

**MUNICIPAL AND INDUSTRIAL  
WATER SUPPLY AND USES  
in the  
SOUTHEAST COLORADO RIVER BASIN  
(Data Collected for Calendar Year 1996)**

**Prepared by**

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

**JULY 1998**

(Revised December 2000)

## **ACKNOWLEDGMENTS**

This water study was conducted under the direction of Paul L. Gillette, deputy director, and supervised by Lloyd H. Austin, chief, Resource Inventories and Special Studies Section, Utah State Division of Water Resources. Staff members assisting in the preparation of this report and/or in the data collection and analysis were Eric K. Klotz and David G. Peterson. Appreciation is expressed to the various water suppliers and the Division of Water Rights for supplying information for this report.

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D. Larry Anderson, Director

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## EXECUTIVE SUMMARY

This document describes the municipal and industrial (M&I) water supplies and uses for the Southeast Colorado River Basin. Total M&I water supplies and uses for the basin are computed by tabulating the results of the basin's four counties. These counties are San Juan, and portions of Garfield, Grand and Kane. County data are compiled by meeting and surveying each public community and non-community system. The results reported herein represent totals for the 1996 calendar year.

The basin's maximum annual potable water supply under present conditions for Public Community Systems is 18,912 acre-feet. Springs account for 17 percent of this total, wells 63 percent, and surface sources 20 percent. The reliable system source capacity for these systems is 8,326 acre-feet. Table I presents this data.

**TABLE I**  
**SOUTHEAST COLORADO RIVER BASIN**  
**Maximum Culinary Water Supplies for Public Community Systems**  
**(Units in Acre-Feet)**

Source	Garfield County	Grand County	Kane County	San Juan County	Total
Springs	548.2	1,871.0	0.0	871.6	3,290.8
Wells	0.0	8,135.0	1,515.7	2,332.0	11,982.7
Surface	0.0	0.0	0.0	3,638.0	3,638.0
<b>TOTALS</b>	548.2	10,006.0	1,515.7	6,841.6	18,911.5
Reliable System Source Capacity	244.3	4,339.3	641.3	3,100.6	8,325.6

M&I water use can be divided into two categories: potable (culinary) and non-potable (secondary). Potable water is delivered by public community, public non-community, self-supplied industrial, and private domestic systems. Non-potable water uses include residential and institutional secondary water usually delivered by separate irrigation companies and secondary water used by self-supplied industries. Table II presents water use data for the potable and non-potable categories delivered by public community systems. The table shows that the residential indoor

category accounts for 30 percent, residential outdoor 36 percent, commercial 12 percent, institutional 21 percent, and light industrial 1 percent of the total public community system water use (5,276 acre-feet) in the basin.

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

<b>Source</b>	<b>Garfield County</b>	<b>Grand County</b>	<b>Kane County</b>	<b>San Juan County</b>	<b>Total</b>
<i>Potable Uses:</i>					
Residential Indoor	67.8	671.9	63.3	742.2	1,545.2
Residential Outdoor	23.5	859.6	85.5	375.9	1,344.5
Commercial	43.6	421.7	16.8	162.4	644.5
Institutional	25.6	161.0	12.3	135.6	334.5
Industrial/Stockwater	2.6	0.0	48.2	28.3	79.1
<b>TOTAL CULINARY</b>	<b>163.1</b>	<b>2,114.2</b>	<b>226.1</b>	<b>1,444.4</b>	<b>3,947.8</b>
<i>Non-Potable Uses:</i>					
Residential	203.6	123.6	0.0	251.0	578.2
Commercial	0.0	0.0	0.0	0.0	0.0
Institutional	1.5	580.0	0.0	168.8	750.3
Industrial/Stockwater	0.0	0.0	0.0	0.0	0.0
<b>TOTAL SECONDARY</b>	<b>205.1</b>	<b>703.6</b>	<b>0.0</b>	<b>419.8</b>	<b>1,328.5</b>
<b>TOTAL WATER USE</b>	<b>368.2</b>	<b>2,817.8</b>	<b>226.1</b>	<b>1,864.2</b>	<b>5,276.3</b>

Table III presents the total M&I water use in the Southeast Colorado River Basin. Public community systems deliver the majority of the potable water in the basin. The table shows that the total potable M&I water use in 1996 is 6,266 acre-feet. Non-potable M&I water use for the basin is 2,269 acre-feet. Therefore, total M&I (potable and non-potable) water use in the basin is about 8,534 acre-feet.

For 1996, population for public community systems in the Southeast Colorado River Basin was 16,466. Residential potable per capita water use is 157 gallons per capita per day (gpcd). Non-potable water use amounts to 31 gpcd resulting in uses of 188 gpcd for residential purposes within the public community systems of the basin. Furthermore, by adding commercial, institutional and industrial uses, public community systems use jumps to 214 gpcd for potable uses and 72 gpcd for non-potable uses for a total of 286 gpcd. Lastly, with a population of 22,800 (including

the private domestic category), the total basin M&I per capita water use including all categories and types of systems is 334 gpcd.

**TABLE III**  
**SOUTHEAST COLORADO RIVER BASIN**  
**Total Municipal and Industrial Water Use for all Categories**  
**(Units in Acre-Feet)**

<b>Source</b>	<b>Garfield County</b>	<b>Grand County</b>	<b>Kane County</b>	<b>San Juan County</b>	<b>Total</b>
<i>Potable Suppliers:</i>					
Public Community Systems	163.1	2,114.2	226.1	1,444.4	3,947.8
Public Non-Community Systems	1.0	37.3	19.4	165.1	222.8
Self-Supplied Industries	0.0	0.0	0.0	1,090.0	1,090.0
Private Domestic	5.0	390.0	10.0	600.0	1,005.0
<b>TOTAL CULINARY</b>	<b>169.1</b>	<b>2,541.5</b>	<b>255.5</b>	<b>3,299.5</b>	<b>6,265.6</b>
<i>Non-Potable Suppliers:</i>					
Secondary Irrigation Companies	205.1	703.6	0.0	419.8	1,328.5
Non-Community Systems	0.0	0.0	0.0	0.0	0.0
Self-Supplied Industries	0.0	940.0	0.0	0.0	940.0
Private Domestic	0.0	0.0	0.0	0.0	0.0
<b>TOTAL SECONDARY</b>	<b>205.1</b>	<b>1,643.6</b>	<b>0.0</b>	<b>419.8</b>	<b>2,268.5</b>
<b>TOTAL WATER USE</b>	<b>374.2</b>	<b>4,185.1</b>	<b>255.5</b>	<b>3,719.3</b>	<b>8,534.1</b>



## INTRODUCTION

### **Authority**

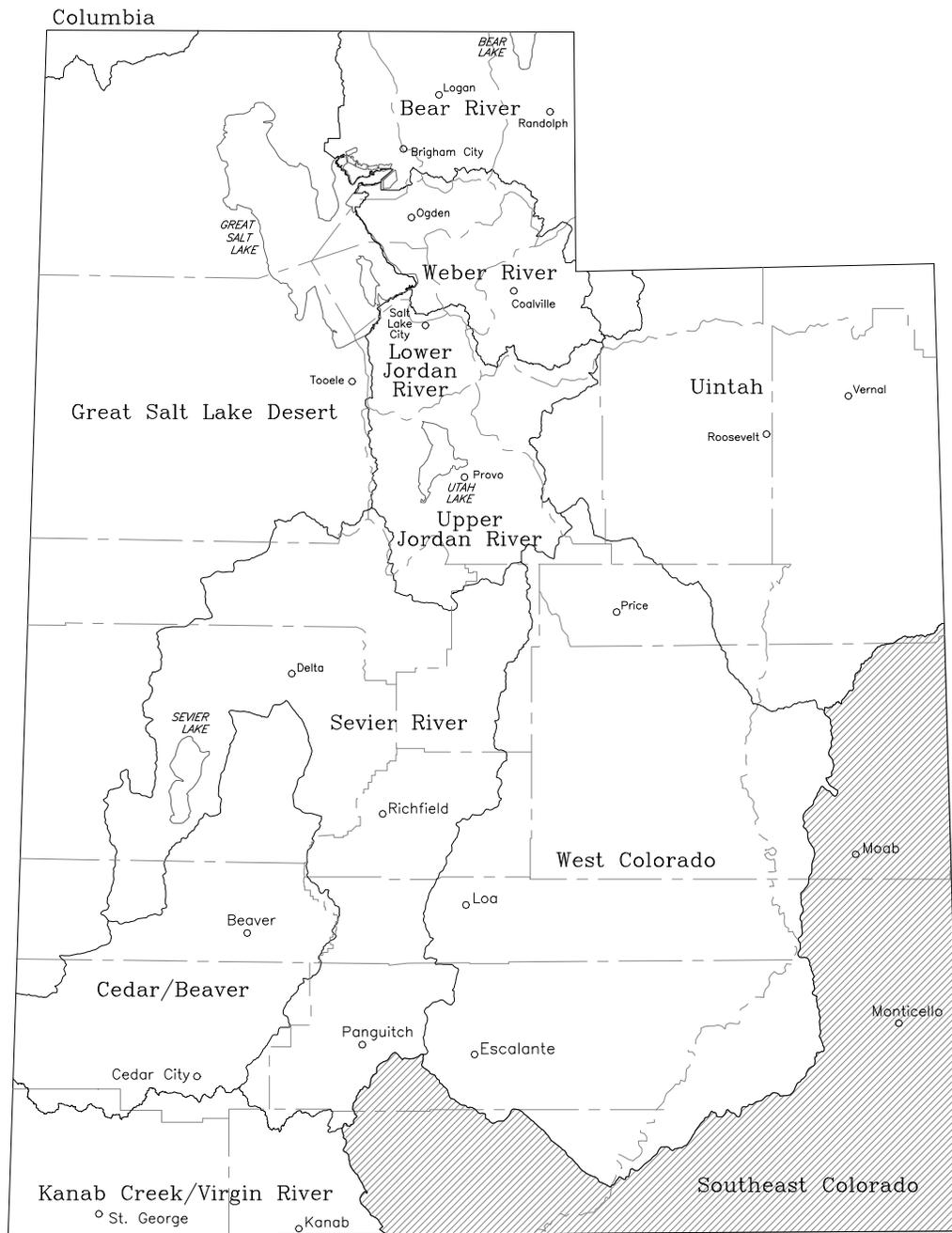
The Utah Division of Water Resources has overall responsibility for completing studies, investigations, and plans directed at the responsible development and utilization of the water resources of the state of Utah. The State Water Plan, prepared and distributed in early 1990, provided the foundation and overall direction to establish and implement the state policy framework of water management. As part of the state water planning process, detailed plans are prepared for each of the 11 hydrologic basins in the state. The Southeast Colorado River Basin is one of these 11 reports. Each basin water plan will identify potential conservation and development projects and describe alternatives to satisfy the problems, needs, and demands. As part of this effort, background data reports are completed for each river basin. These include a water-related land use report and a water budget report.

