

**MUNICIPAL AND INDUSTRIAL  
WATER SUPPLY AND USES  
IN THE  
SOUTHEAST COLORADO  
RIVER BASIN**

**(Data Collected for Calendar-Year 2005)**

**Prepared by**

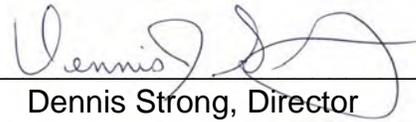
**Utah Department of Natural Resources  
Division of Water Resources**

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## ACKNOWLEDGMENTS

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Dennis Strong, Director



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## EXECUTIVE SUMMARY

The purpose of this report is to document the municipal and industrial (M&I) water system supplies and uses within the Southeast Colorado River Basin during the calendar year of 2005. These water systems deliver culinary (potable) and/or secondary (non-potable) water and have been separated into four categories, as defined on page 18 of this report. The four categories are public community, public non-community, self-supplied industrial and private domestic water systems. Water supplies, under the current hydrologic and each systematic condition, are evaluated for only potable water service in public community water systems.

The base data for both water supply and uses of public community water systems was provided by each of the water systems. Data for the other categories of water systems was compiled by also using various other agencies and references.

M&I water uses, for the basin, were then totaled and tabulated by county. Portions of the five counties of Garfield, Grand, Kane, Summit and San Juan are contained within the Southeast Colorado River Basin. Summit County has no water systems in this basin so it is not further addressed in this report.

### **Public Community Water Systems**

Of the aforementioned categories, public community systems serve about 95 percent of all residents in the State of Utah. Within the Southeast Colorado River Basin, approximately 72 percent of the population is served by public community water systems. Refer to **Figure 3** on page 6 for a location map of these systems, as well as the general boundaries of the basin.

For planning purposes, accurate and detailed current water use and supply information is invaluable in determining the ability of the basin to meet future water demands. The Division of Water Resources (DWRe) uses the annual reliable potable water supply, as defined on page 9, as a tool to quantify the amount of water that can be delivered by each public community water system to satisfy current and projected peak day demands with present water supply conditions.

In the Southeast Colorado River basin, it was determined that the current annual reliable potable water supply is 12,481 acre-feet. Springs account for 16 percent, wells 68 percent and surface water 16 percent of this supply. The breakdown of this supply is presented in the following **Table I**.

**TABLE I**  
**SOUTHEAST COLORADO RIVER BASIN**  
**Reliable Potable Water Supply for Public Community Systems**  
**(Acre-Feet/Year)**

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

Note: All values represent maximum system source capacities limited by water rights, hydrologic constraints and/or system constraints.

M&I water use, within these systems, can be subdivided by two types of water: potable (culinary) and non-potable (secondary). Potable water is delivered by the public community system itself. However, secondary water can be delivered not only by the system, but also by separate irrigation companies, exclusively in some locations.

**Table II**, on the following page, shows public community system water use data for both potable and non-potable categories within the Southeast Colorado River basin. Categorically, the percentage of total water use is 25% residential indoor, 34% residential outdoor, 11% commercial, 29% institutional, and 1% light industrial/stockwatering.

**TABLE II**  
**SOUTHEAST COLORADO RIVER BASIN**  
**Water Use for Public Community Systems**  
**(Acre-Feet/Year)**

	<b>Garfield County</b>	<b>Grand County</b>	<b>Kane County</b>	<b>San Juan County</b>	<b>Total</b>
<b>Potable Use</b>					
Residential Indoor	82.8	718.4	46.0	589.2	<b>1,436.4</b>
Residential Outdoor	38.4	814.1	88.8	343.3	<b>1,284.7</b>
Commercial	52.8	352.9	7.1	194.0	<b>606.7</b>
Institutional	31.4	859.0	14.2	102.6	<b>1,007.1</b>
Industrial/Stockwater	5.2	1.0	32.0	28.0	<b>66.3</b>
<b>Total Potable</b>	<b>210.6</b>	<b>2,745.3</b>	<b>188.1</b>	<b>1,257.0</b>	<b>4,401.1</b>
<b>Secondary Use</b>					
Residential	309.5	31.0	0.0	396.0	<b>736.5</b>
Commercial	18.8	0.0	0.0	0.0	<b>18.8</b>
Institutional	29.5	479.8	0.0	212.8	<b>722.1</b>
Industrial/Stockwater	0.0	0.0	0.0	0.0	<b>0.0</b>
<b>Total Secondary</b>	<b>357.8</b>	<b>510.8</b>	<b>0.0</b>	<b>608.8</b>	<b>1,477.4</b>
<b>TOTAL WATER USE</b>	<b>568.4</b>	<b>3,256.1</b>	<b>188.1</b>	<b>1,865.8</b>	<b>5,878.5</b>

In general, and specifically for this report, all per capita water use figures refer to the water use within public community water systems only. Out of a total basin population of 24,184 in 2005, 17,440 people were served by the public community systems. For these systems, residential potable per capita water use calculates to 139 gallons per capita per day (gpcd). Similarly, non-potable residential water use calculated to 36 gpcd. The resultant total per capita water use is 177 gpcd for residential purposes within the public community systems of the basin. With the addition of water use in the commercial, institutional and industrial categories, the per capita water use for public community systems is 225 gpcd for potable and 76 gpcd for non-potable water, for an overall water use of approximately 301 gpcd. Comparatively, in 2005, the statewide average per capita water use was 190 gpcd potable and 70 gpcd non-potable, for a total of 260 gpcd.

Dry summer months, a long growing season and comparatively large lot sizes, in this basin, greatly increase the outside watering requirements compared with the more densely populated basins along the Wasatch Front. Additionally, secondary

(non-potable) water comprises a relatively high percentage of the residential and institutional outdoor use. Considering that secondary water is rarely metered, its use tends to far exceed outdoor watering needs. Combined, these factors all contribute to the above average per capita water use, in this basin. The per capita water use values for various combinations of categories and types of water are shown in the following **Table III**.

**TABLE III**  
**SOUTHEAST COLORADO RIVER BASIN**  
**Average Per Capita Use**  
**(Supplied by Public Community Systems)**

CATEGORY	Average Per Capita Use (Ac-Ft/Yr)	Average Per Capita Use (GPCD)
Residential Potable Use	0.156	139
Residential Potable Plus Secondary Use	0.198	177
Total Potable Use	0.252	225
Total Potable Plus Secondary Use	0.337	301

Note: Total Potable categories include residential, commercial, institutional and industrial uses.

**Total M&I Water Use**

**Table IV**, on the following page, shows the total potable and non-potable M&I water use for all system types in the Southeast Colorado River Basin for the year 2005. As can be seen, public community systems deliver the majority of the potable water used within the basin. However, as in this basin, self-supplied industries can also use significant amounts of water. The table indicates that the total potable M&I water use in 2005 was 6,036 acre-feet. Total non-potable M&I water use in 2005 for the basin was 2,182 acre-feet. Therefore, total M&I water use for all system categories and types of water in 2005, for the Southeast Colorado River basin, was 8,218 acre-feet.

**TABLE IV**  
**SOUTHEAST COLORADO RIVER BASIN**  
**Total M&I Water Use for all Categories**  
**(Acre-Feet/Year)**

Source	Garfield County	Grand County	Kane County	San Juan County	Total
<b>Potable Use</b>					
Public Community Systems	210.6	2,745.3	188.1	1,257.0	<b>4,401.1</b>
Public Non-Community Systems	0.0	112.4	4.9	169.5	<b>286.8</b>
Self-Supplied Industries	0.0	0.0	0.0	525.3	<b>525.3</b>
Private Domestic	5.0	117.0	101.0	600.0	<b>822.9</b>
<b>Total Potable</b>	<b>215.6</b>	<b>2,974.7</b>	<b>294.0</b>	<b>2,551.7</b>	<b>6,036.1</b>
<b>Secondary Use</b>					
Secondary Irrigation Companies	357.8	510.8	0.0	608.8	<b>1,477.4</b>
Public Non-Community Systems	0.0	29.2	0.0	0.0	<b>29.2</b>
Self-Supplied Industries	0.0	674.9	0.0	0.0	<b>674.9</b>
<b>Total Secondary</b>	<b>357.8</b>	<b>1,214.9</b>	<b>0.0</b>	<b>608.8</b>	<b>2,181.5</b>
<b>TOTAL WATER USE</b>	<b>573.4</b>	<b>4,189.6</b>	<b>294.0</b>	<b>3,160.5</b>	<b>8,217.6</b>

**M&I Water Deliveries and Depletions**

On the following page, **Table V** shows both the deliveries and depletions for all the M&I water in the basin. The information contained in the table is very useful for overall water planning purposes. See pages 20 and 21 for detailed definitions of the terms used. In **Appendix B**, there is a table that contains a breakdown of all the deliveries and depletions of each public community water system, as well as all other categories of water systems, within the basin.

**TABLE V**  
**SOUTHEAST COLORADO RIVER BASIN**  
**M&I Deliveries and Depletions**  
**(Acre-Feet/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	<b>319.9</b>
Grand	1,923.2	2,266.4	4,189.6	727.6	1,510.9	<b>2,238.5</b>
Kane	121.0	173.0	294.0	36.6	115.3	<b>151.9</b>
San Juan	1,603.2	1,557.4	3,160.5	809.9	1,038.2	<b>1,848.1</b>
<b>Basin Totals</b>	<b>3,785.6</b>	<b>4,432.0</b>	<b>8,217.6</b>	<b>1,603.8</b>	<b>2,954.6</b>	<b>4,558.4</b>

## INTRODUCTION

### Authority

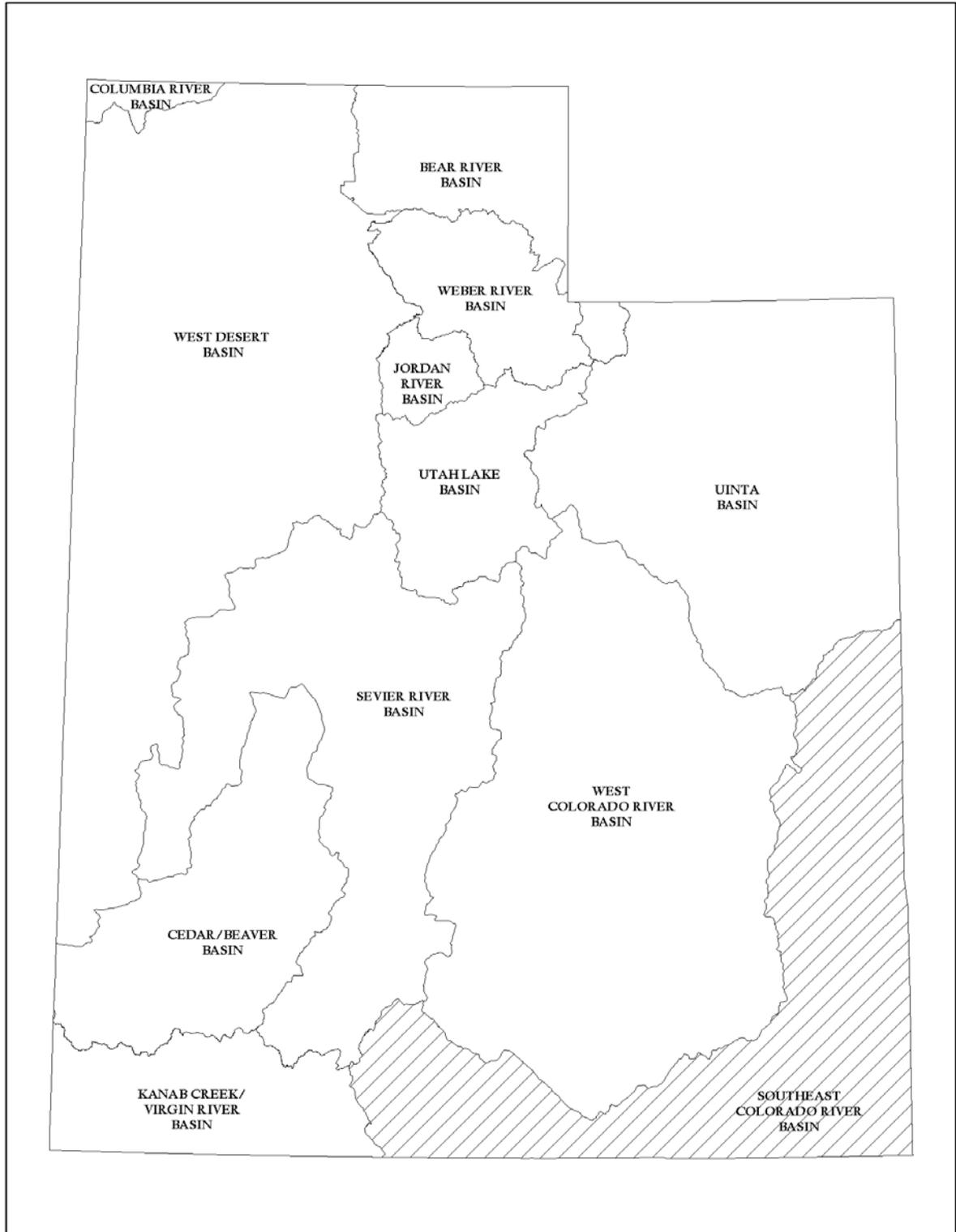
The Utah Division of Water Resources (DWRe) has the overall responsibility for completing studies, investigations, and plans to assist the responsible development and utilization of the water resources of the state of Utah. The State Water Plan, prepared and distributed in early 1990 by the division, provided the foundation and overall direction to establish and implement the state policy framework of water management. As part of the state water planning process, the division prepares detailed plans for each of the 11 hydrologic basins in the state. The Southeast Colorado River Basin is one of these 11 basins. A location map of the Southeast Colorado River Basin is shown in **Figure 1** on the next page.

