

STATE OF UTAH  
DEPARTMENT OF NATURAL RESOURCES  
DIVISION OF WATER RESOURCES

MUNICIPAL AND INDUSTRIAL WATER SUPPLY,  
USE AND RIGHTS IN BEAVER AND IRON COUNTIES  
AND THE ENTERPRISE AREA

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## 1. SUMMARY

Municipal and industrial (M&I) water use, supplies, and rights were determined for public community, public non-community, and self-supplied industries in Beaver and Iron counties and the Enterprise area. Both ground water and surface water are important municipal and industrial water sources in the study area. Municipal and industrial water uses and supplies were estimated for both surface water and ground water.

The municipal and industrial ground water supply for Beaver County was found to be 12,531 acre-feet per year and the municipal and industrial use was found to be 8,906 acre-feet per year. The total municipal and industrial water supply for Beaver County was found to be 13,566 acre-feet per year and the municipal and industrial use was found to be 9,941 acre-feet per year. Average per capita potable plus secondary water use by customers of public community systems in Beaver County was found to be 0.56 acre-feet per year. Water rights for almost all of Beaver County are considered to be fully appropriated.

In Iron County and the Enterprise area, municipal and industrial ground water supply and use were found to be 22,602 acre-feet per year and 8,730 acre-feet per year, respectively. The total municipal and industrial water supply for Iron County and the Enterprise area was found to be 23,605 acre-feet per year and the municipal and industrial use was found to be 9,733 acre-feet per year. Average per capita potable plus secondary water use by customers of public community systems in Iron County and the Enterprise area was found to be 0.40 acre-feet per year. Water rights for all of the Iron County and Enterprise area are considered to be fully appropriated.

## **2. INTRODUCTION**

### **2.1 Background**

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, more detailed plans are being prepared for each of the 11 hydrologic basins in the state. The hydrologic basin plans will identify potential conservation and development projects and describe alternatives to satisfy the problems, needs, and demands.

As part of this effort, several separate investigations have been completed in the Cedar\Beaver River Basin. The Cedar\Beaver River Basin includes most of Beaver and Iron counties and the Enterprise area. One of the current investigations, the subject of this report, is a determination of present M&I water supplies, uses, and rights in Beaver and Iron counties and the Enterprise area. All of the data presented in these reports will become part of the State Water Plan.

### **2.2 Objective and Scope**

The principal objective of this effort was to document the present M&I water supplies, uses and rights in Beaver and Iron counties and the Enterprise area. The study area is shown on Figure 1.

Information considered includes related investigations recently completed by the Division of Water Resources and other entities, and new data obtained during this study.

### **2.3 Authorization**

During the fall of 1993, Hansen, Allen and Luce, Inc. of Salt Lake City was selected by the Utah Division of Water Resource to help complete the documentation of present municipal and industrial (M&I) water supplies, uses and rights in the study area. An agreement was signed on December 6, 1993, with the notice to proceed being the date of the agreement.

### **2.4 General Description of the Study Area**

The study area is located in south western Utah in the basin and range physiographic province. The general location of the study area is shown on Figure 1. Topography of the area consists of a series of mountains and valleys with altitudes varying from over 12,000 feet in the Tusher Mountains east of Beaver to less than 5,000 feet in the Milford Valley north of Milford. The valleys are usually bounded by mountains, forming a series of closed basins. The study area covers several closed basins. The climate of the area ranges from semi-arid in the valleys to humid on the high mountain areas.

Most of the water flowing into the valleys originates as snowmelt in the mountains east of Beaver and Cedar City and in the mountains south of Enterprise. M&I water use in the area is supplied by both surface water and ground water. Surface water and ground water supplies are closely related. Inflow from the mountains and perennial streams has been identified as the largest source of ground water recharge.



Important sources of surface water in the study area are the Beaver River and its tributaries and several small perennial streams in the Iron County and the Enterprise area, including Coal Creek, Quichapa Creek, Shirts Creek, Parowan Creek, Red Creek, Little Creek, Little Pine Creek, Summit Creek, Pinto Creek, Mountain Meadow Creek, and Shoal Creek. The Beaver River drainage area is the largest basin in the study area.

Unconsolidated and semi-consolidated fill underlying the valleys form the principal ground water reservoir for the area. Ground water movement is generally from recharge areas at the base of the mountains toward discharge areas in the valley. Discharge of ground water occurs from both springs and wells. Both sources of ground water are important municipal and industrial water supplies.

Municipal and industrial water is supplied by public community, public non-community and private systems. Public community water suppliers provide water to most of the population in the study area. Locations of the public community water suppliers in the study area are shown on Figure 2.

## **2.5 Relationship of the Study Area to the Cedar\Beaver Basin**

The study area, which consists of Beaver and Iron counties and the Enterprise area, corresponds roughly to the Cedar\Beaver basin. The boundaries of the Cedar\Beaver basin are shown on Figure 3. By comparing Figure 1 and Figure 3, it is apparent that portions of Beaver and Iron counties fall outside the boundaries of the Cedar\Beaver basin and a small portion of Millard County is included in the Cedar\Beaver basin. Although the difference between the areal extent of the study area and the Cedar\Beaver basin is significant, the differences in M&I water use and supply for these two areas are minor.