### **Scope**

The subject of this data report is a determination of present municipal and industrial (M&I) water supplies and uses within this basin. The data presented in these reports will be used in the State Water Plan for the Southeast Colorado River Basin as well as other division reports and studies. The basin is shown in Figure 1. Information considered includes related investigations recently completed by the Division of Water Resources and the Division of Water Rights.

### **Data Collection**

This study was begun in January 1996 by Division staff. The *1996 Municipal and Industrial Water Use Forms*, distributed by the Division of Water Rights, in cooperation with the Division of Water Resources and the Division of Drinking Water,



**Figure 1.** Location of the Southeast Colorado River Basin.

were used and is 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 conversations with Mark Page and Kerry Carpenter, Area Engineers from the State Engineer's Office that cover the areas of the Southeast Colorado River Basin.

### **General Description of the Basin**

The Southeast Colorado River Basin is comprised of approximately 10,876 square miles (6,960,629 acres) of land. 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 along the Timber Mountains between the Paria drainage and Johnson Creek drainage. It then follows the Pink Cliffs in Bryce Canyon and heads 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 up the river to the confluence of the Green and Colorado Rivers. Above this, the boundary follows the drainage divide between these two rivers and then on the Book Cliffs over to the Utah-Colorado state line.

The basin spans part of four counties: Grand, San Juan, Kane, and Garfield. The five hydrologic subareas that form this basin are the Colorado, Delores, San Juan, Wahweep, and Paria. Elevations within the basin climax at 12,721 feet above mean sea level in the La Sal Mountains east of Moab. Approximately 50 miles to the southwest, Abajo Peak in the Blue Mountains reaches 11,360 feet. Lake Powell is at an elevation of about 3,700 feet above mean sea level. Notable features of the basin include Arches National Park, and portions of Bryce Canyon Nation 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 principle river system in the basin is the Colorado River and its tributaries; the San Juan, Dolores, and the Paria Rivers. The southern portion of the Colorado River, which lies in the basin, is now part of Lake Powell. The confluences of the Colorado and the San Juan Rivers (in Lake Powell) and the Colorado and the Green Rivers mark the drainage divisions with this basin and the West Colorado River Basin and the Sevier River Basin. Figure 2 shows a detailed map of the basin.

There are currently 15 public community water systems and 8 unregulated Indian systems in the Southeast Colorado River Basin. These systems serve 14,796 people (about 70 percent of the 21,150 total population within the basin). Figure 3 shows the location of these systems. The basin also includes 26 public non-community systems. These systems serve National Parks, State Parks, campgrounds, isolated commercial establishments, and roadside rest stops and parks. There are also 8 self-supplied industries within the Southeast Colorado Basin.

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

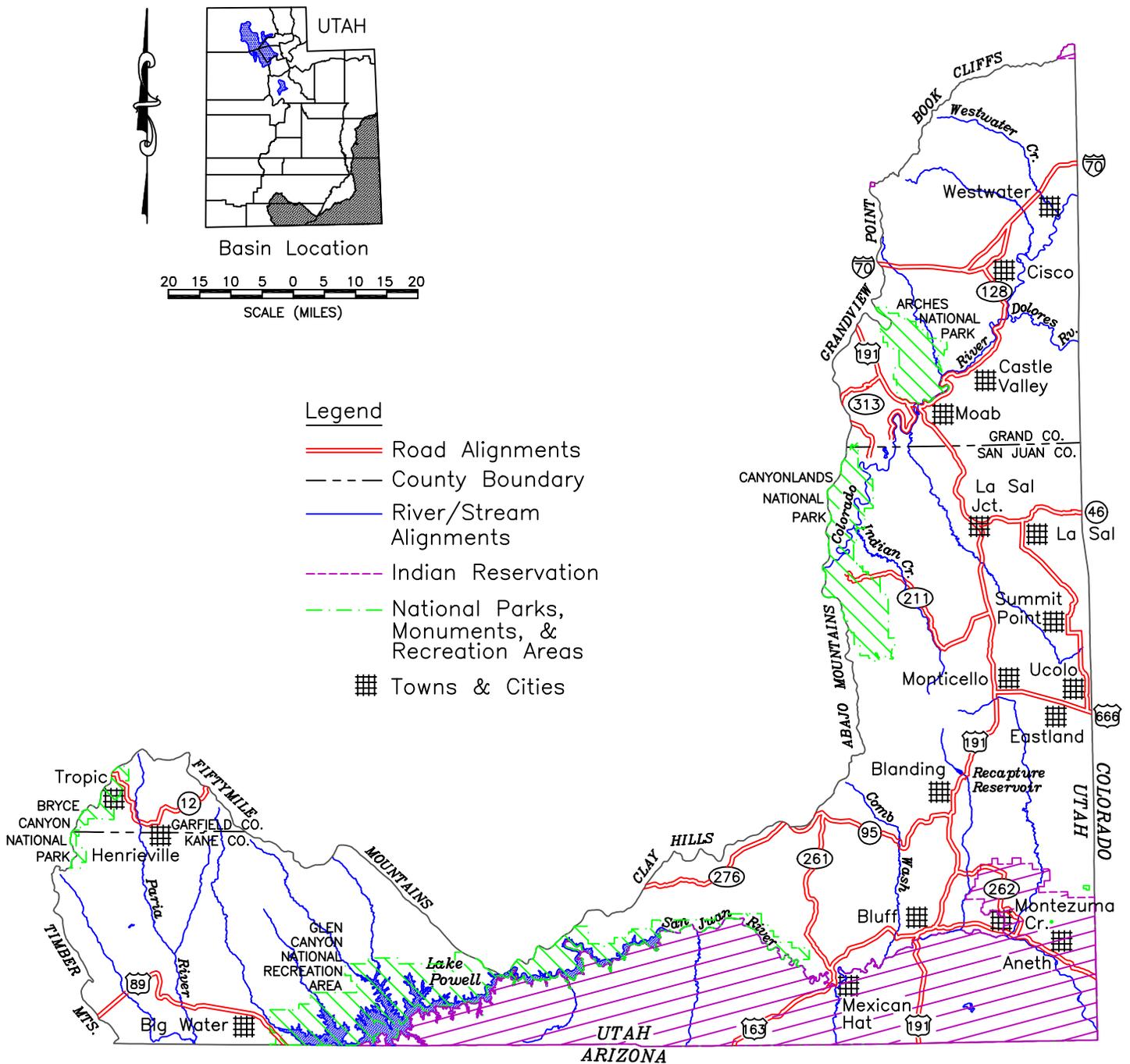
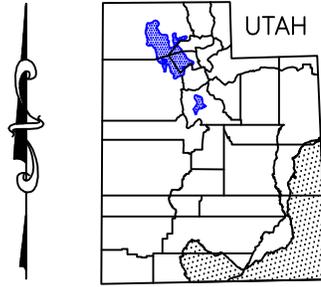
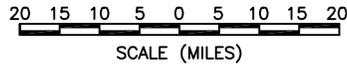


Figure 2. Southeast Colorado River Basin Drainage Map.



Basin Location



Legend

Limits of Public Community System Boundaries

GRAND COUNTY

1. Thompson Water Improvement District
2. Day Star Adventist Academy
3. Spanish Valley Water & Sewer Imp. District (Grand County Water Conservancy District)
4. Moab City Water

SAN JUAN COUNTY

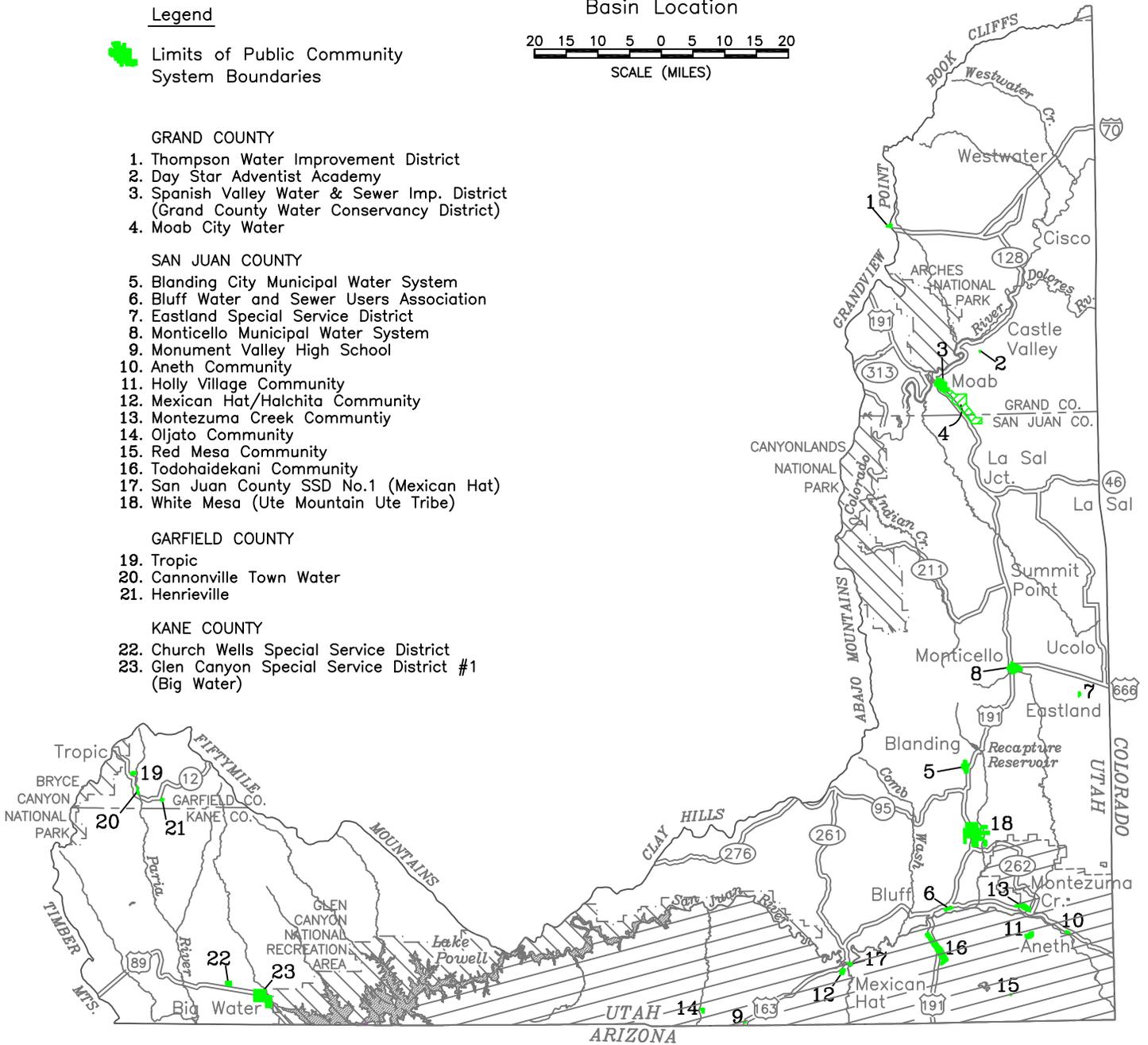
5. Blanding City Municipal Water System
6. Bluff Water and Sewer Users Association
7. Eastland Special Service District
8. Monticello Municipal Water System
9. Monument Valley High School
10. Aneth Community
11. Holly Village Community
12. Mexican Hat/Halchita Community
13. Montezuma Creek Community
14. Oljato Community
15. Red Mesa Community
16. Todohaidekani Community
17. San Juan County SSD No.1 (Mexican Hat)
18. White Mesa (Ute Mountain Ute Tribe)