Each basin water plan identifies potential conservation and development projects and describes alternatives to efficiently satisfy the water needs of that basin. As part of this effort, background data reports are completed for each river basin. These include a Water-Related Land Use Report and a Municipal & Industrial Water Supply & Use Report.

### Scope

As stated earlier, the subject of this M&I report is a determination of present M&I water supplies and uses within this basin. The data presented in this report may be used in the State Water Plan for the Southeast Colorado River Basin as well as other division reports and studies. Information considered for this report also includes related investigations recently completed by the DWRe and the Utah Division of Water Rights (DWRi).

Figure 1. Location of Southeast Colorado River Basin



## **Data Collection**

This study was initiated in April 2006. The 2005 *Municipal and Industrial Water Use Forms*, distributed by the DWRi, in cooperation with the DWRe and the Utah Division of Drinking Water, were used as the basis for the study. In all counties, the data collection process is as described in the following section, *Water Supply and Use Methodology*. Water rights discussions presented herein were prepared based on information from Marc Stilson, Regional Engineer from the State Engineer's Office for the Southeast Colorado River Basin.

## **General Description of the Basin**

The Utah portion of the Southeast Colorado River Basin includes approximately 10,890 square miles of land in the southeast corner of the state. Utah's portion of the basin extends from the Book Cliffs on the north, the Utah/Colorado state lines on the east and the Utah/Arizona state lines on the south to the basins eastern boundary. The eastern boundary follows the Timber Mountains between the Paria drainage and Johnson Creek drainage. It continues along the Pink Cliffs in Bryce Canyon, then turns southeast across 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 northerly up the Colorado River to the confluence of the Green and Colorado Rivers. Above this point, the boundary follows the divide between these two rivers to the north boundary at the Book Cliffs.

The basin spans parts of Kane, Grand, Garfield and San Juan Counties. The five hydrologic study areas that form this basin are the Colorado, Delores, San Juan, Wahweep and Paria. Elevations within the basin vary from high points of 12,721 feet above mean sea level (msl) in the La Sal Mountains east of Moab and 11,360 feet msl at Abajo Peak in the Blue Mountains to a low of 3,700 feet msl on Lake Powell. Notable features of the basin include Arches National Park, portions of Bryce Canyon National Park (below the rim), Canyonlands National Park (Island in the Sky and the

Needles districts), Glen Canyon National Recreation Area, and the new Grand Staircase-Escalante National Monument.

The principal river system in the basin is the Colorado River and its tributaries; the San Juan, Dolores, and Paria Rivers. The southern portion of the Colorado River (situated within the basin), is now a part of Lake Powell. Easily recognized divisions between this basin and the West Colorado River Basin are marked by the confluence of the Colorado and San Juan Rivers (in Lake Powell) and again at the confluence of the Green and Colorado Rivers. **Figure 2**, on page 5, is a detailed map of the basin.

The basin currently has 14 public community water systems and 8 unregulated Indian systems. The public community systems serve 17,440 people (over 72% of the 24,184 total basin population). **Figure 3**, on page 6, shows the location of these systems. In addition, the basin has 27 public non-community systems. These systems serve Arches and Canyonlands National Parks, several National Recreation Areas and Monuments, Dead Horse Point and Kodachrome Basin State Parks, summer home communities, private and public campgrounds, isolated commercial establishments, and roadside rest stops and parks. The basin also has 8 self-supplied industries.

M&I water use is steadily increasing within the basin. Moab is currently experiencing the greatest growth. Tourism drives most of this growth and this trend is likely to continue well into the future.