With the exception of the Town of Kanarraville, which is located just inside the Virgin River basin, the portions of Beaver and Iron counties that are not included in the Cedar\Beaver basin are sparsely populated with no significant M&I water use or supplies. The only significant M&I water use in the small portion of Millard County included within the Cedar\Beaver basin is one public non-community system, the Cove Fort South Bound Rest Stop, the Cove Fort Historic Site, and one self-supplied industry, the Continental Lime Production Plant. DWR estimates annual water use and supply for the Cove Fort South Bound Rest Stop at about 2 ac-ft, the Cove Fort Historical Site at 17.0 ac-ft (3.0 residential and 14.0 institutional), and the annual water use and supply for the lime production plant at about 400 ac-ft. If water use and supply for these two entities are added to totals for the study area and if amounts for Kanarraville are subtracted from the totals for the study area, the results should be representative of water use and supply for the Cedar\Beaver basin.

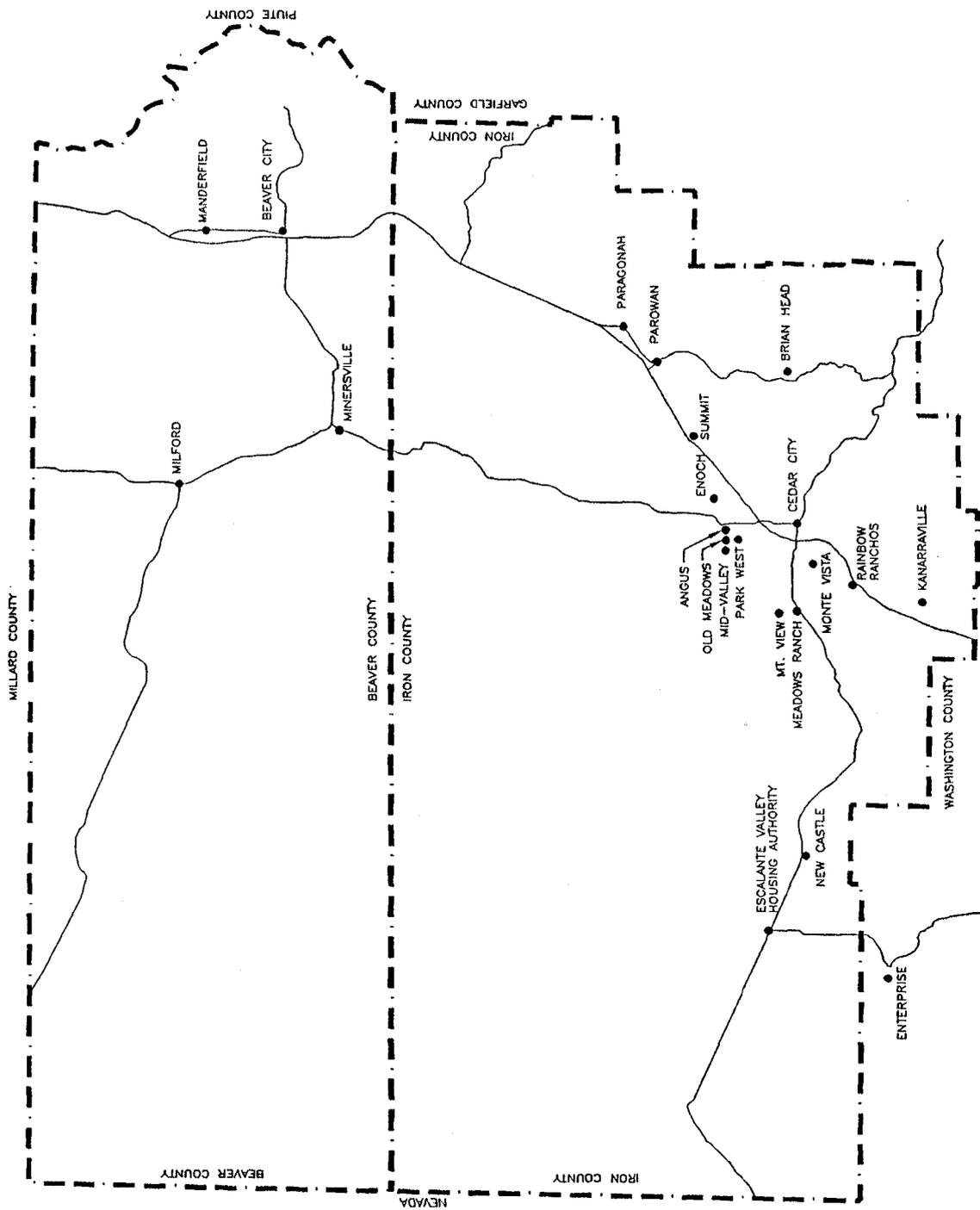
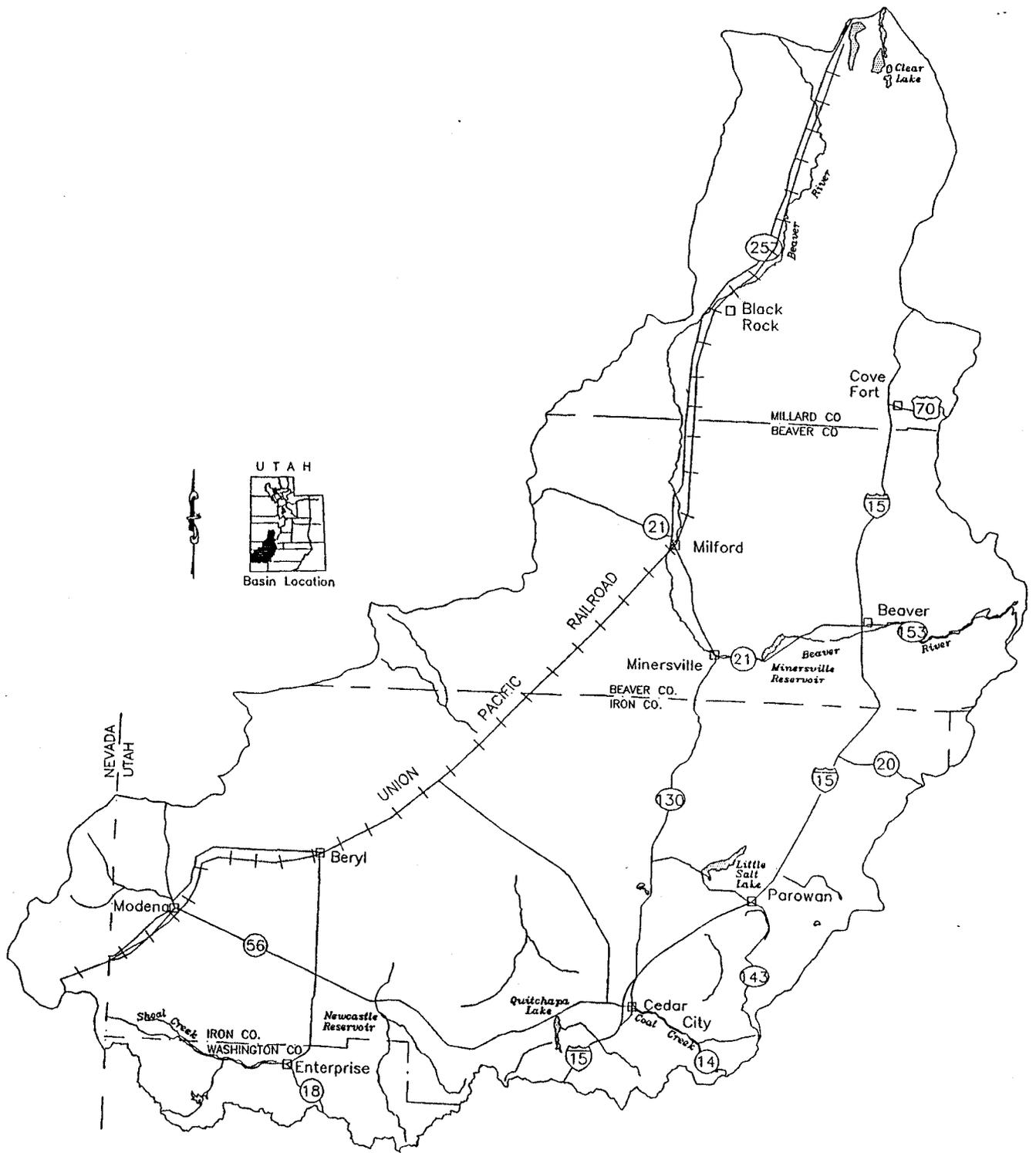