GARFIELD COUNTY

19. Tropic
20. Cannonville Town Water
21. Henrieville

KANE COUNTY

22. Church Wells Special Service District
23. Glen Canyon Special Service District #1 (Big Water)



**Figure 3** Public Community Systems Within the Southeast Colorado River Basin

## **WATER SUPPLY AND USE METHODOLOGY**

### **Background**

Over the past 40 years the Division of Water Resources has employed various procedures to obtain needed M&I data. In recent years, these procedures have become more comprehensive. When the division began water planning in the 1960's, available data consisted mainly of supplies and uses for the entire state. At that time, agriculture uses far exceeded M&I uses in Utah. At that time M&I water use was generally calculated by using available or estimated per capita rates and multiplied by the 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 began an increased focus on M&I water supplies and uses. The Division of Water Rights launched a program to collect yearly, statewide M&I data. The procedure involved mailing a survey designed to query each major public water supplier about their sources of water supply. In addition the United States Geological Survey (USGS) began M&I water use studies. The division relied on both of these data sources in its planning efforts by the late 1980's.

With the preparation of the State Water Plan Basin reports, the division saw the need to check and improve the quality and quantity of the available data through two methods. The first was to join with the Division of Water Rights to improve their M&I data collection program. Secondly, the division began exploring the accuracy of the data through yearly field surveys described in the following four sections.

### **Present Methodology for Community Water Systems**

Each year, division staff targets a particular hydrologic basin or study area for M&I water supply and use analysis. The division of Water Rights' most recent water

use form is the primary tool for these analyses. As an example, the following three pages exhibit the 1996 water use form submitted by Grand County Water Conservancy District.

Division staff contact the manager or operator of each community water system ( as defined by the Division of Drinking Water) to schedule a data analysis meeting. Many times operators inadvertently omit necessary information of their yearly form. During such meetings, division staff attempts to retrieve missing data as well as obtain an overall feeling of the supplies and demands of the water system, in case estimates are necessary. Additionally, a secondary objective of these meetings is to educate the operator or manager to correctly complete the water use data form. Division staff supply a new form to those systems that either didn't receive one or didn't return one. This methodology has been used since 1994, and all of the community water systems for the various basins studied have provided the necessary M&I water supply and use data.

During the analysis, division staff determines the system's water supply and use. Two factors define water supply: 1) maximum water supply available under present conditions and 2) reliable system source capacity. The maximum water supply available under present conditions is defined as the water resource which is presently developed. The resource is limited by either a mechanical constraint (such as pump capacity or pipe size), a hydrologic constraint (such as reliable streamflow or groundwater safe yield) or a legal constraint (such as a water right or contract). The lesser amount of these three constraints is considered in this study as the maximum water supply available under present conditions. Determination of well pump capacities, spring flow estimates, treatment plant capacities, and water right information aid in the calculation of this value. It should be noted here that due to the complexity of water rights, contracts, exchanges, etc., a detailed search of water right limitations associated with each entity is not in the scope of this study.

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

UTAH WATER USE DATA FORM  
 DATA FOR 1996

Return completed form to:  
 Utah Division of Water Rights  
 1594 West North Temple  
 Salt Lake City, UT 84114-6300

System Name: Grand County Water Conservancy District  
 Address: P.O. Box 1046  
 Moab, UT 84532  
 Contact Person: Dale F. Pierson, Manager  
 Form filled out by: Dale F. Pierson

Population Served: 2100 ID #: 1046/10023  
 Total No. Connections: 852 County: Grand  
 Average Lot Size Served: 1 acre (s).  
 Estimated Percent of Lot Irrigated .50 %  
 Phone Number: (801)259-8121  
 Phone Number: (801) 259-8121

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

II. SOURCE INVENTORY:

1 Source Name: Schumaker Well no.1 (14") Type: WE Location: Sec 8, T26S, R22E, SLB&M WR Number: 05-1285  
 Method of Measurement: [X] Master Meter, [ ] Individual Meters, [ ] Estimate, [ ] Other  
 Units of Measurement: AF Rated Pump Capacity: 1000 K] gpm, [ ] cfs  
 Date of Last Pump Test: Yield of Well: 600 [X] gpm, [ ] cfs

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEARLY TOTAL
Yield of Well	0	0	0	0	0	21	21	22	21	0	0	0	85

2 Source Name: White Well no.4 (16") Type: WE Location: Sec 23, T26S, R22E, SLB&M WR Number: 05-278  
 Method of Measurement: [X] Master Meter, [ ] Individual Meters, [ ] Estimate, [ ] Other  
 Units of Measurement: 1000 gallons Rated Pump Capacity: 1100 K] gpm, [ ] cfs  
 Date of Last Pump Test: Yield of Well: 1100 [X] gpm, [ ] cfs

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEARLY TOTAL
Yield of Well	0	0	0	0	14944	30489	35125	31527	21804	0	0	0	133889

3 Source Name: White Well no.5 Type: WE Location: Sec 23, T26S, R22E, SLB&M WR Number: 05-278  
 Method of Measurement: [X] Master Meter, [ ] Individual Meters, [ ] Estimate, [ ] Other  
 Units of Measurement: 1000 gallons Rated Pump Capacity: 1000 K] gpm, [ ] cfs  
 Date of Last Pump Test: Yield of Well: 575 [X] gpm, [ ] cfs

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEARLY TOTAL
Yield of Well	8822	9081	11756	16974	10642	712	0	0	0	16439	8689	8418	91533

RECEIVED

APR 08 1997

WATER RIGHTS  
 SALT LAKE

4. Source Name: Schumaker Well no.3 (6") Type: WE Location: Sec 8, T26S, R22E, SLB&M WR Number: 05-1285

Method of Measurement:  Master Meter, ( ) Estimate, ( ) Other Rated Pump Capacity: 300  gpm, ( ) cfs  
Units of Measurement: AF Yield of Well 300  gpm, ( ) cfs  
Date of Last Pump Test

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEARLY TOTAL
0	0	0	0	23	23	23	23	24	0	0	0	116

5 Source Name: Delay Lance Well Type: WE Location: Sec 7, T26S, R22E, SLB&M WR Number: 05-858

Method of Measurement:  Master Meter, ( ) Estimate, ( ) Other  
Units of Measurement: 1000 gallons Rated Pump Capacity: [ ] gpm, ( ) cfs  
Date of Last Pump Test Yield of Well [ ] gpm, ( ) cfs

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEARLY TOTAL
0	0	0	0	0	0	0	0	0	0	0	0	0

6 Source Name: Howard Lance Well Type: WE Location: Sec 7, T26S, R22E, SLB&M WR Number: 05-174

Method of Measurement:  Master Meter, ( ) Estimate, ( ) Other  
Units of Measurement: 1000 gallons Rated Pump Capacity: [ ] gpm, ( ) cfs  
Date of Last Pump Test Yield of Well [ ] gpm, ( ) cfs

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEARLY TOTAL
0	0	0	0	0	0	0	0	0	0	0	0	0

7 Source Name: Corbin Well (Moab) Type: WE Location: Sec 26, T26S, R22E, SLB&M WR Number: 05-101

Method of Measurement:  Master Meter, ( ) Estimate, ( ) Other  
Units of Measurement: AF Rated Pump Capacity: 1000  gpm, ( ) cfs  
Date of Last Pump Test Yield of Well 1000  gpm, ( ) cfs

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEARLY TOTAL
0	0	0	0	0	0	46	46	46	0	0	0	138

8 Source Name: Cemetery Well Type: WE Location: Sec 7, T26S, R22E, SLB&M WR Number: 05-475

Method of Measurement:  Master Meter, ( ) Estimate, ( ) Other  
Units of Measurement: AF Rated Pump Capacity: [ ] gpm, ( ) cfs  
Date of Last Pump Test Yield of Well 400  gpm, ( ) cfs

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEARLY TOTAL
0	0	0	0	0	24	25	24	0	0	0	0	73

III. WATER USE BREAKDOWN: (If quantities are not known, please estimate percentages. See instructions for definition of uses shown in bold.)

Units of Measurement: \_\_\_\_\_  
 Source of data: ( ) Meter readings at the source; ( ) Meter readings at individual connections; or (X) Estimated  
 Residential: Annual quantity of water delivered for residential purposes - 19142350 Total number of residential connections 766  
 Commercial: Annual quantity of water delivered for commercial purposes - 3243254 Total number of commercial connections 81  
 Industrial: Annual quantity of water delivered for industrial purposes - 1351357 Total number of industrial connections 5  
 Institutional: Annual quantity of water delivered for institutional purposes - \_\_\_\_\_ Total number of institutional connections \_\_\_\_\_  
 Stockwatering: Annual quantity of water delivered for stockwatering purposes - \_\_\_\_\_ Total number of stockwatering connections \_\_\_\_\_  
 Wholesale: Annual quantity of water delivered to other systems - \_\_\_\_\_ Please attach a listing of those supplied.  
 Other Uses: Annual quantity of water delivered for other purposes - \_\_\_\_\_ Total number of other connections \_\_\_\_\_  
 Describe other uses \_\_\_\_\_

IV. IRRIGATION SYSTEM (Separate lawn and garden irrigation system, whether controlled by the drinking water supplier or not)

Is your area served by a separate irrigation water system? (X) Yes, ( ) No If yes, please provide the following information:  
 What percent of your customers are served by a separate irrigation system? \_\_\_\_\_% The water is delivered 0 % by ditch & 100 % by pressurized system  
 If system is operated by another entity, please give name of company, contact person & phone number: \_\_\_\_\_

Number of stock holders: \_\_\_\_\_ Total shares of stock: \_\_\_\_\_ Total acres irrigated: 755 Quantity of water \_\_\_\_\_