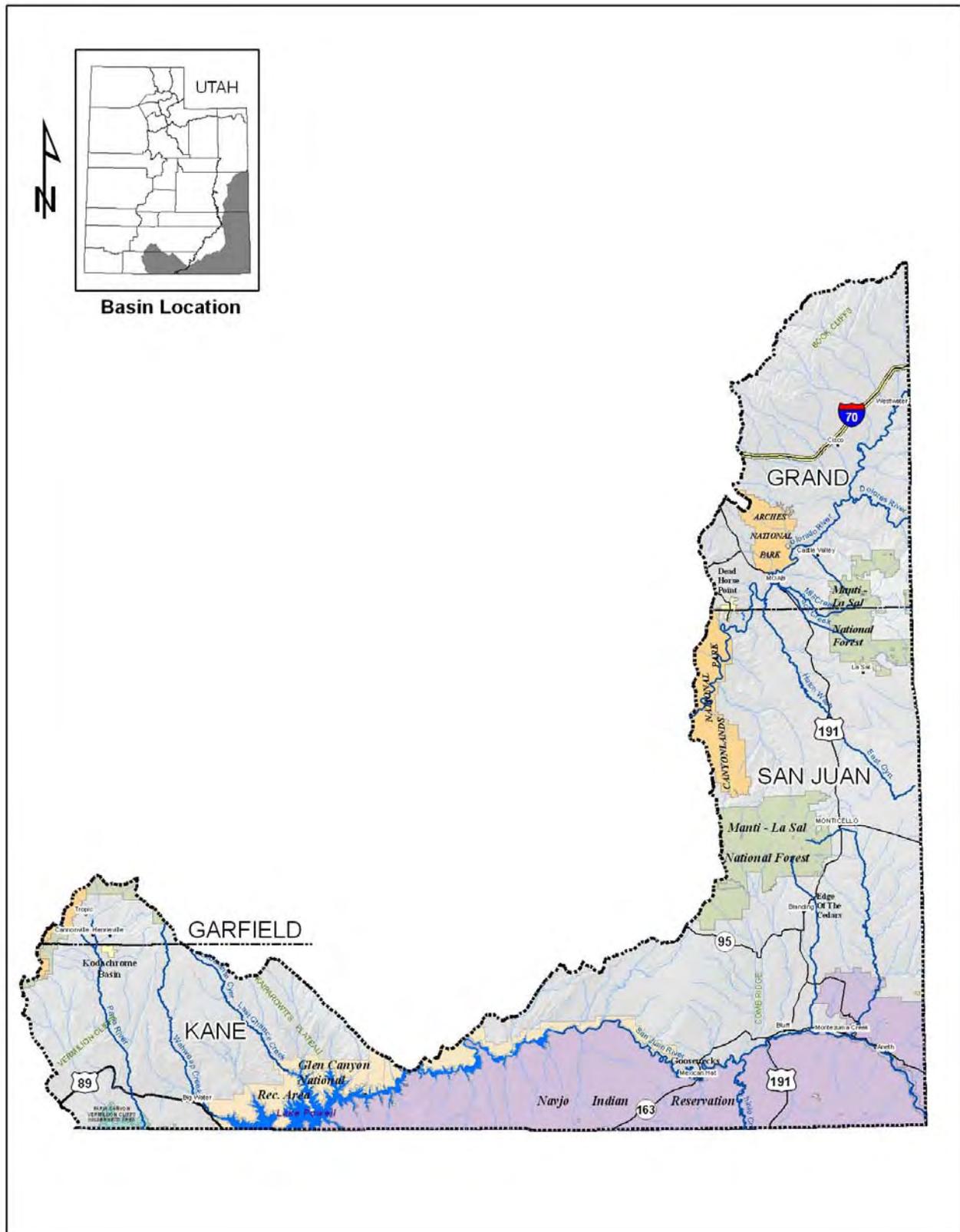


Figure 2. Southeast Colorado River Basin Drainage Map

**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

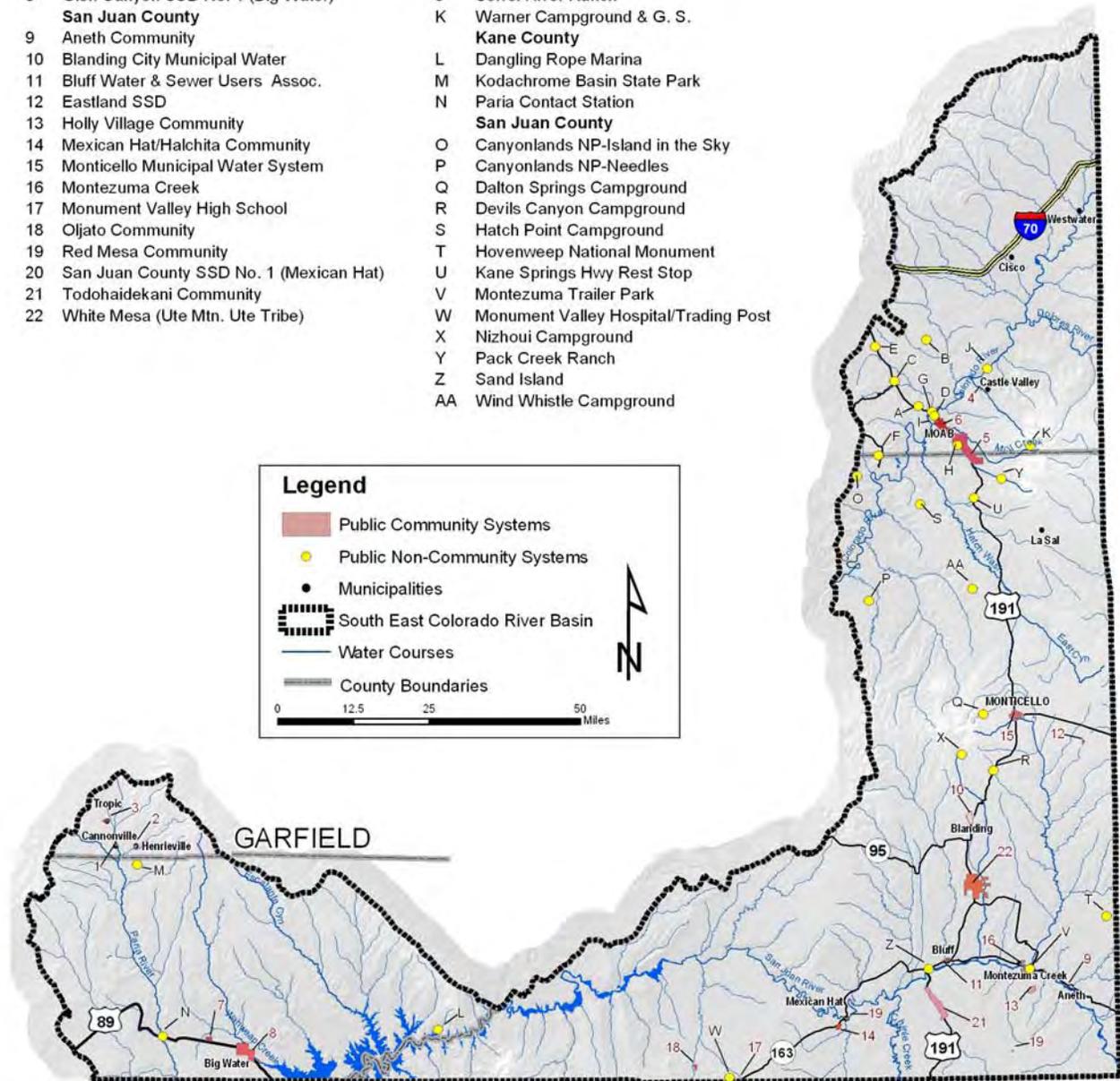


Figure 3. Location of Public Community Systems

## WATER SUPPLY AND USE METHODOLOGY

### Background

Over the past 45 years, the Division of Water Resources (DWR<sub>e</sub>) has employed various procedures to obtain municipal and industrial (M&I) water use data. In recent years, these procedures have become more comprehensive. When the DWR<sub>e</sub> began water planning in the 1960's, available data consisted mainly of supplies and uses for the state as a whole. At that time, Utah's agricultural water uses far exceeded M&I uses. M&I water use was calculated simply by multiplying estimated per capita water use rates by census population data.

By the early 1980's, M&I diversions made up a larger percent of all statewide water uses and the entire water community increased their focus on M&I water supplies and uses. The Division of Water Rights (DWR<sub>i</sub>) and the Division of Drinking Water (DDW) launched a program to collect yearly, statewide M&I data from each public community water system. The procedure involved mailing a survey designed to query major public water suppliers about their sources of water supply. Additionally, the United States Geological Survey (USGS) began M&I water use studies. The DWR<sub>e</sub> relied on both data sources in its planning efforts by the late 1980's.

With the preparation of the State Water Plan Basin reports, and the increasing focus on water conservation, the DWR<sub>e</sub> saw the need to verify and improve the quality and quantity of the available data. The first method used included assisting the DWR<sub>i</sub> and the DDW in the improvement of their M&I data collection program. Currently, the collection of water use data is a joint effort between all three divisions, administered by the DWR<sub>i</sub>. Additionally, the DWR<sub>e</sub> began verifying the accuracy of the data through yearly field surveys, as described in the following four sections.

## **Data Collection Methodology for Public Community Water Systems**

Each year, the DWRe targets several hydrologic basins for M&I water supply and use analysis. The most recent water use information supplied by the DWRi is the basis used to begin the study. Prior to 2003, this information was submitted using a standard form by each water supplier. An example of the water use data form for Monticello is found in **Appendix A**. Since 2003, the program has been updated, allowing for the water suppliers to electronically submit their data.

The DWRe staff contact the manager or operator of each community water system (as defined by the DDW) to schedule a data collection and analysis meeting. These meetings are necessary because data often is not reported (either on the water use forms or electronically) in the detail required for a complete M&I water use study. During these meetings, staff clarifies and collects additional data as needed. Total water supply and usage of the water systems are calculated based on information gathered during these meetings. When data is not available, it is necessary to estimate a part or all of the system use.

A secondary objective of these meetings is to instruct the operator or manager on how to most accurately and effectively complete the water use data form and/or submit their information electronically. This methodology has been used since 1992.

### **Water Supply**

#### ***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.

On page 11, **Figure 4** 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 4**. 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.

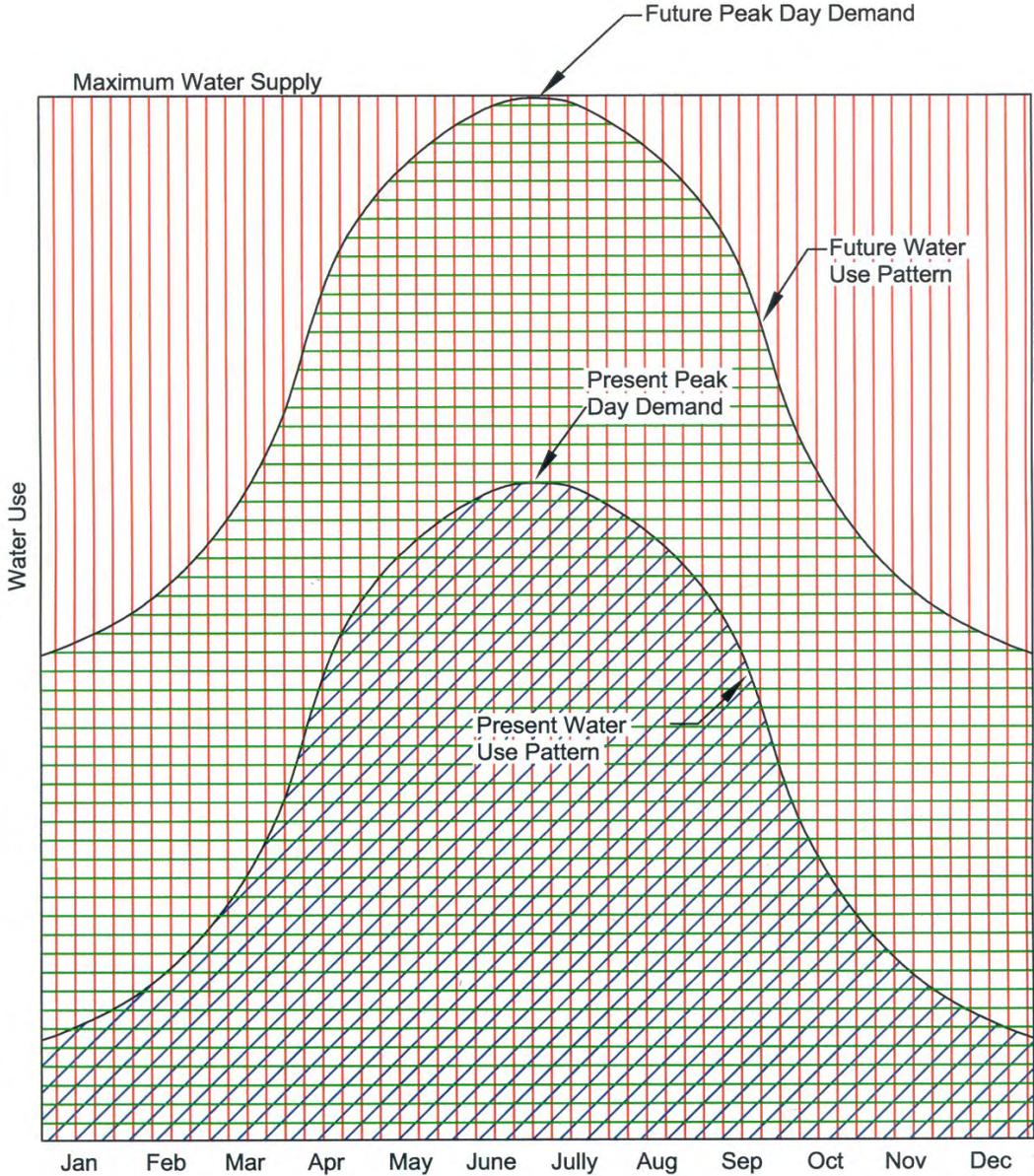
It is important to note that the reliable potable water supply is a theoretical annual volume based upon the current daily peak demand flow rate of any one system, under its current demand conditions. Additional supply may be made available by lowering and/or increasing the size of existing well pumps, 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.

### *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,

Figure 4. Water Supply and Use Hydrograph



-  Present Yearly Water Use (Volume under curve)
-  Present Reliable Water Supply/Future Water Use (Volume under Curve)  
 When this volume is divided by annual per capita water use, this yields the population that can be reliably served.
-  Maximum Water Supply Available Under Present Conditions (Volume under line)

quantifying the available supply of this water is difficult. In Utah, 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 mostly estimated, due to the lack of and/or absence of metering, particularly at the level of individual property connections.

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.**

### 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: residential, commercial, institutional and industrial.

#### *Residential*

The 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.

Typically, culinary indoor use will be estimated 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)

$P_{\text{PH}}$  = 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 given 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.

### *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 assumed application efficiency percentage. The ET used is indicative of the amount of water, in inches, necessary for turf growth.

### *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 of system facilities are also included in this category.

## *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.

### **Data Collection Methodology for Public Non-Community Water 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.

### **Data Collection Methodology for Self-Supplied Industrial Water Systems**

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.

### **Data Collection Methodology for 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.

## DEFINITIONS OF WATER TERMS

Water is supplied by a variety of systems for many types 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 Supply Terms**

*Maximum Developed Potable Water Supply* - 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 8-10 for a more detailed explanation)

*Reliable Potable Water Supply* - 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 8-10 for a more detailed explanation)

*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.

## **Types of 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.

*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.

## **Water System Categories**

*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.

*Public Non-Community Water System* - 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.

Self-Supplied Industrial System - Provides potable and/or non-potable water for use by individual privately owned industries (usually from their own wells or springs).

Private Domestic System – Provides potable and/or non-potable water from privately owned wells and/or springs for use by individual homes.

### **Water Use Terms**

Water is used in a variety of ways and for many 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.**

A table that shows the basin’s M&I water deliveries and depletions is provided in **Appendix B.**

In the previous water supply section, the word “use” can be interchanged with the word “supply” to define the current demand associated with those definitions. Some additional water use terms are as follows:

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.

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.

*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.

*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.

### **Other Water Terms**

*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.

*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.

*Deliveries* - Water already within a system that is being provided to an individual connection, whether potable or non-potable and/or metered or not. 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.**

*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 depletion from the basin system but is not consumed in the basin. 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.

*Diversions* - Water diverted from supply sources such as streams, lakes, reservoirs or groundwater for a variety of purposes including cropland irrigation, as well as residential, commercial, institutional and industrial uses.

*Withdrawal* - Water withdrawn 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.



## **WATER RIGHTS IN SOUTHEAST COLORADO RIVER BASIN**

Although a detailed analysis of water rights is not part of this report, a water supply and use study would not be complete without at least a discussion on the current water right regulations in the area. The following discussion was obtained from the DWRi. It explains the current general water right regulations in the Southeast Colorado River Basin with regards to M&I uses. For more details on these areas, please use the following URL in your web browser.

<http://www.waterrights.utah.gov/wrinfo/policy/wrareas/default.asp>.

### **Garfield County**

Surface and ground waters are considered to be fully appropriated at this time. New diversions and uses must be accomplished by change applications filed on owned or acquired existing rights. Changes between surface and underground sources are reviewed to indicate hydrologic connection, that underlying rights are not enlarged or that there is no potential for interference with existing water rights. The Tropic, Henrieville and Cannonville area is closed to new domestic filings.

### **Grand and San Juan Counties**

Surface and ground waters are considered to be fully appropriated at this time. New diversions and uses must be accomplished by change applications filed on owned or acquired existing rights. Changes between surface and underground sources are reviewed to indicate hydrologic connection, that underlying rights are not enlarged or that there is no potential for interference with existing water rights. However, groundwater for domestic purposes (1 acre and 10 head of livestock, less than 5.73 acre feet per year) applications will be allowed on an individual basis.