FIGURE  
2

LOCATIONS OF PUBLIC COMMUNITY WATER SUPPLIERS  
IN THE STUDY AREA

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ALLEN  
& LUCE** inc.

BOUNDARIES OF THE CEDAR/BEAVER BASIN

FIGURE  
3

### 3. WATER SUPPLY AND USE METHODOLOGY

#### 3.1 Water Supply and Use

Sources of supply considered in this effort are ground water, surface water and imported water. The Pinto Diversion in the Pine Valley Mountains was the only source of imported water identified in this study. Because the imported water that enters the Cedar\Beaver basin through the Pinto diversion is used only for irrigation purposes and the amount is negligible, only ground water and surface water are discussed in this report.

Water supply is defined as a resource which is presently developed. It is further defined as limited by either a mechanical constraint such as pump capacity or pipe size, a hydrologic constraint such as reliable stream flow or ground water safe yield or a legal constraint such as water rights and contracts. Maximum reliable source capacity was evaluated for potable water sources by considering both the physical capacity of the water source and by the use allowed by the water right. The lesser of these two amounts was considered to be the maximum reliable source capacity. Procedures followed to evaluate maximum reliable source capacity for each water supply entity are given in Appendix A. The potable water supply available in the pattern of use was calculated for each public community system using the source capacity and the estimated peak demand for each entity. This amount takes into account the mechanical constraints of the water system. Procedures followed to calculate potable supply available in pattern of use are outlined at the bottom of Tables 6-4 and 7-4.