Please enter quantity of water delivered by the irrigation system: Institutional acreage \_\_\_\_\_

Method of Measurement: (X) Master Meter, ( ) Individual Meters, ( ) Estimate, ( ) Other \_\_\_\_\_

Units of Measurement: ACRE FEET

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEARLY TOTAL
0	0	0	50	600	298	716	769	476	166	186	0	0	3261

Do these quantities reflect water delivered to the municipal service area only? ( ) Yes, (X) No If no, percent delivered to municipal service area? 30%

V. ADDITIONAL INFORMATION:

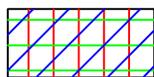
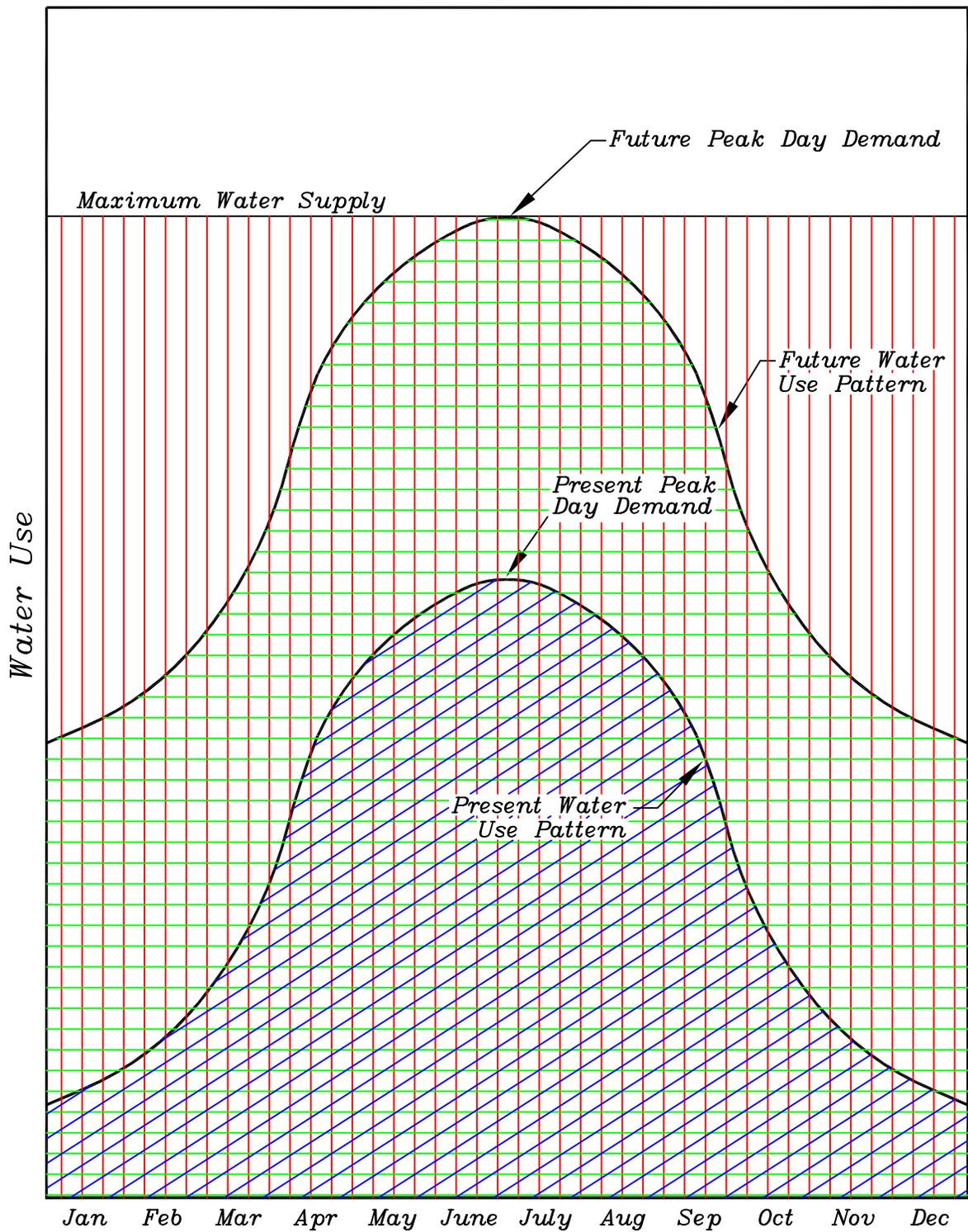
Which of the following maps are available? (X) Service area, (X) Zoning, (X) Distribution systems (pipes and ditches)  
 Can a listing of businesses served by the water system be provided? (X) Yes, ( ) No

The reliable system source capacity is defined as the capacity to meet peak day demands, expressed as an annual volume. The maximum water supply available under present conditions (defined earlier) deals with an average annual volume. Many water supply components in M&I systems (treatment plants, storage facilities, pump motors, etc.) are sized using demand during a peak 24-hour period. The relationship between average day and peak day demand is important. It is for this reason that a more reliable system source capacity is determined to accurately reflect future M&I water conditions for each system. The relationship that is used is as follows:

$$P_D = - 49.4 + 2.5 A_D$$

where  $P_D$  is peak day demand and  $A_D$  is average daily demand. For each public community system, the average per capita use (described later) is used in the relationship above to determine a peak factor, and the maximum water supply available under present conditions is used to determine a peak day supply. These two values are then used in calculating the reliable system source capacity which represents the systems' annual maximum water supply's ability to meet peak day demand conditions. It also represents the volume of water which, when divided by the average annual per capita water use, gives the population that can be reliably served by the present system sources.

Figure 4 graphically presents the relationship between maximum water supply and reliable system source capacity. Current water use is shown in the figure as the volume under the lower curve. The future water use is shown as the volume under the upper curve. The maximum water supply under present conditions is shown by the volume under the upper line. Because this amount is associated with a maximum daily flow rate (limited by the water right or system capacity), the line in the figure must pass through the peak day demand point on the future water use curve. It is for this reason (and the fact that most culinary water system storage tanks are designed to store only about one days' worth of water demand) that not all of the maximum water supply is available to meet future water needs. Therefore, the reliable system source capacity, which is equal to the volume under the future water



Present Yearly Water Use (Volume under curve)



Present Reliable System Source Capacity/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 Source Capacity Available Under Present Conditions (Volume under line)

**Figure 4. Water Supply and Use Hydrograph.**

use curve, is a better indication for meeting future water needs. For most systems this value is about one half of the maximum water supply.

The reliable system source capacity is valuable in determining future water capacities of the particular community water system sources (wells, springs, etc.). Although future water projections are not addressed in this study, the data provided here are used in the state water plans which the division is formulating for each major hydrologic basin in the state. These basin plans deal with considerable detail about future water demands and supplies.

The last part of the data collection process is to determine the present water use for each community water system. Present water use, as defined herein, includes the developed water which is actually diverted into the distribution system from surface or subsurface sources. The data collected represents the latest available complete calendar year from when the study is started. Water use is divided into four categories: residential, commercial, institutional and industrial. For comparative purposes the division chose these categories to correlate with the United States Geological Survey's (USGS) categories of domestic, commercial, industrial, and mining. The division's residential category is equivalent to the USGS domestic category and includes water used in residential homes for inside and outside uses. The USGS commercial category is equivalent to the division's combined commercial and institutional categories. The commercial category includes water use for retail establishments and businesses. The institutional category includes water use for government facilities, military facilities, schools, hospitals, churches, parks, cemeteries, golf courses, etc. The division's industrial category is equivalent to the combined USGS categories of industrial and mining which includes a wide variety of water uses associated with businesses that produce a specific product.

## *Residential Use*

From the system operator, the staff collects data about the number of residential connections and the amount of water used by those connections. Water use in this category is divided into three subcategories: culinary-outside, culinary-inside, and secondary-outside use. The first step in calculating the amount of water used in each of these subcategories is determining the amount of outside irrigation. Because very few entities meter outside water use, division staff attempts to determine the acreage that is actually irrigated by homeowners. Average lot size, percent irrigated, percent of residences that are supplied by separate secondary (pressurized and ditch) irrigation systems, water right-duty rates in the area, and other related information are used to estimate outside water use for each entity. Occasionally, delineation between lawns or gardens and farm fields becomes difficult. In these cases, the division's land use mapping program is utilized to take out the areas of the community that have been included as irrigated farmland.

Once residential outside water use is determined, it is subtracted from the given total residential water use. This amount is assumed to be the residential inside water use. When available, indoor water use can be estimated by looking at several residences' winter water bills and meter readings. When either of these methods yield an unreasonable value, then the staff uses a general range of between 75 and 120 gallons per capita per day (gpcd) for inside use and back-calculates outside water use from the total water use given.

## *Commercial Use*

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 division staff attempts to estimate commercial water use by inventorying commercial businesses in the area and using published commercial water use estimates. These publications come from the Division of

Drinking Water and from reports published by the Utah State Water Lab. In some rural communities where there is a relatively small number of commercial connections, the businesses are visited by division staff and asked about their water use.

### *Institutional Use*

Institutional water use is water used for city, county, state and federal government facilities, parks, golf courses, schools, hospitals, churches, military facilities, fire hydrant testing and other municipal losses in the water system. Because this water use is rarely metered, the process to acquire this data is a difficult one. Again, the system operator is asked to provide information about city facilities such as number and size of parks, schools, churches, and golf courses. Water right-duty rates for the area are used to calculate the amount of water these areas use. Also, estimates are made of leakage and testing of water system facilities and included in this category.

### *Industrial Use*

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

## **Present Methodology for Non-Community Water Systems**

Division staff attempts to contact each non-community system and make a personal visit. These systems rarely meter their water use, so estimates are made by division staff as to their actual annual water use. Questions are asked to determine type of facility, population served, water source information, irrigation of

outside areas, etc. This data, along with other water -related publications, are used to determine water use. The maximum water supply for these systems is often not available and is not in the scope of this study.

### **Present Methodology for Self-Supplied Industrial Water Systems**

For self-supplied industries, water use is acquired by using data given on the Division of Water Rights Industrial Water Use Form. The Division of Water Rights 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 given as county totals. Again, the maximum water supply is often not available and is not in the scope of this study.

### **Present 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. The water use data for this category is acquired by taking the State Office of Budget county population data and subtracting the population served by community water systems. The remainder is the population that is served by private domestic systems. A reasonable per capita rate (usually determined from the residential per capita rates from nearby community systems) is applied to this population to determine the total water use by private domestic systems. Since the maximum water supply for private wells is really an analysis of the total groundwater reservoir/recharge area, it is not in the scope of this study.



## DEFINITIONS OF WATER TERMS

Some water terms peculiar to the water industry are briefly defined in order to better understand the information presented.