## **Kane County**

Surface and ground waters are considered to be fully appropriated at this time. New diversions and uses must be accomplished by change applications filed on owned or acquired existing rights. Changes between surface and underground sources are reviewed to indicate hydrologic connection, that underlying rights are not enlarged or that there is no potential for interference with existing water rights. However, groundwater and/or surface water for domestic purposes (1/4 acre lawn & garden area and 10 head of livestock) applications will be allowed on an individual basis.

## **Miscellaneous**

In all areas, surface and ground waters are considered to be fully appropriated at this time. New diversions and uses must be accomplished by change applications filed on owned, purchased or acquired existing rights. Changes between surface and underground sources are reviewed to indicate hydrologic connection, that underlying rights are not enlarged or that there is no potential for interference with existing water rights. Most, if not all, new applications for domestic purposes (1 acre and 10 head of livestock) will be subject to the above requirements.

## GARFIELD COUNTY M&I WATER SUPPLIES AND USES

The Southeast Colorado River Basin portion of Garfield County includes the incorporated communities of Tropic, Cannonville and Henrieville. Within this area are 3 public community systems. Locations of public community systems are shown in **Figure 3** on page 6.

As shown in the following **Table 1**, the maximum annual water supply for public community systems in this portion of Garfield County is 1,265 acre-feet; about 43% from springs, and 57% from wells.

**TABLE 1  
GARFIELD COUNTY  
Maximum Potable Water Supplies for Public Community Systems  
(Acre-Feet/Year)**

WATER SUPPLIER	Springs	Wells	Surface	Total
Cannonville Town	161.3	716.1	0.0	877.4
Henrieville	64.7	0.0	0.0	64.7
Tropic	322.6	0.0	0.0	322.6
<b>GARFIELD COUNTY TOTALS</b>	<b>548.7</b>	<b>716.1</b>	<b>0.0</b>	<b>1,264.8</b>

Note: All values represent maximum system source capacities limited by water rights, hydrologic constraints, and/or system constraints.

The reliable potable water supply for public community systems in the Garfield County portion of the Southeast Colorado River Basin is 632.4 acre-feet or, in this case, 50% of the maximum supply. The breakdown of this supply is presented in **Table 2** on the following page.

**TABLE 2**  
**GARFIELD COUNTY**  
**Reliable Potable Water Supplies for Public Community Systems**  
**(Acre-Feet/Year)**

WATER SUPPLIER	SPRINGS	WELLS	SURFACE	TOTAL
Cannonville Town	80.7	358.1	0.0	438.7
Henrieville	32.4	0.0	0.0	32.4
Tropic	161.3	0.0	0.0	161.3
<b>GARFIELD COUNTY TOTALS</b>	<b>274.3</b>	<b>358.1</b>	<b>0.0</b>	<b>632.4</b>

\* Wells are limited to 50% of their "maximum" capacity for reliable supply when well/pump capacity is the limiting factor. Springs are limited to 50% of their maximum supply. Surface water supplies are equal to their respective "maximum" capacities.

The following **Table 3**, shows the breakdown of potable water use for each public community system. This table indicates that for Garfield County, the current annual use of 211 acre-feet of water (within the public community systems) is about 33% of the reliable supply.

**TABLE 3**  
**GARFIELD COUNTY**  
**Water Use for Public Community Systems**

GARFIELD COUNTY WATER SUPPLIER	POTABLE USAGE (Ac-Ft/Yr)						Service Population	Gallons Per Capita Per Day
	Residential Indoor	Residential Outdoor	Commercial Total	Institutional Total	Industrial Total	Total M&I		
Cannonville Town	16.1	13.1	4.3	19.2	4.6	57.3	170	301
Henrieville	19.6	0.0	0.0	3.0	0.0	22.6	250	81
Tropic	47.1	25.3	48.5	9.2	0.6	130.7	530	220
<b>GARFIELD COUNTY TOTALS</b>	<b>82.8</b>	<b>38.4</b>	<b>52.8</b>	<b>31.4</b>	<b>5.2</b>	<b>210.6</b>	<b>950</b>	<b>198</b>
A	B	C	D	E	F	G	H	I

A, B, C, D, E, F, H  
G=B+C+D+E+F  
I=G\*(325,851 gallons per acre-foot)/(365 days per year)/H

Input data.  
Potable M&I Water Use.  
Average gallons per capita per day potable water use.

**Table 4**, below, presents the annual amount of secondary water used for various categories within the boundaries of the public community systems. In Garfield County, separate irrigation companies deliver secondary water within the public community systems. Total secondary water use is estimated to be about 358 acre-feet.

**TABLE 4  
GARFIELD COUNTY  
Secondary (Non-Potable) Water Use within Public Community Systems  
(Acre-Feet/Year)**

WATER SUPPLIER	Residential Use	Commercial Use	Institutional Use	Industrial/ Stockwater Use	Public Total Secondary Use
Cannonville Town					
Cannonville Irrigation Co.	27.6	0	0	0	27.6
Henrieville					
Henrieville Irrigation System	29.8	0.0	11.1	0.0	40.9
Tropic					
Tropic Irrigation Co.	252.1	18.8	18.4	0.0	289.3
<b>GARFIELD COUNTY TOTALS</b>	<b>309.5</b>	<b>18.8</b>	<b>29.5</b>	<b>0.0</b>	<b>357.8</b>

Note: Separate irrigation companies provide secondary water to the water supplier unless indicated by an \*\*.

**Table 5** on the following page, presents various per capita rates for the public community systems in the Garfield County portion of the Southeast Colorado River Basin.

**TABLE 5  
GARFIELD COUNTY  
Average GPCD Water Use  
For Public Community Systems**

Water Supplier	Service Population	Residential Water Use			CII Water Use*			TOTAL WATER USE		
		Potable	Non-Potable	Sub Total	Potable	Non-Potable	Sub Total	Potable	Non-Potable	TOTAL
Cannonville Town	170	153	145	298	147	0	147	301	145	446
Henrieville	250	70	106	176	11	40	50	81	146	227
Tropic	530	122	425	547	98	63	161	220	487	708
<b>GARFIELD COUNTY TOTALS</b>	<b>950</b>	<b>114</b>	<b>291</b>	<b>405</b>	<b>84</b>	<b>45</b>	<b>129</b>	<b>198</b>	<b>336</b>	<b>534</b>

\*Commercial, Institutional, and Industrial

Table 6, below, indicates water use for public non-community and private domestic systems in this portion of the Southeast Colorado River Basin. There are no self-supplied industries and only a small number of private domestic wells. All of these uses amount to about 5 acre-feet of potable water.

**TABLE 6  
GARFIELD COUNTY  
Water Use for Public Non-Community Systems,  
Self-Supplied Industries and Domestic Systems  
(Acre-Feet/Year)**

GARFIELD COUNTY WATER SUPPLIER	POTABLE USAGE (Ac-Ft/Yr)					Total Potable Use	Total Secondary Water Use
	Residential	Commercial	Institutional	Industrial			
Forest Service Systems							
	0.0	0.0	0.0	0.0		0.0	0.0
<b>Total Non-Community Use</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>		<b>0.0</b>	<b>0.0</b>
SELF SUPPLIED INDUSTRIES	0.0	0.0	0.0	0.0		0.0	0.0
PRIVATE DOMESTIC SYSTEMS	5.0	0.0	0.0	0.0		5.0	0.0
<b>GARFIELD COUNTY TOTALS</b>	<b>5.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>		<b>5.0</b>	<b>0.0</b>

Collectively, the total potable M&I water use from all systems in this portion of the Southeast Colorado River Basin is 216 acre-feet, while secondary use is 358 acre-feet; giving a total M&I water use of 574 acre-feet.

## GRAND COUNTY M&I WATER SUPPLIES AND USES

The Southeast Colorado portion of Grand County includes the incorporated communities of Moab and Castle Valley. Within this area are 3 public community systems, 10 public non-community systems and 1 self-supplied industry. Locations of public community systems are shown in **Figure 3** on page 6.

The following, **Table 7**, shows that the maximum annual water supply for public community systems in this portion of Grand County is 11,384 acre-feet: 12 percent from springs and 88 percent from wells.

**TABLE 7  
GRAND COUNTY  
Maximum Potable Water Supplies for Public Community Systems  
(Acre-Feet/Year)**

WATER SUPPLIER	Springs	Wells	Surface	Total
Day Star Adventist Academy	0.0	194.0	0.0	<b>194.0</b>
Grand County WCD	NA	NA	NA	<b>NA</b>
Spanish Valley Water & Sewer Improvement District	0.0	4,128.0	0.0	<b>4,128.0</b>
Moab City Water	1,353.1	5,709.2	0.0	<b>7,062.3</b>
<b>GRAND COUNTY TOTALS</b>	<b>1,353.1</b>	<b>10,031.2</b>	<b>0.0</b>	<b>11,384.3</b>

Note: All values represent maximum system source capacities limited by water rights, hydrologic constraints, and/or system constraints.

The reliable potable water supply for public community systems in the Grand County portion of the Southeast Colorado River Basin is about 5,692 acre-feet. The reliable supply is 50% of the maximum supply. The breakdown of this supply is shown on the following page in **Table 8**.

**TABLE 8  
GRAND COUNTY  
Reliable Potable Water Supplies for Public Community Systems  
(Acre-Feet/Year)**

WATER SUPPLIER	SPRINGS	WELLS	SURFACE	TOTAL
Day Star Adventist Academy	0.0	97.0	0.0	97.0
Grand County WCD	NA	NA	NA	NA
Spanish Valley Water & Sewer Improvement District	0.0	2,064.0	0.0	2,064.0
Moab City Water	676.5	2,854.6	0.0	3,531.1
<b>GRAND COUNTY TOTALS</b>	<b>676.5</b>	<b>5,015.6</b>	<b>0.0</b>	<b>5,692.1</b>

\* Wells are limited to 50% of their "maximum" capacity for reliable supply when well/pump capacity is the limiting factor. Springs are limited to 50% of their maximum supply. Surface water supplies are equal to their respective "maximum" capacities.

**Table 9**, below, shows the breakdown of potable water use for each public community system. This table indicates that for Grand County, the current annual use of 2,745 acre-feet of water (within the public community systems) is about 48% of the reliable supply.

**TABLE 9  
GRAND COUNTY  
Water Use for Public Community Systems**

GRAND COUNTY WATER SUPPLIER	POTABLE USAGE (Ac-Ft/Yr)						Service Population	Gallons Per Capita Per Day
	Residential Indoor	Residential Outdoor	Commercial Total	Institutional Total	Industrial Total	Total M&I		
Day Star Adventist Academy	3.2	0.0	0.3	3.0	1.0	7.5	40	167
Grand County WCD								
Spanish Valley Water & Sewer Imp. District	268.3	195.2	112.9	196.0	0.0	772.4	3,020	228
Moab City Water	446.8	618.9	239.7	660.0	0.0	1,965.5	5,030	349
<b>GRAND COUNTY TOTALS</b>	<b>718.4</b>	<b>814.1</b>	<b>352.9</b>	<b>859.0</b>	<b>1.0</b>	<b>2,745.3</b>	<b>8,090</b>	<b>303</b>
A	B	C	D	E	F	G	H	I

A, B, C, D, E, F, H  
G=B+C+D+E+F  
J=G\*(325,851 gallons per acre-foot)/(365 days per year)/H

Input data.  
Potable M&I Water Use.  
Average gallons per capita per day potable water use.

**Table 10**, on the following page, presents the amount of secondary water used in the Grand County portion of the Southeast Colorado River Basin. Total secondary water use is about 511 acre-feet.