Present water use, as defined herein, includes the developed water which is actually diverted from surface water or withdrawn from ground water. No attempt was made to estimate efficiency of use or the actual consumptive use or depletions from the hydrologic system. The data presented herein represent actual 1992 conditions, i.e., no attempt was made to compensate or adjust for situations resulting from current climatic conditions.

The study area can be divided into two geographic areas: (1) Iron County and the Enterprise area, and (2) Beaver County. Although located in Washington County, the Enterprise area was paired with Iron County because of its hydrologic ties to the Escalante Valley in Iron County. Enterprise is the only community outside the boundaries of Beaver or Iron counties considered in this study.

Data used for this study was obtained from personal contacts with public water suppliers, review of water system data reported to the Utah State Engineer, and review of relevant studies in each area. The form used to collect data from the water supply entities is included in Appendix B. Data available from each water supply entity varied in quantity and accuracy, so assumptions were made to calculate water use and supply amounts. Calculations and assumptions used to determine water supply and use amounts are included in Appendix A. Water use data for water delivered by secondary irrigation systems was generally unavailable. Most sources of secondary irrigation, especially surface water, were not metered. Unmetered secondary water use by customers of public water systems was calculated by estimating the irrigated acreage and assuming an irrigation demand of about 4 acre-feet of water per irrigated acre of land.

Water supplied by public systems for agricultural purposes, including stock watering, feed lots, and dairy farms, was classified as industrial use. No attempt was made to quantify water supplied for agricultural purposes by secondary or private systems.

The amount of water delivered through private domestic water systems was estimated by assuming yearly per capita use in areas served by private domestic systems is equal to yearly per capita use by customers of public community systems in each geographic area. Private domestic water supplies were assumed to be from ground water sources with water supplies to be equal to water use. The population supplied by private domestic systems was estimated using the methodology, data, and calculations presented in Appendix A.

### **3.2 Water Rights**

Water rights discussions presented herein were prepared based on conversations with the area engineers from the State Engineer's Office and the regional office in Cedar City, Utah.

### **3.3 Agency Coordination**

Numerous review meetings were held during the course of the study between the Division of Water Resources and Hansen, Allen & Luce to evaluate and refine the scope of effort, data used, and study results.

## 4. DEFINITIONS OF WATER TERMS

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

### 4.1 Water Supply Terms

Water is supplied by a variety of systems for many users. Most water supply systems are owned by a municipality, but in some cases the owner/operator is a private company or is 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.

Culinary Water Supply - Water meeting all applicable safe drinking water requirements for residential, commercial and municipal uses. Sometimes referred to as Potable Water Supply.

Public Community Water Supply - Includes culinary (potable) water supplied by either privately or publicly owned community systems which serve at least 15 service connections year-round or regularly serve at least 25 year-round residents. Water from public community supplies may be used for residential, commercial, municipal and industrial purposes, including irrigation of publicly and privately owned open areas.

Public Non-Community Water Supply - Includes culinary (potable) water supplied by either privately or publicly owned which serve at least 25 non-resident individuals for 60 days or more per year. Examples of these include summer home subdivisions, campgrounds, restaurants, and commercial establishments which have their own wells or springs.

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 outdoor water supply in addition to the culinary supply.

Self-Supplied Industrial Supply - Includes potable or secondary water supplied by individual privately owned industries usually from their own well or springs.

Supply Available in Pattern of Use - The actual quantity of the maximum reliable source capacity 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.

Municipal and Industrial Water Supply - Includes all water (culinary and secondary) supplied for residential, commercial, municipal, light industry, and large self-supplied industries.

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

#### **4.2 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, withdrawn, depleted or consumed. But it is also "used" in place for such things as fish and wildlife habitat, recreation and hydropower production.

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.

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.

Municipal 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 and other facilities. This term is commonly used to include residential, commercial and municipal uses.

Industrial Use - Use associated with the manufacturing or assembly of products which may include the same basic uses as commercial business. However, the volume of water used by industrial businesses can be considerably greater than water used by commercial businesses.

Municipal and Industrial (M&I) Use - This term is commonly used to include residential, commercial, municipal, and industrial uses. It is sometimes used interchangeably with the term "public water use."

Private-Domestic Use - Includes water from private wells for individual homes, usually in rural areas not accessible to a public water system.

### **4.3 Other Water Terms**

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

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

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. Therefore, 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.

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

Consumptive Use - Incidental losses of water brought about by human endeavors when used for residential, commercial, municipal, industrial, agricultural, power generation, and recreation. Naturally occurring vegetation and fish and wildlife also consumptively use water.

## **5. WATER RIGHTS IN BEAVER AND IRON COUNTIES AND THE ENTERPRISE AREA**

No water supply and use study would be complete without a discussion on the current water rights situation in the area. The following discussion was obtained from the Division of Water Rights, Cedar City office. It explains the current water rights conditions in Beaver and Iron Counties and the Enterprise area.