### **Water Supply Terms**

Water is supplied by a variety of systems for many users. The general term supply is defined as the amount of water available. Most water supply systems are owned by a municipality, but in some cases the owner/operator is a private company or a state or federal agency. Thus, a "public" water supply may be either publicly or privately owned. Also, systems may supply treated or untreated water.

*Maximum Water Supply Available Under Present Conditions* - The annual volume of water which is the lesser of the hydrologic capacity of the water source, the physical capacity of the water system, or the use allowed by the water right. See Figure 4.

*Reliable System Source Capacity* - The actual annual quantity of the maximum water supply that is available to meet peak demands. When this number is divided by the average per capita usage, the resulting number represents the maximum population that the water source can serve. See Figure 4.

*Municipal Water Supply* - A supply that provides potable (culinary) water for residential, commercial, and institutional uses. The terms municipal, community and city are often used interchangeably.

*Municipal and Industrial Water Supply* - Includes all water (potable and non-potable) supplied for residential, commercial, institutional, light industry, and large self-supplied industries. This supply is available for public community systems, public

non-community (transient and non-transient) system, self-supplied industrial systems, unregulated Indian systems and private wells.

*Potable Water Supply* - Water meeting all applicable safe drinking water requirements for residential, commercial, institutional and industrial uses. Sometimes referred to as culinary water supply.

*Non -Potable Water Supply* - Water not meeting safe drinking water requirements. Secondary irrigation companies and self-supplied industries supply this water. Sometimes referred to as non-culinary water supply, but usually referred to as secondary water.

*Public Community Water Supply* - Includes potable water supplied by either privately or publicly owned community systems which serve at least 15 service connections or 25 individuals occupied year round. Water from public community supplies may be used for residential, commercial, institutional, and industrial purposes. This can include both indoor and outdoor uses.

*Public Non-Community Water Supply* - Includes potable water supplied by either privately or publicly owned systems 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 combines transient and non-transient systems together and calls them all public non-community systems. Industries are reported under self-supplied industries.

*Secondary Water Supply* - Pressurized or open ditch water supply systems that supply untreated water for irrigation of privately and publicly owned lawns, gardens, parks, cemeteries, golf courses and other open areas. These systems, sometimes called "dual" water systems, are installed to provide an alternative to irrigating with culinary water for these outdoor areas. This supply is often provided by irrigation companies. Self-supplied industries can also use secondary water for industrial processes.

*Self-supplied Industrial Supply* - Includes potable or non-potable water supplied by individual privately owned industries usually from their own wells or springs.

### **Water Use Terms**

Water is used in a variety of ways and for many purposes. Water is often said to be "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. The word *use* can be inserted where the word *supply* is written in most of the previous water supply terms to define the current demand associated with those definitions. Some additional water use terms are as follows:

*Commercial Use* - Uses normally associated with small business operations which may include drinking water, food preparation, personal sanitation, facility cleaning and maintenance and irrigation of facility landscapes. Retail businesses, restaurants and hotels are some examples.

*Industrial Use* - Uses 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. Manufacturing plants, oil and gas producers, mining companies, mink farms and dairies are some examples.

*Institutional Use* - Uses normally associated with general operation of various public agencies and institutions including drinking water, personal sanitation, facility cleaning and maintenance and irrigation of parks, cemeteries, playgrounds, recreational areas, golf courses, and other facilities. Many times the amount used by cities for outside irrigation of public areas is not metered.

*Municipal and Industrial (M&I) Use* - Term includes all residential, commercial, institutional, and industrial uses. It includes total uses (potable and non-potable) supplied by public water systems (community and non-community), self-supplied industries, private domestic systems, and secondary irrigation companies.

*Private-Domestic Use* - Includes water from private wells or springs for use in individual homes, usually in rural areas not accessible to public water supply systems.

*Residential Use* - Water 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 facilities. Single family homes, apartments, duplexes and condominiums are some examples.

### **Other Water Terms**

*Consumption* - Water evaporated, transpired or irreversibly bound in either a physical, chemical or biological process.

*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.

*Depletion* - Water lost or 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 to the basin system but is not consumed in the basin. The exported water is available for use in another system. Water diverted to irrigated 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 a depletion to the system.

*Diversion* - Water diverted from supply sources such as streams, lakes, reservoirs or groundwater for a variety of uses including cropland irrigation, residential, commercial, institutional and industrial. The terms diversion and withdrawal are often used interchangeably.

*Withdrawal* - Water withdrawn from supply sources such as lakes, streams, reservoirs or groundwater. This term is normally used in association with groundwater withdrawal.



## **WATER RIGHTS IN THE 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 a discussion on the current water right regulations in the area. The following discussion was obtained from the Division of Water Rights, Price area and the Cedar area office. It explains the current general water right regulations in the Southeast Colorado River Basin with regards to M&I uses.

### **Garfield County**

The Tropic, Henrieville, and Cannonville area is closed to new domestic fillings.

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

This area is open to new groundwater appropriations for domestic purposes but is limited to applications less than 5.73 acre-feet per year. In general this assumes one family, one acre of lawn and garden irrigation and ten head of livestock.

### **Kane County**

This area is open for domestic uses for small fillings; one family, 0.25 acres of lawn and garden irrigation, and ten head of livestock. It is open to both groundwater and surface water sources.

### **Miscellaneous**

In all these areas a common method for obtaining municipal and industrial rights is to purchase existing agricultural rights and file a change application with the State Engineer to transfer these to a domestic purpose.



## 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 and 1 public non-community system. Location of the public community systems are shown back in figure 3.

Table 1 shows that the maximum annual water supply for public community systems in this portion of Garfield County is 548 acre-feet; all from springs. Reliable system source capacity is less than half that amount at 244 acre-feet.

**TABLE 1  
GARFIELD COUNTY  
Potable Water Supplies for Public Community Systems**

WATER SUPPLIER	Springs (Ac-Ft/Yr)	Wells (Ac-Ft/Yr)	Surface (Ac-Ft/Yr)	Total (Ac-Ft/Yr)
<b>GARFIELD COUNTY</b>				
Cannonville Town	161.0	0.0	0.0	161.0
Henrieville	64.7	0.0	0.0	64.7
Tropic	322.5	0.0	0.0	322.5
<b>GARFIELD COUNTY TOTALS</b>	548.2	0.0	0.0	548.2

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

Table 2 shows this along with a breakdown of potable water use for each public community system. This table shows that for this portion of Garfield County the current annual potable water use of 163 acre-feet is about 67 percent of the reliable supply of 244 acre-feet of water.

Secondary water is another important aspect of total M&I use. Table 3 gives the amount of secondary water used for various categories within the boundaries of the public community systems. In this portion of Garfield County various irrigation companies deliver secondary water to customers; some through the Tropic Canal from the Sevier River drainage. Total secondary use is 205 acre-feet.

**TABLE 2  
GARFIELD COUNTY  
WATER USE AND SUPPLY FOR PUBLIC COMMUNITY SYSTEMS**

WATER SUPPLIER	POTABLE USAGE						POTABLE PER CAPITA USAGE			MAXIMUM WATER SUPPLY AVAILABLE UNDER PRESENT CONDITIONS (Ac-Ft/Yr)	POTABLE ESTIMATED PEAK DAY VALUES				RELIABLE SYSTEM SOURCE CAPACITY UNDER PRESENT CONDITIONS (Ac-Ft/Yr)
	Residential Indoor Use (Ac-Ft/Yr)	Residential Outdoor Use (Ac-Ft/Yr)	Commercial Indoor and Outdoor Use (Ac-Ft/Yr)	Institutional Indoor and Outdoor Use (Ac-Ft/Yr)	Industrial/ Stockwater Indoor and Outdoor Use (Ac-Ft/Yr)	Total Potable M & I Use (Ac-Ft/Yr)	Population	Average Per Capita Water Use (Ac-Ft/Yr)	Average Per Capita Water Use (GPCPD)		Assumed Peaking Factor (PD/AD)	Peak Day Supply (MGD)	Peak Day Demand (MGD)	Peak Day Supply Over Demand (MGD)	
<b>GARFIELD COUNTY</b>															
Cannonville Town	19.7	7.4	0.0	8.2	1.1	36.4	156	0.233	208.3	161	2.2628	0.1437	0.0735	0.0702	71
Henrieville	14.6	1.1	0.0	1.8	1.5	19.0	180	0.106	94.2	65	1.9757	0.0578	0.0335	0.0243	33
Tropic	33.5	15.0	43.6	15.6	0.0	107.7	396	0.272	242.8	323	2.2965	0.2879	0.2208	0.0671	140
<b>GARFIELD COUNTY TOTALS</b>	<b>67.8</b>	<b>23.5</b>	<b>43.6</b>	<b>25.6</b>	<b>2.6</b>	<b>163.1</b>	<b>732</b>	<b>0.223</b>	<b>198.9</b>	<b>548</b>	<b>2.2516</b>	<b>0.4894</b>	<b>0.3278</b>	<b>0.1616</b>	<b>244</b>
A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P

\* Note: Peak Day Demand exceeds the calculated Peak Day Supply. An assumption was made that in these cases the Peak Day Supply has been exactly met and should be set equal to the Peak Day Demand.  
Although some systems may withdraw the maximum water supply available under present conditions, the hydrologic conditions will probably limit all systems collectively from withdrawing this quantity, as presented.

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

G=B+C+D+E+F

I=G/H

J=I\*892.682

L=(2.5\*J-49.4)/J

M=K\*892.682/1000000; (except as provided in the note above)

N=H\*L/1000000

O=M-N

P=(M/(L\*J))\*J\*1120.22

These values are all input data.

This value represents only Potable M&I Water Use.

Average per capita potable water use.

Converts from Ac-Ft/Yr to GPD

The factor which when multiplied to the average per capita water use represents water use during peak demands.

Peak Day Supply of potable water based on maximum reliable source capacity converted to MGD). Where the calculated Peak Day Supply of potable water is less than the Peak Day Demand of Potable Water, this value was set equal to the Peak Day Demand of potable water.

Peak Day Demand on potable water based on the total potable M&I water use multiplied by the peaking factor

The amount of Peak Day Supply of potable water above the amount of the Peak Day Demand of potable water.

Reliable system source capacity represents that volume of water, which when divided by the average annual water per capita use, gives that population that can be reliably served by the system sources under peak day demand conditions.