**TABLE 10**

**GRAND COUNTY**  
**Secondary (Non-Potable) Water Use within Public Community Systems**  
**(Acre-Feet/Year)**

WATER SUPPLIER	Residential Use	Commercial Use	Institutional Use	Industrial/ Stockwater Use	Total Secondary Use
Day Star Adventist Academy*	9.0	0.0	1.8	0.0	10.8
Grand County WCD*	22.0	0.0	478.0	0.0	500.0
Moab City Water	0.0	0.0	0.0	0.0	0.0
<b>GRAND COUNTY TOTALS</b>	<b>31.0</b>	<b>0.0</b>	<b>479.8</b>	<b>0.0</b>	<b>510.8</b>

Note: Separate irrigation companies provide secondary water to the water supplier unless indicated by an '\*'.

**Table 11**, below, presents various per capita rates for the public community systems in the Grand County portion of the Southeast Colorado River Basin.

**TABLE 11**  
**GRAND COUNTY**  
**Average GPCD Water Use**  
**for Public Community Systems**

Water Supplier	Service Population	Residential Water Use			CII Water Use*			TOTAL WATER USE		
		Potable	Non-Potable	Sub Total	Potable	Non-Potable	Sub Total	Potable	Non-Potable	TOTAL
Day Star Adventist Academy	40	72	201	273	95	40	135	167	241	409
Grand County WCD										
Spanish Valley Water & Sewer Imp. District	3,020	137	7	144	91	141	233	228	148	376
Moab City Water	5,030	189	0	189	160	0	160	349	0	349
<b>GRAND COUNTY TOTALS</b>	<b>8,090</b>	<b>169</b>	<b>3</b>	<b>173</b>	<b>134</b>	<b>53</b>	<b>187</b>	<b>303</b>	<b>56</b>	<b>359</b>

\*Commercial, Institutional, and Industrial

**Table 12**, on the following page, indicates water use for public non-community, self-supplied industries and private domestic systems in this portion of the Southeast Colorado River Basin. There is one self-supplied industry and roughly 100 private domestic wells. All of these uses amount to 229 acre-feet of potable water and 704 acre-feet of non-potable water.

**TABLE 12  
GRAND COUNTY  
Water Use for Public Non-Community Systems,  
Self-Supplied Industries and Domestic Systems  
(Acre-Feet/Year)**

GRAND COUNTY WATER SUPPLIER	POTABLE USAGE					Total Secondary Water Use
	Residential	Commercial	Institutional	Industrial	Total Potable Use	
Forest Service Systems						
Warner Campground & GS	0.0	0.0	0.1	0.0	0.1	0.0
National Park Systems						
Arches National Park HQ	1.2	0.0	7.1	0.0	8.3	0.0
Arches National Park- Devils Garden	0.1	0.0	1.3	0.0	1.4	0.0
State Park Systems						
Dead Horse Point State Park	0.0	0.0	0.4	0.0	0.4	0.0
Archview Partners LLC (Campground)	0.2	2.7	0.0	0.0	2.9	0.0
Bucks Grill House	0.9	0.7	0.0	0.0	1.6	0.0
Canyonlands Field	0.4	1.3	0.0	0.0	1.8	0.0
Matrimony Spring	0.3	0.0	0.0	0.0	0.3	0.0
Moab KOA Campground	0.0	0.0	74.6	0.0	74.6	0.0
Slickrock Campground	1.2	9.3	0.0	0.0	10.5	0.0
Sorrel River Ranch Water	3.4	7.2	0.0	0.0	10.6	29.2
<b>Total Non-Community</b>	<b>7.7</b>	<b>21.3</b>	<b>83.4</b>	<b>0.0</b>	<b>112.4</b>	<b>29.2</b>
SELF SUPPLIED INDUSTRIES*	0.0	0.0	0.0	0.0	0.0	674.9
PRIVATE DOMESTIC SYSTEMS	117.0	0.0	0.0	0.0	117.0	0.0
<b>GRAND COUNTY TOTALS</b>	<b>124.7</b>	<b>21.3</b>	<b>83.4</b>	<b>0.0</b>	<b>229.4</b>	<b>704.1</b>

\*SELF SUPPLIED INDUSTRIES  
Moab Salt Incorporated

Collectively, the total potable M&I water use from all systems in this portion of the Southeast Colorado River Basin is about 2,975 acre-feet, secondary use is 1,215 acre-feet; giving a total M&I water use of 4,190 acre-feet.

## KANE COUNTY M&I WATER SUPPLIES AND USES

The Kane County portion of the Southeast Colorado River Basin includes the incorporated community of Big Water. Within this area, there are 2 public community systems and 3 public non-community systems. Locations of the public community systems are shown in **Figure 3** on page 6.

**Table 13**, below, presents the maximum annual water supply for public community systems in Kane County. The maximum annual potable water supply for public community systems in this portion of Kane County is 1,086 acre-feet: all from wells.

**TABLE 13  
KANE COUNTY  
Maximum Potable Water Supplies for Public Community Systems  
(Acre-Feet/Year)**

WATER SUPPLIER	Springs	Wells	Surface	Total
Church Wells Special Service District	0.0	361.8	0.0	<b>361.8</b>
Glen Canyon Special Service District #1 (Big Water)	0.0	724.0	0.0	<b>724.0</b>
<b>KANE COUNTY TOTALS</b>	<b>0.0</b>	<b>1,085.8</b>	<b>0.0</b>	<b>1,085.8</b>

Note: All values represent maximum system source capacities limited by water rights, hydrologic constraints, and/or system constraints.

The reliable potable water supply for public community systems in the Kane County portion of the Southeast Colorado River Basin is 543 acre-feet, 50% of the maximum supply. The breakdown of this supply is presented in **Table 14**, on the following page.

**TABLE 14**  
**KANE COUNTY**  
**Reliable Potable Water Supplies for Public Community Systems**  
**(Acre-Feet/Year)**

WATER SUPPLIER	SPRINGS	WELLS	SURFACE	TOTAL
Church Wells Special Service District	0.0	180.9	0.0	180.9
Glen Canyon Special Service District #1 (Big Water)	0.0	362.0	0.0	362.0
<b>KANE COUNTY TOTALS</b>	<b>0.0</b>	<b>542.9</b>	<b>0.0</b>	<b>542.9</b>

\* Wells are limited to 50% of their "maximum" capacity for reliable supply when well/pump capacity is the limiting factor. Springs are limited to 50% (Fruitland 75%) of their maximum supply. Surface water supplies are equal to their respective "maximum" capacities.

**Table 15**, below, shows the breakdown of the potable water use for each public community system. This table indicates that for Kane County, the current annual use of 188 acre-feet of water (within the public community systems) is about 35% of the reliable supply.

**TABLE 15**  
**KANE COUNTY**  
**Water Use for Public Community Systems**

WATER SUPPLIER	POTABLE USAGE (Ac-Ft/Yr)						Service Population	Gallons Per Capita Per Day
	Residential Indoor	Residential Outdoor	Commercial Total	Institutional Total	Industrial Total	TOTAL M&I		
Church Wells Special Service District	9.4	22.3	0.0	1.6	2.1	35.4	110	287
Glen Canyon SSD #1 (Big Water)	36.7	66.5	7.1	12.6	29.9	152.7	430	317
<b>KANE COUNTY TOTALS</b>	<b>46.0</b>	<b>88.8</b>	<b>7.1</b>	<b>14.2</b>	<b>32.0</b>	<b>188.1</b>	<b>540</b>	<b>311</b>
A	B	C	D	E	F	G	H	I

A, B, C, D, E, F, H  
G=B+C+D+E+F  
I=G\*(325,851 gallons per acre-foot)/(365 days per year)/H

Input data.  
Potable M&I Water Use  
Average gallons per capita per day potable water use.

The following **Table 16** presents the amount of secondary water used in the Kane County portion of the Southeast Colorado River Basin. There is no secondary water use by public community systems in this area of the Basin.

**TABLE 16  
KANE COUNTY  
Secondary (Non-Potable) Water Use within Public Community Systems  
(Acre-Feet/Year)**

WATER SUPPLIER	Residential Use	Commercial Use	Institutional Use	Industrial/ Stockwater Use	Total Secondary Use
<b>KANE COUNTY</b>					
Church Wells Special Service District	0.0	0.0	0.0	0.0	<b>0.0</b>
Glen Canyon SSD #1 (Big Water)	0.0	0.0	0.0	0.0	<b>0.0</b>
<b>KANE COUNTY TOTALS</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>

Note: Separate irrigation companies provide secondary water to the water supplier unless indicated by an '\*'.

**Table 17**, below, presents various per capita rates for public community systems in the Kane County portion of the Southeast Colorado River Basin.

**TABLE 17  
KANE COUNTY  
Average GPCD Water Use  
For Public Community Systems**

Water Supplier	Service Population	Residential Water Use			CII Water Use*			TOTAL WATER USE		
		Potable	Non-Potable	Sub Total	Potable	Non-Potable	Sub Total	Potable	Non-Potable	TOTAL
Church Wells Special Service District	110	257	0	257	30	0	30	287	0	287
Glen Canyon SSD #1 (Big Water)	430	214	0	214	103	0	103	317	0	317
<b>KANE COUNTY TOTALS</b>	<b>540</b>	<b>223</b>	<b>0</b>	<b>223</b>	<b>88</b>	<b>0</b>	<b>88</b>	<b>311</b>	<b>0</b>	<b>311</b>

\*Commercial, Institutional, and Industrial

**Table 18**, on the following page, indicates water use for public non-community systems, self-supplied industries, and private domestic systems in this portion of the Southeast Colorado River Basin. Kodachrome Basin State Park and Dangling Rope Marina are among the listed non-community systems. There are no self-supplied

industries listed, but there are numerous residences using their own wells. All of these uses amount to 106 acre-feet of potable water and no secondary water.

**TABLE 18  
KANE COUNTY  
Water Use for Public Non-Community Systems,  
Self-Supplied Industries and Domestic Systems  
(Acre-Feet/Year)**

KANE COUNTY WATER SUPPLIER	POTABLE USAGE					Total Secondary Water Use
	Residential	Commercial	Institutional	Industrial/ Stockwater	Total Potable Use	
National Park Service Systems						
Glen Canyon NRA (Dangling Rope Marina)	0.0	0.0	0.1	0.0	0.1	0.0
Forest Service Systems						
Paria Contact Station	0.2	0.0	0.7	0.0	0.9	0.0
State Park Systems						
Kodachrome Basin State Park	1.0	0.0	3.0	0.0	4.0	0.0
<b>Total Non-Community Use</b>	<b>1.2</b>	<b>0.0</b>	<b>3.7</b>	<b>0.0</b>	<b>4.9</b>	<b>0.0</b>
Self Supplied Industries	0.0	0.0	0.0	0.0	0.0	0.0
Private Domestic	101.0	0.0	0.0	0.0	101.0	0.0
<b>KANE COUNTY TOTALS</b>	<b>102.2</b>	<b>0.0</b>	<b>3.7</b>	<b>0.0</b>	<b>105.9</b>	<b>0.0</b>

Collectively, the total potable M&I water diversion of all systems in this portion of the Southeast Colorado River Basin is 294 acre-feet. There are no secondary diversions.

## **SAN JUAN COUNTY M&I WATER SUPPLIES AND USES**

The San Juan County portion of the Southeast Colorado River Basin includes the incorporated communities of Monticello, Blanding and Bluff. Within this area are 6 public community systems not counting a portion of Grand County's Spanish Valley Water & Sewer Improvement District, 8 unregulated Indian systems 13 public non-community systems and 7 self-supplied industries. Locations of the public community systems are shown in **Figure 3**, on page 6. The National Park Service delivers water to Halls Crossing Marina in Glen Canyon National Recreation Area. The Navajo Tribal Utility Authority delivers water to the Navajo Nation through 7 separate unregulated water systems. One other unregulated Indian system is operated by the Ute Mountain Indian Tribe. Spanish Valley Water & Sewer Improvement District provides water from Grand County to residents in San Juan County.