Beaver and Iron counties and the Enterprise area are closed to all new appropriations with the exception of the Wah Wah area in Beaver County and the Escalante Valley north of Township 27 South also in Beaver County. Applications in these two areas are currently being accepted for amounts not exceeding residential use by one family. No change in this policy is foreseen in the immediate future. With the exception of the two areas just described, it has been held that all waters in Beaver and Iron counties are fully appropriated and new uses of water are obtained by filing change or exchange applications with the State Engineer. These applications are acted on based upon the individual merits of the application. Water rights transfers are also limited by boundaries established by the Division of Water Rights.

## **6. M & I SUPPLIES AND USES IN BEAVER COUNTY**

### **6.1 General**

Beaver County comprises about the northern one-third of the study area. Municipal and industrial water needs are supplied by both surface water and ground water. Surface water is used primarily for irrigation, and ground water is used to supply all potable water needs and some irrigation needs.

### **6.2 Presently Developed Municipal and Industrial Water Supply in Beaver County**

Sources of municipal and industrial supply for Beaver County are presented in two categories: ground water and surface water. Presently developed water supply is defined as a resource which is currently developed. It is further defined as limited by either mechanical constraints such as pump capacity or pipe size, a hydrologic constraint such as reliable stream flow or ground water safe yield, or a legal constraint such as water rights and contracts.

#### *Ground Water*

Ground water is the principal source of the municipal and industrial water supply in Beaver County. Ground water provides the total potable water supply for public community and public non-community water systems. Data collected for this study indicates that wells and springs serving customers of public community water supply systems have a total capacity to withdraw approximately 5,345 acre-feet per year. This amount includes ground water delivered by secondary water systems. Amounts of water delivered by secondary systems are tabulated in Appendix C for each public community system with customers served by a secondary system. Secondary systems were assumed to have capacities equal to their present use. Ground water withdrawal capacities for each public community water supplier in Beaver County are presented in Table 7-1 .

Public, non-community systems are assumed to have capacities equal to their present uses, which is 76 acre-feet. The estimated presently developed ground water supply from private domestic wells is 177 acre feet of water per year. Two self-supplied industries are located in Beaver County and use 6,933 acre-feet of water per year.

The total currently developed ground water supply for Beaver County is estimated to be 12,531 acre feet per year.

**TABLE 6-1  
BEAVER COUNTY  
PRESENTLY DEVELOPED GROUND WATER SUPPLIES  
FOR PUBLIC COMMUNITY SYSTEMS**

| PUBLIC COMMUNITY<br>WATER SUPPLIERS | POTABLE<br>SUPPLY<br>AVAILABLE<br>IN PATTERN <sup>1</sup><br>OF USE<br>(AC-FT/YR) | SOURCE CAPACITY <sup>2</sup> (AC-FT/YR) |                          |  |
|-------------------------------------|---|---|--------------------------|--|
|                                     |   | POTABLE                                 | NON-POTABLE <sup>3</sup> | POTABLE PLUS<br>NON-POTABLE <sup>3</sup> |
| Beaver City Water System            | 700   | 1,572                                   | 87                       | 1,659                                    |
| Manderfield Culinary Water Co.      | 127   | 306                                     | 0                        | 306                                      |
| Milford City Water System           | 934   | 2,194                                   | 226                      | 2,420                                    |
| Minersville City Water System       | 403   | 960                                     | 0                        | 960                                      |
| <b>TOTAL</b>                        | <b>2,164</b>  | <b>5,032</b>                            | <b>313</b>               | <b>5,345</b>                             |

- 1) The potable water supply available in the pattern of use was calculated for each public community system using the source capacity and the estimated peak demand for each entity. See Table 6-4 for the calculation of these values.
- 2) Water was classified as potable or non-potable according to the system that delivered the water rather than the physical characteristics of the water.
- 3) Non-Potable water is supplied by secondary systems. Secondary water system capacities are assumed to be equal to secondary water use.

*Surface Water*

Surface water sources in Beaver County include the Beaver River and its tributaries. Surface water supplies are delivered by either pressurized or ditch secondary systems for irrigation use. Surface water delivered by secondary systems (to customers of public community systems) within Beaver County is estimated to be 1,035 acre-feet per year. There were no public non-community systems that indicated they were served by secondary systems. Total surface and ground water supplies for municipal and industrial purposes within Beaver County is 13,566 acre-feet per year. Water supply amounts by source and system category are presented in Table 6-2.

**TABLE 6-2  
BEAVER COUNTY  
PRESENTLY DEVELOPED MUNICIPAL AND INDUSTRIAL WATER SUPPLIES**

| SOURCE                    | DESCRIPTION                  | SUPPLY <sup>1,2</sup> (AC-FT/YR) |                          |                           |
|---------------------------|------------------------------|----------------------------------|--------------------------|---------------------------|
|                           |                              | POTABLE                          | NON-POTABLE              | POTABLE PLUS NON-POTABLE  |
| GROUND WATER              | Public Community Systems     | 5,032                            | 313                      | 5,345                     |
|                           | Public Non-Community Systems | 76                               | 0                        | 76                        |
|                           | Self-Supplied Industries     | 0                                | 6,933                    | 6,933                     |
|                           | Private Domestic Systems     | 177                              | 0                        | 177                       |
|                           | <b>Ground Water Total</b>    | <b>5,285</b>                     | <b>7,246</b>             | <b>12,531</b>             |
| SURFACE WATER             | Public Community Systems     | 0                                | 1,035 <sup>3</sup>       | 1,035 <sup>3</sup>        |
|                           | Public Non-Community Systems | 0                                | 0                        | 0                         |
|                           | <b>Surface Water Total</b>   | <b>0</b>                         | <b>1,035<sup>3</sup></b> | <b>1,035<sup>3</sup></b>  |
| <b>TOTAL WATER SUPPLY</b> |                              | <b>5,285</b>                     | <b>8,281<sup>3</sup></b> | <b>13,566<sup>3</sup></b> |