**TABLE 3  
GARFIELD COUNTY  
Secondary (Non-Potable) Water Use Within Public Community Systems**

WATER SUPPLIER	Residential Use (Ac-Ft/Yr)	Commercial Use (Ac-Ft/Yr)	Institutional Use (Ac-Ft/Yr)	Industrial/ Stockwater Use (Ac-Ft/Yr)	Total Secondary Use (Ac-Ft/Yr)
<b>GARFIELD COUNTY</b>					
Cannonville Town	22.5	0.0	1.5	0.0	24.0
Henrieville	56.1	0.0	0.0	0.0	56.1
Tropic	125.0	0.0	0.0	0.0	125.0
<b>GARFIELD COUNTY TOTALS</b>	203.6	0.0	1.5	0.0	205.1

Note: Separate irrigation companies provide secondary water to the water supplier unless indicated by an <sup>†</sup>.

Table 4 gives the water use for public non-community system and private domestic systems. There are no self-supplied industries and only a handful of private domestic wells. All of these uses amount to 6 acre-feet.

**TABLE 4  
GARFIELD COUNTY  
Water Use for Public Non-Community Systems,  
Self-Supplied Industries and Private Domestic Systems**

Non-Community System	POTABLE USAGE					SECONDARY USE (Ac-Ft/Yr)
	Residential Use (Ac-Ft/Yr)	Commercial Use (Ac-Ft/Yr)	Institutional Use (Ac-Ft/Yr)	Industrial/ Stockwater Use (Ac-Ft/Yr)	Total Potable Use (Ac-Ft/Yr)	
<b>GARFIELD COUNTY</b>						
<u>Forest Service Systems</u>						
<u>Tropic Spring Roadside Park</u>	0.0	0.0	1.0	0.0	1.0	0.0
<u>SELF-SUPPLIED INDUSTRIES</u>	0.0	0.0	0.0	0.0	0.0	0.0
<u>PRIVATE DOMESTIC SYSTEMS</u>	5.0	0.0	0.0	0.0	5.0	0.0
<b>GARFIELD COUNTY TOTALS</b>	5.0	0.0	1.0	0.0	6.0	0.0

Total potable M&I water use in the county is 169 acre-feet, while secondary use is 205 acre-feet; giving a total M&I water use of 374 acre-feet. Since the current population of this portion of Garfield County is about 750 the total M&I per capita use is 445 gpcd. Table 5 gives various per capita rates for public community systems. Appendix A shows the data for each public community system that is presented in the tables.

**TABLE 5**  
**GARFIELD COUNTY**  
**Average Per Capita M&I Water Use for all Public Community Systems**

<b>CATEGORY</b>	<b>Average Per Capita Use (Ac-Ft/Yr)</b>	<b>Average Per Capita Use (GPCD)</b>
Residential Potable Use	0.125	111
Residential Potable Plus Secondary Use	0.403	360
Total Potable Use	0.223	199
Total Potable Plus Secondary Use	0.503	449

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

## GRAND COUNTY M&I WATER SUPPLIES AND USES

The Southeast Colorado River Basin portion of Grand County includes the incorporated communities of Moab and Castle Valley. Thompson is located in the West Colorado River Basin, therefore it is not included here. Within this area are 3 public community systems, 10 public non-community systems, and 1 self-supplied industry. Location of the public community systems are shown back in figure 3. Grand County Water Conservancy District wholesales water to Spanish Valley Water for use in the area south of Moab. Castle Valley does not have a community system; all of it's residents use private domestic wells.

Table 6 shows that the maximum annual water supply for public community systems in Grand County is 10,006 acre-feet; 1,871 acre-feet from springs and 8,135 acre-feet from wells. Reliable system source capacity is slightly more than half that amount at 4,339 acre-feet.

**TABLE 6  
GRAND COUNTY  
Potable Water Supplies for Public Community Systems**

<b>WATER SUPPLIER</b>	<b>Springs (Ac-Ft/Yr)</b>	<b>Wells (Ac-Ft/Yr)</b>	<b>Surface (Ac-Ft/Yr)</b>	<b>Total (Ac-Ft/Yr)</b>
<b>GRAND COUNTY</b>				
Day Star Adventist Academy	NA	NA	NA	NA
Grand County WCD				
Spanish Valley Water & Sewer Imp. District	0.0	3,620.0	0.0	3,620.0
Moab City Water	1,871.0	4,515.0	0.0	6,386.0
<b>GRAND COUNTY TOTALS</b>	1,871.0	8,135.0	0.0	10,006.0

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

Table 7 shows the reliable system source capacity along with a breakdown of the potable water use for each public community system. This table shows that for Grand County the current annual potable water use of 2,114 acre-feet is about one half the reliable system source capacity of 4,339 acre-feet.

**TABLE 7  
GRAND COUNTY  
WATER USE AND SUPPLY FOR PUBLIC COMMUNITY SYSTEMS**

WATER SUPPLIER	POTABLE USAGE						POTABLE PER CAPITA USAGE			MAXIMUM WATER SUPPLY AVAILABLE UNDER PRESENT CONDITIONS (Ac-Ft/Yr)	POTABLE ESTIMATED PEAK DAY VALUES				RELIABLE SYSTEM SOURCE CAPACITY UNDER PRESENT CONDITIONS (Ac-Ft/Yr)	
	Residential Indoor Use (Ac-Ft/Yr)	Residential Outdoor Use (Ac-Ft/Yr)	Commercial Indoor and Outdoor Use (Ac-Ft/Yr)	Institutional Indoor and Outdoor Use (Ac-Ft/Yr)	Industrial/ Stockwater Indoor and Outdoor Use (Ac-Ft/Yr)	Total Potable M & I Use (Ac-Ft/Yr)	Population	Average Per Capita Water Use (Ac-Ft/Yr)	Average Per Capita Water Use (GPCPD)		Assumed Peaking Factor (PD/AD)	Peak Day Supply (MGD)	Peak Day Demand (MGD)	Peak Day Supply Over Demand (MGD)		
<b>GRAND COUNTY</b>																
Day Star Adventist Academy	4.1	0.0	0.0	1.0	0.0	5.1	37	0.138	123.0	NA	NA	NA	NA	NA	NA	
Grand County WCD																
Spanish Valley Water & Sewer Imp. District	241.0	269.6	39.3	11.2	0.0	561.1	2,238	0.251	223.8	3,620	2.2793	3.2315	1.1417	2.0899	1,588	
Moab City Water	426.8	590.0	382.4	148.8	0.0	1,548.0	5,000	0.310	276.4	6,386	2.3213	5.7007	3.2077	2.4930	2,751	
<b>GRAND COUNTY TOTALS</b>	<b>671.9</b>	<b>859.6</b>	<b>421.7</b>	<b>161.0</b>	<b>0.0</b>	<b>2,114.2</b>	<b>7,275</b>	<b>0.291</b>	<b>259.4</b>	<b>see note</b>	<b>10,006</b>	<b>2.3096</b>	<b>8.9322</b>	<b>4.3493</b>	<b>4.5828</b>	<b>4339</b>
	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P

\* Note: Peak Day Demand exceeds the calculated Peak Day Supply. An assumption was made that in these cases the Peak Day Supply has been exactly met and should be set equal to the Peak Day Demand. Although some systems may withdraw the maximum water supply available under present conditions, the hydrologic conditions will probably limit all systems collectively from withdrawing this quantity, as presented.

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

G=B+C+D+E+F

I=G/H

J=I\*892.682

L=(2.5\*J-49.4)/J

M=K\*892.682/1000000; (except as provided in the note above)

N=H\*J\*L/1000000

O=M-N

P=(M/(L\*J))\*J\*1120.22

These values are all input data.

This value represents only Potable M&I Water Use.

Average per capita potable water use.

Converts from Ac-Ft/Yr to GPD

The factor which when multiplied to the average per capita water use represents water use during peak demands.

Peak Day Supply of potable water based on maximum reliable source capacity converted to MGD). Where the calculated Peak Day Supply of potable water is less than the Peak Day Demand of Potable Water, this value was set equal to the Peak Day Demand of potable water.

Peak Day Demand on potable water based on the total potable M&I water use multiplied by the peaking factor

The amount of Peak Day Supply of potable water above the amount of the Peak Day Demand of potable water.

Reliable system source capacity represents that volume of water, which when divided by the average annual water per capita use, gives that population that can be reliably served by the system sources under peak day demand conditions.

Secondary water is another important aspect of total M&I use. Table 8 gives the annual amount of secondary water used for various categories within the boundaries of the public community systems. In Grand County, the Grand County Water Conservancy District and Moab Irrigation Company deliver secondary water to customers. Total secondary use is 704 acre-feet.

**TABLE 8  
GRAND COUNTY  
Secondary (Non-Potable) Water Use Within Public Community Systems**

WATER SUPPLIER	Residential Use (Ac-Ft/Yr)	Commercial Use (Ac-Ft/Yr)	Institutional Use (Ac-Ft/Yr)	Industrial/ Stockwater Use (Ac-Ft/Yr)	Total Secondary Use (Ac-Ft/Yr)
<b>GRAND COUNTY</b>					
Day Star Adventist Academy	3.0	0.0	0.0	0.0	3.0
Grand County WCD*					
Spanish Valley Water & Sewer Imp. District	74.0	0.0	580.0	0.0	654.0
Moab City Water	46.6	0.0	0.0	0.0	46.6
<b>GRAND COUNTY TOTALS</b>	123.6	0.0	580.0	0.0	703.6

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

Table 9 gives annual water use for public non-community systems, self-supplied industries, and private domestic systems. Arches National Park and Dead Horse State Park are among the 10 listed non-community systems. Moab Salt Incorporated is the one listed self-supplied industry. There are a few residences that use their own wells. All of these amount to 427 acre-feet of potable and 940 acre-feet of non-potable water use.

Total potable M&I water use in the county is about 2,542 acre-feet, while non-potable use is 1,643 acre-feet; giving a total M&I water use of 4,185 acre-feet. Since the current population of this portion of Grand County is about 8,700 the total M&I per capita use is 429 gpcd. Table 10 gives various per capita rates for public community systems. Appendix B shows the data for each public community system that is presented in the tables.