**Table 19**, on the following page, shows the maximum annual water supply for public community systems in the San Juan County portion of the basin is 9,217 acre-feet: 23% from springs, 55% from wells and 12% from surface supplies.

**TABLE 19**  
**SAN JUAN COUNTY**  
**Maximum Potable Water Supplies for Public Community Systems**  
**(Acre-Feet/Year)**

WATER SUPPLIER	Springs	Wells	Surface	Total
Blanding City Municipal Water System	32.3	2,069.1	1,784.4	<b>3,885.7</b>
Bluff Water & Sewer Users Association	0.0	300.8	0.0	<b>300.8</b>
Eastland Special Service District	0.0	47.8	0.0	<b>47.8</b>
Monticello Municipal Water System	2,092.1	531.4	0.0	<b>2,623.5</b>
Monument Valley High School	0.0	168.0	0.0	<b>168.0</b>
Navajo Tribal Utility Authority				
Aneth Community	0.0	144.0	0.0	<b>144.0</b>
Holly Village Community	NA	NA	NA	<b>NA</b>
Mexican Hat / Halchita Community	0.0	0.0	226.0	<b>226.0</b>
Montezuma Creek Community	0.0	1,612.0	0.0	<b>1,612.0</b>
Oljato Community	NA	NA	NA	<b>NA</b>
Red Mesa Community	NA	NA	NA	<b>NA</b>
Todohaidekani Community	NA	NA	NA	<b>NA</b>
San Juan County SSD #1 (Mexican Hat)	0.0	131.8	0.0	<b>131.8</b>
Spanish Valley Water & Sewer Improvement District <sup>1</sup>	NA	NA	NA	<b>NA</b>
White Mesa (Ute Mountain Ute Tribe)	0.0	77.4	0.0	<b>77.4</b>
<b>SAN JUAN COUNTY TOTALS</b>	<b>2,124.4</b>	<b>5,082.3</b>	<b>2,010.4</b>	<b>9,217.0</b>

Note: All values represent maximum system source capacities limited by water rights, hydrologic constraints, and/or system constraints.

<sup>1</sup> Supplies to Spanish Valley Water & Sewer Improvement District are included in Grand County data on page 29

The reliable potable water supply for public community systems in the San Juan County portion of the Southeast Colorado River Basin is 5,614 acre-feet. The reliable supply is about 61% of the maximum supply. The breakdown of this supply is shown on the following page in **Table 20**.

**TABLE 20**  
**SAN JUAN COUNTY**  
**Reliable Potable Water Supplies for Public Community Systems**  
**(Acre-Feet/Year)**

<b>WATER SUPPLIER</b>	<b>SPRINGS</b>	<b>WELLS</b>	<b>SURFACE</b>	<b>TOTAL*</b>
Blanding City Municipal Water System	16.2	1,034.5	1,784.4	<b>2,835.0</b>
Bluff Water & Sewer Users Association	0.0	150.4	0.0	<b>150.4</b>
Eastland Special Service District	0.0	23.9	0.0	<b>23.9</b>
Monticello Municipal Water System	1,046.0	265.7	0.0	<b>1,311.7</b>
Monument Valley High School	0.0	84.0	0.0	<b>84.0</b>
Navajo Tribal Utility Authority				
Aneth Community	0.0	72.0	0.0	<b>72.0</b>
Holly Village Community	NA	NA	NA	<b>NA</b>
Mexican Hat / Halchita Community	0.0	0.0	226.0	<b>226.0</b>
Montezuma Creek Community	0.0	806.0	0.0	<b>806.0</b>
Ojato Community	NA	NA	NA	<b>NA</b>
Red Mesa Community	NA	NA	NA	<b>NA</b>
Todohaidekani Community	NA	NA	NA	<b>NA</b>
San Juan County SSD #1 (Mexican Hat)	0.0	65.9	0.0	<b>65.9</b>
Spanish Valley Water & Sewer Imp. <sup>1</sup>	NA	NA	NA	<b>NA</b>
White Mesa (Ute Mountain Ute Tribe)	0.0	38.7	0.0	<b>38.7</b>
<b>SAN JUAN COUNTY TOTALS</b>	<b>1,062.2</b>	<b>2,541.2</b>	<b>2,010.4</b>	<b>5,613.7</b>

\* Wells are limited to 50% of their "maximum" capacity for reliable supply when well/pump capacity is the limiting factor. Springs are limited to 50% of their maximum supply. Surface water supplies are equal to their respective "maximum" capacities.

<sup>1</sup> Supplies to Spanish Valley Water & Sewer Improvement District are included in Grand County data on page 30

**Table 21**, on the following page, presents the breakdown of the potable water use for each public community system. This table indicates that for San Juan County, the current annual use of 1,257 acre-feet of water (within the public community systems) is about 23% of the reliable supply.

**TABLE 21  
SAN JUAN COUNTY  
Water Use for Public Community Systems**

SAN JUAN COUNTY WATER SUPPLIER	POTABLE USAGE (Ac-Ft/Yr)						Service Population	Gallons Per Capita Per Day
	Residential Indoor	Residential Outdoor	Commercial Total	Institutional Total	Industrial Total	Total M&I		
Blanding City Municipal Water System	252.0	156.0	86.0	15.0	0.0	509.0	3,190	142
Bluff Water & Sewer Users Association	24.5	5.8	33.6	1.8	0.0	65.7	310	189
Eastland Special Service District	7.9	1.3	0.6	1.0	0.0	10.8	100	97
Monticello Municipal Water System	159.6	169.3	46.4	10.0	0.0	385.3	2,020	170
Monument Valley High School	6.7	6.0	0.0	32.2	0.0	44.9	60	668
Navajo Tribal Utility Authority								
Aneth Community	26.9	0.0	5.1	0.2	23.7	55.9	410	122
Holly Village Community	5.5	0.0	0.0	0.0	0.0	5.5	100	49
Mexican Hat / Halchita Community	12.6	0.0	4.6	12.0	0.1	29.3	310	84
Montezuma Creek Community	16.6	0.0	3.1	26.2	4.2	50.1	260	172
Oljato Community	21.1	0.0	1.7	0.1	0.0	22.9	310	66
Red Mesa Community	11.1	0.0	0.0	1.0	0.0	12.1	250	43
Todohaidekani Community	8.4	0.0	0.1	0.0	0.0	8.5	120	63
San Juan County SSD #1 (Mexican Hat)	5.5	3.0	12.7	3.0	0.0	24.2	70	309
Spanish Valley Water & Sewer Imp. Dist.	3.3	2.0	0.0	0.0	0.0	5.3	40	117
White Mesa (Ute Mountain Ute Tribe)	27.5	0.0	0.0	0.0	0.0	27.5	310	79
<b>SAN JUAN COUNTY TOTALS</b>	<b>589.2</b>	<b>343.3</b>	<b>194.0</b>	<b>102.6</b>	<b>28.0</b>	<b>1,257.0</b>	<b>7,860</b>	<b>143</b>
A	B	C	D	E	F	G	H	I

A, B, C, D, E, F, H

G=B+C+D+E+F

I=G\*(325,851 gallons per acre-foot)/(365 days per year)/H

Input data.

Potable M&I Water Use

Average gallons per capita per day potable water use.

Table 22, below, presents the amount of secondary water used by the public community systems in the San Juan County portion of the Southeast Colorado River Basin. Total secondary water use in this area of the Basin is 609 acre-feet.

**TABLE 22  
SAN JUAN COUNTY  
Secondary (Non-Potable) Water Use within Public Community Systems  
(Acre-Feet/Year)**

WATER SUPPLIER	Residential Use	Commercial Use	Institutional Use	Industrial/ Stockwater Use	Public Total Secondary Use
Blanding City Municipal Water System*	0.0	0.0	92.8	0.0	92.8
Bluff Water & Sewer Users Association	0.0	0.0	0.0	0.0	0.0
Eastland Special Service District	0.0	0.0	0.0	0.0	0.0
Monticello Municipal Water System*	396.0	0.0	120.0	0.0	516.0
Monument Valley High School	0.0	0.0	0.0	0.0	0.0
Navajo Tribal Utility Authority					
Aneth Community	0.0	0.0	0.0	0.0	0.0
Holly Village Community	0.0	0.0	0.0	0.0	0.0
Mexican Hat / Halchita Community	0.0	0.0	0.0	0.0	0.0
Montezuma Creek Community	0.0	0.0	0.0	0.0	0.0
Oljato Community	0.0	0.0	0.0	0.0	0.0
Red Mesa Community	0.0	0.0	0.0	0.0	0.0
Todohaidekani Community	0.0	0.0	0.0	0.0	0.0
San Juan County SSD #1 (Mexican Hat)	0.0	0.0	0.0	0.0	0.0
Spanish Valley Water & Sewer Imp. Dist.	0.0	0.0	0.0	0.0	0.0
White Mesa (Ute Mountain Ute Tribe)	0.0	0.0	0.0	0.0	0.0
<b>SAN JUAN COUNTY TOTALS</b>	<b>396.0</b>	<b>0.0</b>	<b>212.8</b>	<b>0.0</b>	<b>608.8</b>

Note: Separate irrigation companies provide secondary water to the water supplier unless indicated by an \*\*\*.

Various per capita rates for public community systems in the San Juan County portion of the Southeast Colorado River Basin are given in **Table 23**, below.

**TABLE 23  
SAN JUAN COUNTY  
Average GPCD Water Use  
For Public Community Systems**

Water Supplier	Service Population	Residential Water Use			CII Water Use*			TOTAL WATER USE		
		Potable	Non-Potable	Sub Total	Potable	Non-Potable	Sub Total	Potable	Non-Potable	TOTAL
Blanding City Municipal Water System	3,190	114	0	114	28	26	54	142	26	168
Bluff Water & Sewer Users Association	310	87	0	87	102	0	102	189	0	189
Eastland Special Service District	100	82	0	82	15	0	15	97	0	97
Monticello Municipal Water System	2,020	145	175	320	25	53	78	170	228	398
Monument Valley High School	60	189	0	189	479	0	479	668	0	668
Navajo Tribal Utility Authority										
Aneth Community	410	59	0	59	63	0	63	122	0	122
Holly Village Community	100	49	0	49	0	0	0	49	0	49
Mexican Hat / Halchita Community	310	36	0	36	48	0	48	84	0	84
Montezuma Creek Community	260	57	0	57	115	0	115	172	0	172
Ojato Community	310	61	0	61	5	0	5	66	0	66
Red Mesa Community	250	40	0	40	4	0	4	43	0	43
Todohaidekani Community	120	62	0	62	1	0	1	63	0	63
San Juan County SSD #1 (Mexican Hat)	70	109	0	109	200	0	200	309	0	309
Spanish Valley Water & Sewer Imp. Dist.	40	117	0	117	0	0	0	117	0	117
White Mesa (Ute Mountain Ute Tribe)	310	79	0	79	0	0	0	79	0	79
<b>SAN JUAN COUNTY TOTALS</b>	<b>7,860</b>	<b>106</b>	<b>45</b>	<b>151</b>	<b>37</b>	<b>24</b>	<b>61</b>	<b>143</b>	<b>69</b>	<b>212</b>

\*Commercial, Institutional, and Industrial

**Table 24**, on the following page, indicates annual water use for public non-community systems, self-supplied industries, and private domestic systems in this portion of the Southeast Colorado River Basin. Canyonlands National Park, Hovenweep National Monument and the Monument Valley Hospital are among the listed non-community systems. Many people living on the Navajo Indian Reservation do not have running water in their homes. Most of these people drive to Hovenweep National Monument or to Monument Valley Hospital to fill containers with water for residential use. There are numerous residences using their own wells. Self supplied industries are listed below the Table. All of these uses amount to 1,295 acre-feet of potable water and no secondary water.