- 1) Water was classified as potable or non-potable based on the system delivering the water rather than the characteristics of the water. Thus, all water supplied to secondary irrigation systems or self-supplied industries was classified as non-potable.
- 2) Water supplies for secondary water systems, self-supplied industries, public non-community systems, and private domestic water systems are assumed to be equal to use.
- 3) This amount includes non-potable water supplied by irrigation companies to customers of public community systems. (Secondary water is often supplied to customers of public community systems by irrigation companies that are separate entities from the potable water supplier.)

### 6.3 Present Water Use

The previously presented water supply information includes the developed water which could be used for municipal and industrial purposes within Beaver County. The present water use includes the developed water which is actually diverted from surface water or withdrawn from ground water. An estimate of the present water use by source of supply and use category in Beaver County is presented in Table 6-3. Potable and secondary water use by individual public community systems are presented in Tables 6-4 and 6-5. Potable water use by public non-community systems is presented in Table 6-6.

**TABLE 6-3  
BEAVER COUNTY  
PRESENT MUNICIPAL AND INDUSTRIAL USE  
BY SOURCE AND USE CATEGORY**

| SOURCE                 | DESCRIPTION                  | USE <sup>1</sup> (AC-FT/YR) |                          |                          |
|------------------------|------------------------------|-----------------------------|--------------------------|--------------------------|
|                        |                              | POTABLE                     | NON-POTABLE              | POTABLE PLUS NON-POTABLE |
| GROUND WATER           | Residential & Institutional: |                             |                          |                          |
|                        | Public Community Systems     | 1,088                       | 313 <sup>2</sup>         | 1,401 <sup>2</sup>       |
|                        | Public Non-Community Systems | 6                           | 0                        | 6                        |
|                        | Private Domestic Systems     | 177                         | 0                        | 177                      |
|                        | Commercial:                  |                             |                          |                          |
|                        | Public Community Systems     | 90                          | 0                        | 90                       |
|                        | Public Non-Community Systems | 70                          | 0                        | 70                       |
|                        | Industrial:                  |                             |                          |                          |
|                        | Public Community Systems     | 229                         | 0                        | 229                      |
|                        | Self-Supplied Industries     | 0                           | 6,933                    | 6,933                    |
|                        | <b>Ground Water Total</b>    | <b>1,660</b>                | <b>7,246<sup>2</sup></b> | <b>8,906<sup>2</sup></b> |
| SURFACE WATER          | Residential & Institutional: |                             |                          |                          |
|                        | Public Community Systems     | 0                           | 1,035 <sup>2</sup>       | 1,035 <sup>2</sup>       |
|                        | Public Non-Community Systems | 0                           | 0                        | 0                        |
|                        | Commercial:                  |                             |                          |                          |
|                        | Public Community Systems     | 0                           | 0                        | 0                        |
|                        | Public Non-Community Systems | 0                           | 0                        | 0                        |
|                        | <b>Surface Water Total</b>   | <b>0</b>                    | <b>1,035<sup>2</sup></b> | <b>1,035<sup>2</sup></b> |
| <b>TOTAL WATER USE</b> |                              | <b>1,660</b>                | <b>8,281<sup>2</sup></b> | <b>9,941<sup>2</sup></b> |

- 1) Water was classified as potable or non-potable based on the system delivering the water rather than the characteristics of the water. Thus, all water supplied to secondary irrigation systems or self-supplied industries was classified as non-potable
- 2) This amount includes non-potable water supplied by irrigation companies to customers of public community systems. (Secondary water is often supplied to customers of public community systems by irrigation companies that are separate entities from the potable water supplier.)