**TABLE 9  
GRAND COUNTY  
Water Use for Public Non-Community Systems,  
Self-Supplied Industries and Private Domestic Systems**

Non-Community System	POTABLE USAGE					SECONDARY USE (Ac-Ft/Yr)
	Residential Use (Ac-Ft/Yr)	Commercial Use (Ac-Ft/Yr)	Institutional Use (Ac-Ft/Yr)	Industrial/ Stockwater Use (Ac-Ft/Yr)	Total Potable Use (Ac-Ft/Yr)	
<b>GRAND COUNTY</b>						
Forest Service Systems						
Warner Campground and Guard Station	0.0	0.0	0.4	0.0	0.4	0.0
National Park Systems						
Arches National Park-Headquarters	3.0	0.0	6.7	0.0	9.7	0.0
Arches National Park-Devils Garden	0.0	0.0	1.9	0.0	1.9	0.0
State Park Systems						
Dead Horse Point State Park	0.6	0.0	1.6	0.0	2.2	0.0
Bucks Grill House	1.0	1.0	0.0	0.0	2.0	0.0
Canyonlands Field	1.0	1.0	0.0	0.0	2.0	0.0
Grand County Lions Park	0.0	0.0	3.0	0.0	3.0	0.0
Matrimony Spring	0.0	0.0	0.3	0.0	0.3	0.0
Moab KOA Campground	0.0	4.0	0.0	0.0	4.0	0.0
Slickrock Campground	0.0	11.8	0.0	0.0	11.8	0.0
SELF SUPPLIED INDUSTRIES*	0.0	0.0	0.0	0.0	0.0	940.0
PRIVATE DOMESTIC SYSTEMS	390.0	0.0	0.0	0.0	390.0	0.0
<b>GRAND COUNTY TOTALS</b>	395.6	17.8	13.9	0.0	427.3	940.0

\*SELF SUPPLIED INDUSTRIES:  
Moab Salt Incorporated

**TABLE 10  
GRAND COUNTY  
Average Per Capita M&I Water Use for all Public Community Systems**

CATEGORY	Average Per Capita Use (Ac-Ft/Yr)	Average Per Capita Use (GPCD)
Residential Potable Use	0.211	188
Residential Potable Plus Secondary Use	0.228	203
Total Potable Use	0.291	259
Total Potable Plus Secondary Use	0.387	346

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

## KANE COUNTY M&I WATER SUPPLIES AND USES

The Southeast Colorado River Basin portion of Kane County includes the incorporated community of Big Water. Within this area are 2 public community systems and 3 public non-community systems. Location of the public community systems are shown back in figure 3.

Table 11 shows that the maximum annual water supply for public community systems in this portion of Kane County is 1,516 acre-feet; all from wells. Reliable system source capacity is less than half that amount at 641 acre-feet.

**TABLE 11  
KANE COUNTY  
Potable Water Supplies for Public Community Systems**

WATER SUPPLIER	Springs (Ac-Ft/Yr)	Wells (Ac-Ft/Yr)	Surface (Ac-Ft/Yr)	Total (Ac-Ft/Yr)
<b>KANE COUNTY</b>				
Church Wells SSD	0.0	387.0	0.0	387.0
Glen Canyon SSD #1 (Big Water)	0.0	1,128.7	0.0	1,128.7
<b>KANE COUNTY TOTALS</b>	0.0	1,515.7	0.0	1,515.7

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

Table 12 shows the reliable system source capacity along with a breakdown of the potable water use for each public community system. This table shows that for this portion of Kane County the current annual potable water use of 226 acre-feet is a little less than one half the reliable supply of 641 acre-feet. There is no secondary water used at all in this portion of Kane County.

Table 13 gives water use for public non-community systems and private domestic systems. Kodachrome Basin State Park and Dangling Rope Marina are two of the two listed non-community systems. There are no self-supplied industries and only a few private domestic wells. All of these uses amount to 13 acre-feet.

**TABLE 12  
KANE COUNTY  
WATER USE AND SUPPLY FOR PUBLIC COMMUNITY SYSTEMS**

WATER SUPPLIER	POTABLE USAGE						POTABLE PER CAPITA USAGE			MAXIMUM WATER SUPPLY AVAILABLE UNDER PRESENT CONDITIONS (Ac-Ft/Yr)	POTABLE ESTIMATED PEAK DAY VALUES				RELIABLE SYSTEM SOURCE CAPACITY UNDER PRESENT CONDITIONS (Ac-Ft/Yr)
	Residential Indoor Use (Ac-Ft/Yr)	Residential Outdoor Use (Ac-Ft/Yr)	Commercial Indoor and Outdoor Use (Ac-Ft/Yr)	Institutional Indoor and Outdoor Use (Ac-Ft/Yr)	Industrial/ Stockwater Indoor and Outdoor Use (Ac-Ft/Yr)	Total Potable M & I Use (Ac-Ft/Yr)	Population	Average Per Capita Water Use (Ac-Ft/Yr)	Average Per Capita Water Use (GPCPD)		Assumed Peaking Factor (PD/AD)	Peak Day Supply (MGD)	Peak Day Demand (MGD)	Peak Day Supply Over Demand (MGD)	
<b>KANE COUNTY</b>															
Church Wells SSD	12.9	27.0	0.0	0.0	0.6	40.5	105	0.386	344.3	387	2.3565	0.3455	0.0852	0.2603	164
Glen Canyon SSD #1 (Big Water)	50.4	58.5	16.8	12.3	47.6	185.6	450	0.412	368.2	1,129	2.3658	1.0076	0.3920	0.6156	477
<b>KANE COUNTY TOTALS</b>	<b>63.3</b>	<b>85.5</b>	<b>16.8</b>	<b>12.3</b>	<b>48.2</b>	<b>226.1</b>	<b>555</b>	<b>0.407</b>	<b>363.7</b>	<b>see note</b> <b>1,516</b>	<b>2.3642</b>	<b>1.3530</b>	<b>0.4772</b>	<b>0.8759</b>	<b>641</b>
A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P

\* Note: Peak Day Demand exceeds the calculated Peak Day Supply. An assumption was made that in these cases the Peak Day Supply has been exactly met and should be set equal to the Peak Day Demand. Although some systems may withdraw the maximum water supply available under present conditions, the hydrologic conditions will probably limit all systems collectively from withdrawing this quantity, as presented.

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

G=B+C+D+E+F

I=G/H

J=I\*892.682

L=(2.5\*J-49.4)/J

M=K\*892.682/1000000; (except as provided in the note above)

N=H\*J\*1000000

O=M-N

P=(M/(L\*J))\*J\*1120.22

These values are all input data.

This value represents only Potable M&I Water Use.

Average per capita potable water use.

Converts from Ac-Ft/Yr to GPD

The factor which when multiplied to the average per capita water use represents water use during peak demands.

Peak Day Supply of potable water based on maximum reliable source capacity converted to MGD). Where the calculated Peak Day Supply of potable water is less than the Peak Day Demand of Potable Water, this value was set equal to the Peak Day Demand of potable water.

Peak Day Demand on potable water based on the total potable M&I water use multiplied by the peaking factor

The amount of Peak Day Supply of potable water above the amount of the Peak Day Demand of potable water.

Reliable system source capacity represents that volume of water, which when divided by the average annual water per capita use, gives that population that can be reliably served by the system sources under peak day demand conditions.

**TABLE 13**  
**KANE COUNTY**  
**Water Use for Public Non-Community Systems,**  
**Self-Supplied Industries and Private Domestic Systems**

Non-Community System	POTABLE USAGE					SECONDARY USE (Ac-Ft/Yr)
	Residential Use (Ac-Ft/Yr)	Commercial Use (Ac-Ft/Yr)	Institutional Use (Ac-Ft/Yr)	Industrial/ Stockwater Use (Ac-Ft/Yr)	Total Potable Use (Ac-Ft/Yr)	
<b>KANE COUNTY</b>						
National Park Service Systems						
Glen Canyon NRA - Dangling Rope Marina	1.6	4.2	1.0	0.0	6.8	0.0
Forest Service Systems						
Paria Contact Station	0.0	0.0	0.1	0.0	0.1	0.0
State Park Systems						
Kodachrome Basin State Park	0.0	0.0	2.5	0.0	2.5	0.0
SELF-SUPPLIED INDUSTRIES	0.0	0.0	0.0	0.0	0.0	0.0
PRIVATE DOMESTIC SYSTEMS	10.0	0.0	0.0	0.0	10.0	0.0
<b>KANE COUNTY TOTALS</b>	11.6	4.2	3.6	0.0	19.4	0.0

Total potable M&I water use in the county is about 256 acre-feet. Since the current population of this portion of Kane County is about 600 the total M&I per capita use in Kane County is about 380 gpcd. Table 14 gives various per capita rates for public community systems. Appendix C shows the data for each public community system that is presented in the tables.

**TABLE 14**  
**KANE COUNTY**  
**Average Per Capita M&I Water Use for all Public Community Systems**

CATEGORY	Average Per Capita Use (Ac-Ft/Yr)	Average Per Capita Use (GPCD)
Residential Potable Use	0.268	239
Residential Potable Plus Secondary Use	0.268	239
Total Potable Use	0.407	364
Total Potable Plus Secondary Use	0.407	364

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



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

The Southeast Colorado River Basin portion of San Juan County includes the incorporated communities of Monticello, Eastland, Blanding, Bluff, Mexican Hat, Montezuma Creek and Aneth. Within this area are 6 public community systems, 8 unregulated Indian systems, 12 public non-community systems, and 7 self-supplied industries. Location of the public community systems are shown back in figure 3. One system is run by the National Park Service which 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. Another unregulated Indian system is located in White Mesa, south of Blanding, and is operated by the Ute Mountain Indian Tribe.

Table 15 shows that the maximum annual water supply for public community systems in the county is 6,842 acre-feet; 872 acre-feet from springs, 2,332 acre-feet from wells, and 3,638 acre-feet from surface treatment plants in Monticello, Blanding, and Halchita Indian System. Reliable system source capacity is 3,101 acre-feet.

Table 16 shows the reliable system source capacity along with a breakdown of the potable water use by public community systems. This table shows that for San Juan County the current annual potable water use of 1,444 acre-feet is about half the reliable supply of 3,101 acre-feet of water.

Secondary water is another important aspect of total M&I use. Table 17 gives the amount of secondary water used for various categories within the boundaries of the public community systems. In San Juan County three community systems use secondary water. Monticello delivers it's own and the San Juan Water Conservancy District provides secondary water for Blanding and Bluff. Total secondary water use is 420 acre-feet.

**TABLE 15**  
**SAN JUAN COUNTY**  
**Potable Water Supplies for Public Community Systems**

<b>WATER SUPPLIER</b>	<b>Springs (Ac-Ft/Yr)</b>	<b>Wells (Ac-Ft/Yr)</b>	<b>Surface (Ac-Ft/Yr)</b>	<b>Total (Ac-Ft/Yr)</b>
<b>SAN JUAN COUNTY</b>				
Blanding City Municipal Water System	0.0	0.0	2,912.0	2,912.0
Bluff Water and Sewer Users Association	0.0	177.4	0.0	177.4
Eastland Special Service District	0.0	61.3	0.0	61.3
Monticello Municipal Water System	871.6	0.0	500.0	1,371.6
Monument Valley High School	0.0	168.0	0.0	168.0
Navajo Tribal Utility Authority				
Aneth Community	0.0	144.0	0.0	144.0
Holly Village Community	NA	NA	NA	NA
Mexican Hat / Halchita Community	0.0	0.0	226.0	226.0
Montezuma Creek Community	0.0	1,612.0	0.0	1,612.0
Oljato Community	NA	NA	NA	NA
Red Mesa Community	NA	NA	NA	NA
Todohaidekani Community	NA	NA	NA	NA
San Juan County SSD No. 1 (Mexican Hat)	0.0	91.9	0.0	91.9
White Mesa (Ute Mountain Ute Tribe)	0.0	77.4	0.0	77.4
<b>SAN JUAN COUNTY TOTALS</b>	871.6	2,332.0	3,638.0	6,841.6

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

Table 18 gives water use for public non-community systems, self-supplied industries, and private domestic systems. Canyonlands National Park, Hovenweep National Monument, and The Monument Valley Hospital and Trading Post are among the 12 listed non-community systems. Many Indians living in the Navaho Indian Reservation do not have running water in their homes. Many of these people drive to the Hovenweep National Monument and the Monument Valley Hospital and Trading Post to fill containers with water for residential use. Self-supplied industries include Wexpro Co., Summo Corp., Rio Algom Mining Corp., UNOCAL, Mobile Oil, and Cochrane Resources. Numerous residences use their own wells. All of these uses amount to 1,855 acre-feet of water.