**TABLE 24**  
**SAN JUAN COUNTY**  
**Water Use for Public Non-Community Systems,**  
**Self-Supplied Industries and Domestic Systems**  
**(Acre-Feet/Year)**

SAN JUAN COUNTY WATER SUPPLIER	POTABLE USAGE (Ac-Ft/Yr)					Total Potable Use	Total Secondary Water Use
	Residential	Commercial	Institutional	Industrial			
<b>Non-Community Systems</b>							
Forest Service Systems							
Dalton Springs Campground	0.0	0.0	0.1	0.0		0.1	0.0
Devils Canyon Campground	0.0	0.0	0.1	0.0		0.1	0.0
Nizhoni Campground	0.0	0.0	0.2	0.0		0.2	0.0
National Park Service Systems							
Canyonlands National Park - Island in the Sky	0.3	0.0	0.6	0.0		0.9	0.0
Canyonlands National Park - Needles District	1.0	0.0	3.2	0.0		4.2	0.0
Hovenweep National Monument	0.4	0.0	1.0	0.0		1.4	0.0
BLM Systems							
Hatch Point Campground	0.0	0.0	0.1	0.0		0.1	0.0
Sand Island	0.0	0.0	0.1	0.0		0.1	0.0
Wind Whistle Campground	0.0	0.0	0.1	0.0		0.1	0.0
Kane Springs Highway Rest Stop	0.0	0.0	2.5	0.0		2.5	0.0
Montezuma Trailer Park	0.0	1.6	0.0	0.0		1.6	0.0
Monument Valley Hospital / Trading Post & Lodge*	55.0	82.5	17.0	0.0		154.5	0.0
Pack Creek Ranch	0.3	3.4	0.0			3.7	0.0
<b>Total Non-Community Use</b>	<b>57.0</b>	<b>87.5</b>	<b>25.0</b>	<b>0.0</b>		<b>169.5</b>	<b>0.0</b>
<b>Self Supplied Industries**</b>	10.1	0.0	0.0	515.2		525.3	0.0
<b>Private Domestic</b>	600.0	0.0	0.0	0.0		600.0	0.0
<b>SAN JUAN COUNTY TOTALS</b>	<b>667.1</b>	<b>87.5</b>	<b>25.0</b>	<b>515.2</b>		<b>1,294.8</b>	<b>0.0</b>

\* Source in Arizona

\*\* Self Supplied Industries: Wexpro Company (Bug Field), Summo USA Corporation, Rio Algom Mining Corporation, Elkhorn Operating Company, UNOCAL, Mobile Exploration and Producing North America Incorporated and Cochrane Resources.

Collectively, the total potable M&I water deliveries of all systems in this portion of the Southeast Colorado River Basin is 2,552 acre-feet, while secondary deliveries are 609 acre-feet; giving a total M&I water diversion of 3,161 acre-feet.

# APPENDIX A

## TYPICAL WATER USE DATA FORM

Return completed form to:  
Utah Division of Water Rights  
PO Box 146300  
Salt Lake City, UT 84114-6300

### UTAH WATER USE DATA FORM DATA FOR 2005

Information jointly requested by:  
Utah Division of Water Resources, 538-7264  
Utah Division of Drinking Water, 536-4200; and  
Utah Division of Water Rights, 538-7392.

System Name: Monticello Municipal Water System Population Served: 1950 DEQH: 19004  
Address: P.O. Box 457 -17 North 100 East County: San Juan  
Monticello, UT 84535 E-Mail Address: \_\_\_\_\_

Contact Person: Nathan Langston Phone Number: (435) 587-2271  
Form filled out by: Nathan Langston Phone Number: 587-2271 **FEB 28 2006**

I. STORAGE INVENTORY: Total treated storage capacity: 1,250,000 in gallons. Number of Tanks: 2

II. SOURCE INVENTORY:

1. Source Name: Blue Mt. Springs Type: Spring Location: Sec 35, T33S, R24E, SLB&M WR Number: 09-1276, 09-2007, 09-2138, 09-2136  
Method of Measurement:  Master Meter, [ ] Estimate, [ ] Other \_\_\_\_\_  
Units of Measurement: million gallons  
Are there any spills/overflow?  Yes, [ ] No If Yes, estimate annual quantity 1 MG. Where is source measured?  Before overflow, [ ] After overflow  
When do spills/overflow occur? Spring runoff Are spills/overflow included in the quantities reported?  Yes [ ] No

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
16.40	14.24	44.20	46.26	68.67	47.11	53.65	39.97	26.58	21.36	15.53	14.77	408.75

2. Source Name: Cemetery Well No. 1 Type: Well Location: Sec 31, T33S, R24E, SLB&M WR Number: 09-881 09-313  
Method of Measurement:  Master Meter, [ ] Estimate, [ ] Other \_\_\_\_\_  
Units of Measurement: MG  
Date of Last Pump Test: April 04 Yield of Well \_\_\_\_\_ Rated Pump Capacity: 60 gpm, [ ] cfs

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
—	—	—	—	—	—	—	—	—	—	—	—	—

3. Source Name: Circle Park Well Type: Well Location: Sec , T, R, B&M WR Number: 09-1029  
Method of Measurement:  Master Meter, [ ] Estimate, [ ] Other \_\_\_\_\_  
Units of Measurement: MG  
Date of Last Pump Test: April 04 Yield of Well \_\_\_\_\_ Rated Pump Capacity: N/A gpm, [ ] cfs

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
—	—	—	—	—	—	—	—	—	—	—	—	—

*entered 3/9/05*

**III. WATER USE BREAKDOWN:** (Please use sum of the readings from individual meters, not master meter readings at source. If quantities are not known, please estimate. See instructions for definition of uses shown in bold.)

Units of Measurement: gallons

**Residential:** Annual quantity of water delivered for residential purposes 107,146,967 Total number of residential connections 658  
 Meter readings at individual connections [ ] or Estimated [ ]  
 Number of connections serving multiple units (apartments) from a single connection 12 Units per connection (avg) 2

**Commercial:** Annual quantity of water delivered for commercial purposes 15,126,630 Total number of commercial connections 96  
 Meter readings at individual connections [ ] or Estimated [ ]

**Industrial:** Annual quantity of water delivered for industrial purposes 1 Total number of industrial connections 1  
 Meter readings at individual connections [ ] or Estimated [ ]

**Institutional:** Annual quantity of water delivered for institutional purposes 3,253,039 Total number of institutional connections 20  
 Meter readings at individual connections [ ] or Estimated [ ]

**Stockwatering:** Annual quantity of water delivered for stockwatering purposes \_\_\_\_\_ Total number of stockwatering connections \_\_\_\_\_  
 Meter readings at individual connections [ ] or Estimated [ ]

**Wholesale:** Annual quantity of water delivered for wholesale purposes \_\_\_\_\_ Please attach a listing of those supplied.  
 Meter readings at individual connections [ ] or Estimated [ ]

**Other Uses:** Annual quantity of water delivered for other purposes \_\_\_\_\_ Total number of other connections \_\_\_\_\_  
 Describe other uses \_\_\_\_\_

**Unmetered:** Annual estimate of water delivered by unmetered connections \_\_\_\_\_ Total number of unmetered connections 20  
 Unmetered connections used for \_\_\_\_\_

**Total annual quantity of water delivered for all purposes** 126,055,250 **Total number of all connections** 775  
125,526,631 Of this total, how many connections are active? \_\_\_\_\_

**IV. IRRIGATION SYSTEM** (Lawn and garden irrigation, whether controlled by the drinking water supplier or not)

Average Residential Lot Size (Acres) \_\_\_\_\_ Average Amount of Lot Irrigated (%) \_\_\_\_\_

Is any of your area served by a separate ditch or pipe fed irrigation water system? [ ] Yes, [X] No If Yes, please provide the following information:  
 What percent of your customers are served by a separate irrigation system? 70 %  
 Of these customers, what percent are served by ditch? 0 %  
 What percent are served by pressurized-pipe? 100 %

Do you operate and maintain the separate lawn and garden irrigation water system? [ ] Yes, [ ] No

If the separate irrigation system is operated by other entities, please give name of companies, contact person & phone number:

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**APPENDIX B**  
**2005 Southeast Colorado River Basin**  
**M&I Deliveries and Depletions**