**TABLE 6-4  
BEAVER COUNTY  
PUBLIC COMMUNITY WATER SUPPLIERS 1992 SUPPLIES AND USAGE**

| WATER SUPPLIER                 | Maximum Potable Reliable Source Capacity (Ac-Ft/Yr) | Secondary Residential and Municipal Outdoor Use (Ac-Ft/Yr) | POTABLE USAGE                      |                                   |                              |                           |                           |                            | Residential Secondary Outdoor Use Plus Total Potable M&I Use (Ac-Ft/Yr) | POTABLE PER CAPITA USAGE |   |                                      | POTABLE ESTIMATED PEAK DAY VALUES |                       |                       |   | Potable Supply Available In Pattern of Use (Ac-Ft/Yr) |
|--------------------------------|---|--|------------------------------------|-----------------------------------|------------------------------|---------------------------|---------------------------|----------------------------|---|--------------------------|---|--------------------------------------|-----------------------------------|-----------------------|-----------------------|---|---|
|                                |   |  | Residential Outdoor Use (Ac-Ft/Yr) | Residential Indoor Use (Ac-Ft/Yr) | Institutional Use (Ac-Ft/Yr) | Commercial Use (Ac-Ft/Yr) | Industrial Use (Ac-Ft/Yr) | Total "M&I" Use (Ac-Ft/Yr) |   | Population               | Average Per Capita Water Use (Ac-Ft/C-Yr) | Average Per Capita Water Use (GPCPD) | Assumed Peaking Factor (PD/AD)    | Peak Day Supply (MGD) | Peak Day Demand (MGD) | Peak Day Supply In Excess of Demand (MGD) |   |
| Beaver City Water System       | 1,572.3   | 854.2  | 81.8                               | 394.3                             | 0                            | 60.5                      | 140.8                     | 677.4                      | 1,531.6   | 3,200                    | 0.21                                      | 187.5                                | 2.24                              | 1.40                  | 1.34                  | 0.06                                      | 700   |
| Manderfield Culinary Water Co. | 305.8   | 4.0  | 13.0                               | 4.9                               | 0                            | 0                         | 0                         | 17.9                       | 21.9  | 40                       | 0.45                                      | 401.7                                | 2.38                              | 0.27                  | 0.04                  | 0.23                                      | 127   |
| Milford City Water System      | 2,193.8   | 226.1  | 232.2                              | 135.5                             | 0                            | 27.7                      | 0                         | 395.4                      | 621.5   | 1100                     | 0.36                                      | 321.4                                | 2.35                              | 1.96                  | 0.83                  | 1.13                                      | 934   |
| Minersville City Water System  | 959.9   | 263.9  | 31.5                               | 75.2                              | 119.7                        | 0.6                       | 87.7                      | 314.7                      | 578.6   | 610                      | 0.52                                      | 464.2                                | 2.39                              | 0.86                  | 0.68                  | 0.18                                      | 403   |
| <b>Area Summary</b>            | <b>5,031.8</b>                                      | <b>1,348.2</b>   | <b>358.5</b>                       | <b>609.9</b>                      | <b>119.7</b>                 | <b>88.8</b>               | <b>228.5</b>              | <b>1,405.4</b>             | <b>2,753.6</b>  | <b>4,950</b>             | <b>0.28</b>                               | <b>250.0</b>                         | <b>2.30</b>                       | <b>4.49</b>           | <b>2.85</b>           | <b>1.64</b>                               | <b>2,187</b>  |
| <b>A</b>                       | <b>B</b>  | <b>C</b>   | <b>D</b>                           | <b>E</b>                          | <b>F</b>                     | <b>G</b>                  | <b>H</b>                  | <b>I</b>                   | <b>J</b>  | <b>K</b>                 | <b>L</b>                                  | <b>M</b>                             | <b>N</b>                          | <b>O</b>              | <b>P</b>              | <b>Q</b>                                  | <b>R</b>  |

B, C, D, E, F, G, H and K are all input data.

$I = D + E + F + G + H$

$J = C + I$

$L = I / K$

$M = L * 892.682$  (converts from ac.ft./yr to GPD)

$N = (2.5 * M - 49.4) / M$

$O = B * 892.682 / 1,000,000$

$P = K * M * N / 1,000,000$

$Q = O - P$

$R = \{O / (N * M)\} * M * (1120.22)$ , (1120.22 converts from MGD to Ac-Ft/Yr)

This value represents only Potable M&I Water Use.

This value represents Secondary Water Use combined with Potable M&I Water Use.

Average per capita water use based only on use of potable water.

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 potable water supply is less than the peak day potable water demand, this value was set equal to the Peak day potable water demand.

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 water supply above the amount of peak day potable water demand.

The actual quantity of the maximum reliable source capacity 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 potable water sources can serve.

**TABLE 6-5  
BEAVER COUNTY  
SECONDARY WATER USE  
BY CUSTOMERS OF PUBLIC COMMUNITY WATER SYSTEMS**

| Public Community Water System     | Secondary Water Use <sup>1</sup> |                             |                          |
|-----------------------------------|----------------------------------|-----------------------------|--------------------------|
|                                   | Ground Water<br>(ac-ft/yr)       | Surface Water<br>(ac-ft/yr) | Total<br>(ac-ft/yr)      |
| Beaver City Water System          | 87                               | 767                         | 854                      |
| Manderfield Culinary Water System | 0                                | 4 <sup>2</sup>              | 4 <sup>2</sup>           |
| Milford City Water System         | 226                              | 0                           | 226                      |
| Minersville City Water System     | 0                                | 264 <sup>2</sup>            | 264 <sup>2</sup>         |
| <b>Sum</b>                        | <b>313</b>                       | <b>1,035<sup>2</sup></b>    | <b>1,348<sup>2</sup></b> |

- 1) Secondary water use for non-metered sources was calculated by assuming an irrigation demand of about 4 acre-feet per irrigated acre.
- 2) This amount includes non-potable water supplied by irrigation companies to customers of public community systems. (Secondary water is often supplied to customers of public, community systems by irrigation companies that are separate entities from the potable water supplier.)