**TABLE 16  
SAN JUAN COUNTY  
WATER USE AND SUPPLY FOR PUBLIC COMMUNITY SYSTEMS**

WATER SUPPLIER	POTABLE USAGE					POTABLE PER CAPITA USAGE			MAXIMUM WATER SUPPLY AVAILABLE UNDER PRESENT CONDITIONS (Ac-Ft/Yr)	POTABLE ESTIMATED PEAK DAY VALUES				RELIABLE SYSTEM SOURCE CAPACITY UNDER PRESENT CONDITIONS (Ac-Ft/Yr)	
	Residential Indoor Use (Ac-Ft/Yr)	Residential Outdoor Use (Ac-Ft/Yr)	Commercial Indoor and Outdoor Use (Ac-Ft/Yr)	Institutional Indoor and Outdoor Use (Ac-Ft/Yr)	Industrial/ Stockwater Indoor and Outdoor Use (Ac-Ft/Yr)	Total Potable M & I Use (Ac-Ft/Yr)	Population	Average Per Capita Water Use (Ac-Ft/Yr)		Average Per Capita Water Use (GPCPD)	Assumed Peaking Factor (PD/AD)	Peak Day Supply (MGD)	Peak Day Demand (MGD)		Peak Day Supply Over Demand (MGD)
<b>SAN JUAN COUNTY</b>															
Blanding City Municipal Water System	320.4	316.6	70.8	43.0	1.1	751.9	3,299	0.228	203.5	2,912	2.2572	2.5995	1.5150	1.0844	1,290
Bluff Water and Sewer Users Association	11.7	10.1	29.3	9.5	0.0	60.6	300	0.202	180.3	177	2.2260	0.1584	0.1204	0.0379	80
Eastland Special Service District	3.8	0.8	0.0	0.3	0.2	5.1	60	0.085	75.9	61	1.8490	0.0547	0.0084	0.0463	33
Monticello Municipal Water System	272.9	42.0	18.7	10.9	1.6	346.1	2,100	0.165	147.1	1,372	2.1642	1.2244	0.6687	0.5557	634
Monument Valley High School	6.7	6.0	0.0	32.2	0.0	44.9	60	0.748	668.0	168	2.4261	0.1500	0.0972	0.0527	69
Navajo Tribal Utility Authority															
Aneth Community	24.3	0.0	4.6	0.2	21.4	50.5	370	0.136	121.8	144	2.0945	0.1285	0.0944	0.0341	69
Holly Village Community	3.2	0.0	0.0	0.0	0.0	3.2	60	0.053	47.6	NA	NA	NA	NA	NA	NA
Mexican Hat / Haichita Community	13.1	0.0	4.8	12.5	0.1	30.5	320	0.095	85.1	226	1.9194	0.2017	0.0523	0.1495	118
Montezuma Creek Community	15.5	0.0	2.9	24.5	3.9	46.8	240	0.195	174.1	1,612	2.2162	1.4390	0.0926	1.3464	727
Olato Community	20.6	0.0	1.7	0.1	0.0	22.4	300	0.075	66.7	NA	NA	NA	NA	NA	NA
Red Mesa Community	10.8	0.0	0.0	1.0	0.0	11.8	240	0.049	43.9	NA	NA	NA	NA	NA	NA
Todohidekani Community	8.2	0.0	0.1	0.0	0.0	8.3	120	0.069	61.7	NA	NA	NA	NA	NA	NA
San Juan County SSD No. 1 (Mexican Hat)	2.0	0.4	29.5	1.4	0.0	33.3	110	0.303	270.2	92	2.3172	0.0820	0.0689	0.0132	40
White Mesa (Ute Mountain Ute Tribe)	29.0	0.0	0.0	0.0	0.0	29.0	325	0.089	79.7	77	1.8798	0.0691	0.0487	0.0204	41
<b>SAN JUAN COUNTY TOTALS</b>	<b>742.2</b>	<b>375.9</b>	<b>162.4</b>	<b>135.6</b>	<b>28.3</b>	<b>1,444.4</b>	<b>7,904</b>	<b>0.183</b>	<b>163.1</b>	<b>6,842</b>	<b>2.1972</b>	<b>6.1074</b>	<b>2.7666</b>	<b>3.3408</b>	<b>3101</b>
A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P

\* Note: Peak Day Demand exceeds the calculated Peak Day Supply. An assumption was made that in these cases the Peak Day Supply has been exactly met and should be set equal to the Peak Day Demand.

Although some systems may withdraw the maximum water supply available under present conditions, the hydrologic conditions will probably limit all systems collectively from withdrawing this quantity, as presented.

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

G=B+C+D+E+F

I=G/H

J=I\*892.682

L=(2.5\*J-49.4)/J

M=K\*892.682/1000000; (except as provided in the note above)

N=H\*J/L/1000000

O=M-N

P=(M/(L\*J))\*J\*1120.22

These values are all input data.

This value represents only Potable M&I Water Use.

Average per capita potable water use.

Converts from Ac-Ft/Yr to GPD

The factor which when multiplied to the average per capita water use represents water use during peak demands.

Peak Day Supply of potable water based on maximum reliable source capacity converted to MGD). Where the calculated Peak Day Supply of potable water is less than the Peak Day Demand of Potable Water, this value was set equal to the Peak Day Demand of potable water.

Peak Day Demand on potable water based on the total potable M&I water use multiplied by the peaking factor

The amount of Peak Day Supply of potable water above the amount of the Peak Day Demand of potable water.

Reliable system source capacity represents that volume of water, which when divided by the average annual water per capita use, gives that population that can be reliably served by the system sources under peak day demand conditions.

**TABLE 17**  
**SAN JUAN COUNTY**  
**Secondary (Non-Potable) Water Use Within Public Community Systems**

<b>WATER SUPPLIER</b>	<b>Residential Use (Ac-Ft/Yr)</b>	<b>Commercial Use (Ac-Ft/Yr)</b>	<b>Institutional Use (Ac-Ft/Yr)</b>	<b>Industrial/ Stockwater Use (Ac-Ft/Yr)</b>	<b>Total Secondary Use (Ac-Ft/Yr)</b>
<b>SAN JUAN COUNTY</b>					
Blanding City Municipal Water System	44.7	0.0	55.2	0.0	99.9
Bluff Water and Sewer Users Association	6.0	0.0	0.0	0.0	6.0
Eastland Special Service District	0.0	0.0	0.0	0.0	0.0
Monticello Municipal Water System*	200.3	0.0	113.6	0.0	313.9
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 No. 1 (Mexican Hat)	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>	251.0	0.0	168.8	0.0	419.8

Note: Separate irrigation companies provide secondary water to the water supplier unless indicated by an '\*1'.

**TABLE 18**  
**SAN JUAN COUNTY**  
**Water Use for Public Non-Community Systems, Self-Supplied Industries and Private Domestic Systems**

<b>Non-Community System</b>	<b>POTABLE USAGE</b>					<b>SECONDARY USE (Ac-Ft/Yr)</b>
	<b>Residential Use (Ac-Ft/Yr)</b>	<b>Commercial Use (Ac-Ft/Yr)</b>	<b>Institutional Use (Ac-Ft/Yr)</b>	<b>Industrial/ Stockwater Use (Ac-Ft/Yr)</b>	<b>Total Potable Use (Ac-Ft/Yr)</b>	
<b>SAN JUAN COUNTY</b>						
<b>National Forest Systems</b>						
Buckboard Campground	0.0	0.0	0.1	0.0	0.1	0.0
Dalton Springs Campground	0.0	0.0	0.1	0.0	0.1	0.0
Devils Canyon Campground	0.0	0.0	0.3	0.0	0.3	0.0
Nizhoni Campground	0.0	0.0	0.2	0.0	0.2	0.0
<b>National Park Service Systems</b>						
Canyonlands National Park-Island in the Sky	0.3	0.0	0.6	0.0	0.9	0.0
Canyonlands National Park-Needles District	0.9	0.0	2.6	0.0	3.5	0.0
Hovenweep National Monument	0.4	0.0	0.9	0.0	1.3	0.0
<b>BLM Systems</b>						
Wind Wistle 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	0.5	0.0	0.0	0.5	0.0
Monument Valley Hospital/Trading Post & Lodge (Source in Az.)	53.4	82.2	17.0	0.0	152.6	0.0
Pack Creek Ranch	0.0	3.0	0.0	0.0	3.0	0.0
SELF SUPPLIED INDUSTRIES*	0.0	0.0	0.0	1,090.0	1,090.0	0.0
PRIVATE DOMESTIC SYSTEMS	600.0	0.0	0.0	0.0	600.0	0.0
<b>SAN JUAN COUNTY TOTALS</b>	655.0	85.7	24.4	1,090.0	1,855.1	0.0

\* 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

Wexpro Company - Bug Field  
Summo USA Corporation  
Rio Algom Mining Corporation  
Elkhorn Operating Company  
UNOCAL  
Mobile Exploration and Producing North America Incorporated  
Cochrane Resources

Total potable M&I water use in the county is about 3,300 acre-feet, while secondary use is 420 acre-feet; giving a total M&I water use of about 3,745 acre-feet. Since the current population of San Juan County is about 13,150 the total M&I per capita use is 254 gpcd. Table 19 gives various per capita rates for public community systems. Appendix D shows data for each public community system presented in the tables.

**TABLE 19**  
**SAN JUAN COUNTY**  
**Average Per Capita M&I Water Use for all Public Community Systems**

<b>CATEGORY</b>	<b>Average Per Capita Use (Ac-Ft/Yr)</b>	<b>Average Per Capita Use (GPCD)</b>
Residential Potable Use	0.141	126
Residential Potable Plus Secondary Use	0.173	155
Total Potable Use	0.183	163
Total Potable Plus Secondary Use	0.236	211

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