WATER SUPPLIER	Potable Residential Indoor Use	Potable Residential Outdoor Use	Potable Commercial Use	Potable Institutional Use	Potable Industrial/Stockwater Use	Total Potable Use	Secondary Water Use	Total Indoor Use	Total Outdoor Use	Res. Indoor Return Flow	Commercial Indoor Return Flow	Institutional Indoor Return Flow	Industrial/Stockwater Indoor Return Flow	Total Indoor Return Flow To Treatment Facility	Pond Evaporation	Treatment Facility Outflow (Indoor) Return Flow	Outdoor Return Flow	Total Return Flow	Total Deliveries	Total Depletion
<b>GARFIELD COUNTY</b>																				
Cannonville Town	16.1	13.1	4.3	19.2	4.6	57.3	27.6	28.0	56.9	15.8	3.4	3.8	0.0	22.9	0.0	21.8	19.0	40.7	84.9	44.1
Henrieville	19.6	0.0	0.0	3.0	0.0	22.6	40.9	20.2	43.3	19.2	0.0	0.6	0.0	19.8	0.0	18.8	14.4	33.3	63.5	30.3
Tropic	47.1	25.3	48.5	9.2	0.6	130.7	289.3	88.3	331.7	46.1	38.0	1.8	0.0	86.0	15.3	66.3	110.6	176.9	420.0	243.1
<b>Total Community Systems</b>	<b>82.8</b>	<b>38.4</b>	<b>52.8</b>	<b>31.4</b>	<b>5.2</b>	<b>210.6</b>	<b>357.8</b>	<b>136.5</b>	<b>431.9</b>	<b>81.1</b>	<b>41.4</b>	<b>6.2</b>	<b>0.0</b>	<b>128.7</b>	<b>15.3</b>	<b>106.9</b>	<b>144.0</b>	<b>250.9</b>	<b>568.4</b>	<b>317.5</b>
Non-community Systems	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Self Supplied Industries	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Private Domestic Systems	1.7	3.4	0.0	0.0	0.0	5.0	0.0	1.7	3.4	1.6	0.0	0.0	0.0	1.6	0.0	1.5	1.1	2.7	5.0	2.3
<b>COUNTY TOTALS</b>	<b>84.4</b>	<b>41.8</b>	<b>52.8</b>	<b>31.4</b>	<b>5.2</b>	<b>215.6</b>	<b>357.8</b>	<b>138.2</b>	<b>435.3</b>	<b>82.8</b>	<b>41.4</b>	<b>6.2</b>	<b>0.0</b>	<b>130.3</b>	<b>15.3</b>	<b>108.5</b>	<b>145.1</b>	<b>253.6</b>	<b>573.4</b>	<b>319.9</b>
<b>GRAND COUNTY</b>																				
Day Star Adventist Academy	3.2	0.0	0.3	3.0	1.0	7.5	10.8	5.1	13.3	3.2	0.2	0.6	0.0	4.0	0.0	3.8	4.4	8.2	18.3	10.1
Spanish Valley Water & Sewer	268.3	195.2	112.9	196.0	0.0	772.4	500.0	397.8	874.5	262.9	88.5	38.4	0.0	389.9	0.0	382.1	291.5	673.6	1,272.4	598.8
Moab City Water	446.8	618.9	239.7	660.0	0.0	1,965.5	0.0	770.6	1,194.9	437.9	187.9	129.4	0.0	755.2	0.0	740.1	398.3	1,138.4	1,965.5	827.1
<b>Total Community Systems</b>	<b>718.4</b>	<b>814.1</b>	<b>352.9</b>	<b>859.0</b>	<b>1.0</b>	<b>2,745.3</b>	<b>510.8</b>	<b>1,173.5</b>	<b>2,082.7</b>	<b>704.0</b>	<b>276.6</b>	<b>168.4</b>	<b>0.0</b>	<b>1,149.0</b>	<b>0.0</b>	<b>1,125.9</b>	<b>694.2</b>	<b>1,820.1</b>	<b>3,256.1</b>	<b>1,436.0</b>
Non-community systems, etc.	2.5	5.1	21.3	83.4	0.0	112.4	29.2	36.3	105.3	2.5	16.7	16.4	0.0	35.6	0.0	33.8	35.1	68.9	141.6	72.7
Self Supplied Industries	0.0	0.0	0.0	0.0	0.0	0.0	674.9	674.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	674.9	674.9
Private Domestic Systems	38.6	78.4	0.0	0.0	0.0	117.0	0.0	38.6	78.4	37.8	0.0	0.0	0.0	37.8	0.0	35.9	26.1	62.1	117.0	54.9
<b>COUNTY TOTALS</b>	<b>759.5</b>	<b>897.6</b>	<b>374.2</b>	<b>942.4</b>	<b>1.0</b>	<b>2,974.7</b>	<b>1,214.9</b>	<b>1,923.2</b>	<b>2,266.4</b>	<b>744.3</b>	<b>293.4</b>	<b>184.7</b>	<b>0.0</b>	<b>1,222.4</b>	<b>0.0</b>	<b>1,195.6</b>	<b>755.5</b>	<b>1,951.1</b>	<b>4,189.6</b>	<b>2,238.5</b>
<b>KANE COUNTY</b>																				
Curch Wells SSD	9.4	22.3	0.0	1.6	2.1	35.4	0.0	11.8	23.6	9.2	0.0	0.3	0.0	9.5	0.0	9.3	7.9	17.2	35.4	18.2
Glenn Canyon SSD #1 (Big Water)	36.7	66.5	7.1	12.6	29.9	152.7	0.0	74.8	78.0	35.9	5.6	2.5	0.0	43.9	0.0	43.1	26.0	69.1	152.7	83.7
<b>Total Community Systems</b>	<b>46.0</b>	<b>88.8</b>	<b>7.1</b>	<b>14.2</b>	<b>32.0</b>	<b>188.1</b>	<b>0.0</b>	<b>86.6</b>	<b>101.6</b>	<b>45.1</b>	<b>5.6</b>	<b>2.8</b>	<b>0.0</b>	<b>53.4</b>	<b>0.0</b>	<b>52.4</b>	<b>33.9</b>	<b>86.2</b>	<b>188.1</b>	<b>101.9</b>
Non-community systems, etc.	0.4	0.8	0.0	3.7	0.0	4.9	0.0	1.1	3.8	0.4	0.0	0.7	0.0	1.1	0.0	1.1	1.3	2.3	4.9	2.6
Self Supplied Industries	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Private Domestic Systems	33.3	67.6	0.0	0.0	0.0	101.0	0.0	33.3	67.6	32.6	0.0	0.0	0.0	32.6	0.0	31.0	22.5	53.6	101.0	47.4
<b>COUNTY TOTALS</b>	<b>79.8</b>	<b>157.3</b>	<b>7.1</b>	<b>17.9</b>	<b>32.0</b>	<b>294.0</b>	<b>0.0</b>	<b>121.0</b>	<b>173.0</b>	<b>78.2</b>	<b>5.6</b>	<b>3.5</b>	<b>0.0</b>	<b>87.2</b>	<b>0.0</b>	<b>84.5</b>	<b>57.7</b>	<b>142.1</b>	<b>294.0</b>	<b>151.9</b>
<b>San Juan County</b>																				
Blanding City Municipal Water Sys.	252.0	156.0	86.0	15.0	0.0	509.0	92.8	323.8	278.0	246.9	67.4	2.9	0.0	317.3	114.4	187.0	92.7	279.7	601.8	322.1
Bluff Water & Sewer Users Assn.	24.5	5.8	33.6	1.8	0.0	65.7	0.0	51.7	14.0	24.0	26.3	0.4	0.0	50.7	0.0	48.2	4.7	52.8	65.7	12.9
Eastland Special Service District	7.9	1.3	0.6	1.0	0.0	10.8	0.0	8.6	2.2	7.7	0.5	0.2	0.0	8.4	0.0	8.0	0.7	8.7	10.8	2.1
Monticello Municipal Water System	159.6	169.3	46.4	10.0	0.0	385.3	516.0	198.7	702.5	156.4	36.4	2.0	0.0	194.7	71.0	114.0	234.2	348.2	901.3	553.1
Monument Valley High School	6.7	6.0	0.0	32.2	0.0	44.9	0.0	13.1	31.8	6.6	0.0	6.3	0.0	12.9	0.0	12.2	10.6	22.8	44.9	22.1
Aneth Community	26.9	0.0	5.1	0.2	23.7	55.9	0.0	54.7	1.2	26.4	4.0	0.0	0.0	30.4	0.0	28.9	0.4	29.3	55.9	26.6
Holly Village Community	5.5	0.0	0.0	0.0	0.0	5.5	0.0	5.5	0.0	5.4	0.0	0.0	0.0	5.4	0.0	5.1	0.0	5.1	5.5	0.4
Mexican Hat / Halchita Community	12.6	0.0	4.6	12.0	0.1	29.3	0.0	18.8	10.5	12.3	3.6	2.4	0.0	18.3	0.0	17.4	3.5	20.9	29.3	8.4
Montezuma Creek Community	16.6	0.0	3.1	26.2	4.2	50.1	0.0	28.5	21.6	16.3	2.4	5.1	0.0	23.8	0.0	22.6	7.2	29.8	50.1	20.3
Oljato Community	21.1	0.0	1.7	0.1	0.0	22.9	0.0	22.5	0.4	20.7	1.3	0.0	0.0	22.0	0.0	20.9	0.1	21.1	22.9	1.8
Red Mesa Community	11.1	0.0	0.0	1.0	0.0	12.1	0.0	11.3	0.8	10.9	0.0	0.2	0.0	11.1	0.0	10.5	0.3	10.8	12.1	1.3
Todohaidekani Community	8.4	0.0	0.1	0.0	0.0	8.5	0.0	8.5	0.0	8.2	0.1	0.0	0.0	8.3	0.0	7.9	0.0	7.9	8.5	0.6
San Juan County SSD #1 (Mex. Hat)	5.5	3.0	12.7	3.0	0.0	24.2	0.0	16.3	7.9	5.4	10.0	0.6	0.0	16.0	8.9	6.3	2.6	8.9	24.2	15.3
Spanish Valley Water & Sewer	3.3	2.0	0.0	0.0	0.0	5.3	0.0	3.3	2.0	3.2	0.0	0.0	0.0	3.2	0.0	3.1	0.7	3.7	5.3	1.5
White Mesa (Ute Mountain Ute Tribe)	27.5	0.0	0.0	0.0	0.0	27.5	0.0	27.5	0.0	27.0	0.0	0.0	0.0	27.0	0.0	26.4	0.0	26.4	27.5	1.1
<b>Total Community Systems</b>	<b>589.2</b>	<b>343.3</b>	<b>194.0</b>	<b>102.6</b>	<b>28.0</b>	<b>1,257.0</b>	<b>608.8</b>	<b>792.8</b>	<b>1,072.9</b>	<b>577.4</b>	<b>152.1</b>	<b>20.1</b>	<b>0.0</b>	<b>749.5</b>	<b>194.4</b>	<b>518.5</b>	<b>357.6</b>	<b>876.1</b>	<b>1,865.8</b>	<b>989.6</b>
Non-community Systems, etc.	18.8	38.2	87.5	25.0	0.0	169.5	0.0	93.8	75.7	18.4	68.6	4.9	0.0	91.9	0.0	87.3	25.2	112.5	169.5	56.9
Self Supplied Industries	3.3	6.8	0.0	0.0	515.2	525.3	0.0	518.5	6.8	3.3	0.0	0.0	0.0	3.3	0.0	3.1	2.3	5.4	525.3	519.9
Private Domestic Systems	198.0	402.0	0.0	0.0	0.0	600.0	0.0	198.0	402.0	194.0	0.0	0.0	0.0	194.0	0.0	184.3	134.0	318.3	600.0	281.7
<b>COUNTY TOTALS</b>	<b>809.3</b>	<b>790.3</b>	<b>281.5</b>	<b>127.5</b>	<b>543.2</b>	<b>2,551.7</b>	<b>608.8</b>	<b>1,603.2</b>	<b>1,557.4</b>	<b>793.1</b>	<b>220.7</b>	<b>25.0</b>	<b>0.0</b>	<b>1,038.8</b>	<b>194.4</b>	<b>793.3</b>	<b>519.1</b>	<b>1,312.4</b>	<b>3,160.5</b>	<b>1,848.1</b>
<b>Basin Community Systems</b>	<b>1,436.4</b>	<b>1,284.7</b>	<b>606.7</b>	<b>1,007.1</b>	<b>66.3</b>	<b>4,401.1</b>	<b>1,477.4</b>	<b>2,189.4</b>	<b>3,689.1</b>	<b>1,407.6</b>	<b>475.6</b>	<b>197.4</b>	<b>0.0</b>	<b>2,080.7</b>	<b>209.7</b>	<b>1,803.7</b>	<b>1,229.7</b>	<b>3,033.4</b>	<b>5,878.5</b>	<b>2,845.1</b>
<b>Total Non-Community Systems</b>	<b>21.7</b>	<b>44.1</b>	<b>108.8</b>	<b>112.1</b>	<b>0.0</b>	<b>286.8</b>	<b>29.2</b>	<b>131.2</b>	<b>184.8</b>	<b>21.3</b>	<b>85.3</b>	<b>22.0</b>	<b>0.0</b>	<b>128.6</b>	<b>0.0</b>	<b>122.2</b>	<b>61.6</b>	<b>183.8</b>	<b>316.0</b>	<b>132.2</b>
<b>Self Supplied Industries</b>	<b>3.3</b>	<b>6.8</b>	<b>0.0</b>	<b>0.0</b>	<b>515.2</b>	<b>525.3</b>	<b>674.9</b>	<b>1,193.4</b>	<b>6.8</b>	<b>3.3</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>3.3</b>	<b>0.0</b>	<b>3.1</b>	<b>2.3</b>	<b>5.4</b>	<b>1,200.2</b>	<b>1,194.8</b>
<b>Private Domestic Systems</b>	<b>271.6</b>	<b>551.4</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>822.9</b>	<b>0.0</b>	<b>271.6</b>	<b>551.4</b>	<b>266.1</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>266.1</b>	<b>0.0</b>	<b>252.8</b>	<b>183.8</b>	<b>436.6</b>	<b>822.9</b>	<b>386.3</b>
<b>Southeast Colorado River Basin</b>	<b>1,733.0</b>	<b>1,886.9</b>	<b>715.5</b>	<b>1,119.2</b>	<b>581.5</b>	<b>6,036.1</b>	<b>2,181.5</b>	<b>3,785.6</b>	<b>4,432.0</b>	<b>1,698.4</b>	<b>561.0</b>	<b>219.4</b>	<b>0.0</b>	<b>2,478.7</b>	<b>209.7</b>	<b>2,181.8</b>	<b>1,477.3</b>	<b>3,659.1</b>	<b>8,217.6</b>	<b>4,558.4</b>

Potable Use Data  
 Secondary Use Data  
 Indoor/Outdoor Use Data

Return Flow Data  
 Diversion Data  
 Depletion Data

Regular = Sewage Treatment Plant  
 Bold = Facultative ponds/Lagoons  
 Bold/Italics = Septic System/Tanks