,643.8	31,504.4
Weber River	65,072.8	141,316.1	206,388.9	15,204.0	94,210.6	109,414.6
Utah Lake	64,780.3	76,967.2	141,747.5	17,094.2	50,748.2	67,842.4
Jordan River	214,751.0	118,968.2	333,719.2	120,556.1	79,312.1	199,868.2
Sevier River	32,103.7	16,236.2	48,339.9	26,527.2	10,824.1	37,351.3
Cedar/Beaver	13,981.2	8,571.2	22,552.4	10,333.9	5,715.1	16,049.0
Uintah	17,092.5	9,792.4	26,884.9	12,962.2	6,528.2	19,490.4
West Colorado	36,888.1	7,140.2	44,028.3	34,376.3	4,760.2	39,136.5
Southeast Colorado	3,785.6	4,432.0	8,217.6	1,603.8	2,954.6	4,558.4
Kanab Creek/Virgin River	19,298.5	27,185.4	46,483.9	2,317.5	18,123.6	20,441.1
State Totals	499,744.9	452,156.2	951,901.1	254,435.5	300,875.0	555,310.5

Table 3-5
State of Utah
Public Community Systems M&I Deliveries and Depletions
(Acre-Feet/Year)

Basin	Deliveries			Depletions		
	Indoor Use	Outdoor Use	Total	Indoor Use	Outdoor Use	Total
West Desert	5,529.2	8,243.6	13,772.8	3,059.3	5,495.8	8,555.1
Bear River	19,126.5	28,820.9	47,947.4	5,860.8	19,214.0	25,074.8
Weber River	54,165.1	139,218.3	193,383.4	5,020.4	92,812.1	97,832.5
Utah Lake	52,951.9	71,232.8	124,184.7	7,101.1	47,488.6	54,589.7
Jordan River	107,062.5	116,957.0	224,019.5	13,274.5	77,971.3	91,245.8
Sevier River	7,512.9	14,133.1	21,646.0	2,746.9	9,422.1	12,169.0
Cedar/Beaver	5,612.9	7,982.2	13,595.1	2,235.2	5,321.5	7,556.7
Uintah	6,555.4	9,455.7	16,011.1	2,612.7	6,303.9	8,916.6
West Colorado	3,883.4	7,049.5	10,932.9	1,503.4	4,699.7	6,203.1
Southeast Colorado	2,189.4	3,689.1	5,878.5	385.7	2,459.4	2,845.1
Kanab Creek/Virgin River	19,117.7	26,994.9	46,112.6	2,215.5	17,996.5	20,212.0
State Totals	283,706.9	433,777.1	717,484.0	46,015.5	289,184.9	335,200.4