**TABLE 6-6  
BEAVER COUNTY  
WATER USE AND SUPPLY FOR PUBLIC NON-COMMUNITY SYSTEMS**

| WATER SUPPLIER                        | USAGE                        |  |                            |                             |                             |                        |
|---------------------------------------|------------------------------|--|----------------------------|-----------------------------|-----------------------------|------------------------|
|                                       | Residential Use (Acre-Ft/Yr) | Recreational & Commercial Use (Acre-Ft/Yr) | Municipal Use (Acre-Ft/Yr) | Irrigation Use (Acre-Ft/Yr) | Industrial Use (Acre-Ft/Yr) | Total Use (Acre-Ft/Yr) |
| Anderson Meadows Campground           | 0.0                          | 0.1  | 0.0                        | 0.0                         | 0.0                         | 0.1                    |
| Arrowhead Corporation <sup>(1)</sup>  | 0.0                          | 0.0  | 0.0                        | 0.0                         | 0.0                         | 0.0                    |
| Beaver Camperland                     | 2.6                          | 9.1  | 0.0                        | 16.4                        | 0.0                         | 28.1                   |
| Beaver KOA                            | 0.4                          | 1.7  | 0.0                        | 6.0                         | 0.0                         | 8.1                    |
| Cove Fort North Bound RS              | 0.0                          | 6.0  | 0.0                        | 6.0                         | 0.0                         | 12.0                   |
| Greenville Ward                       | 0.0                          | 0.1  | 0.0                        | 6.0                         | 0.0                         | 6.1                    |
| Hi-Lo Estates Water System            | 0.3                          | 0.0  | 0.0                        | 0.0                         | 0.0                         | 0.3                    |
| Kents Lake Campground                 | 0.0                          | 0.3  | 0.0                        | 0.0                         | 0.0                         | 0.3                    |
| Little Reservoir Campground           | 1.2                          | 0.5  | 0.0                        | 0.0                         | 0.0                         | 1.7                    |
| Minersville Lake State Park           | 0.4                          | 1.6  | 0.0                        | 1.0                         | 0.0                         | 3.0                    |
| Mt. Holly Water System                | 0.9                          | 15.2                                       | 0.0                        | 0.0                         | 0.0                         | 16.1                   |
| Ponderosa Picnic Ground               | 0.0                          | 0.1  | 0.0                        | 0.0                         | 0.0                         | 0.1                    |
| Self Supplied Industries <sup>2</sup> | 0.0                          | 0.0  | 0.0                        | 0.0                         | 6,932.5                     | 6,932.5                |
| <b>AREA SUMMARY</b>                   | 5.80                         | 34.70                                      | 0.00                       | 35.40                       | 6,932.5                     | 7,008.4                |
| A                                     | B                            | C  | D                          | E                           | F                           | G                      |

- 1) Arrowhead Corporation did not use their well in 1992 due to low water levels. All water used at the cabins normally supplied by the system was hauled in by individuals.
- 2) Self supplied industries include two geothermal power plants, Intermountain Geothermal near Milford and Mother Earth Industries at Sulpherdale. This water is poor quality, warm water.

## 6.4 Per Capita Water Usage

Average per capita water use in Beaver County was calculated using the water use amounts for 1992. The population totals for areas supplied by public systems were provided by the individual water supply entities. The population served by private domestic water systems was estimated using 1990 census data, population estimates by the Utah Office of Planning and Budget, and population and connection data supplied by Beaver City. The procedure used to estimate the population served by private domestic systems is included in Appendix A. Per capita water use for several categories of water use are presented in Table 6-7.

**TABLE 6-7  
BEAVER COUNTY  
AVERAGE PER CAPITA M&I WATER USE**

| CATEGORY  | AVERAGE PER CAPITA USE (AC-FT/CAP/YR) | AVERAGE PER CAPITA USE (GALLONS/CAP/DAY) |
|---|---------------------------------------|--|
| Residential & Institutional Potable Use <sup>1</sup>                | 0.24                                  | 213.4                                    |
| Residential & Institutional Potable Plus Secondary Use <sup>1</sup> | 0.49                                  | 440.1                                    |
| Public Community Systems Potable Use <sup>2</sup>                   | 0.28                                  | 253.5                                    |
| Public Community Systems Potable Plus Secondary Use <sup>2</sup>    | 0.56                                  | 496.3                                    |

1) Based on a population of 5,312 for Beaver County.

2) Based on a population of 4,950 people supplied by Public Community Systems in Beaver County.

## **7. M & I SUPPLIES AND USES IN IRON COUNTY AND THE ENTERPRISE AREA**

### **7.1 General**

Iron County and the Enterprise area comprise approximately the southern two-thirds of the study area. Although located in Washington County, the Enterprise area was included in the study area because of its hydrologic ties to Iron County. Enterprise is the only community outside the boundaries of Beaver and Iron counties that was included in this study. Municipal and industrial water needs for Iron County and the Enterprise area are supplied by both surface water and ground water. Surface water is used primarily for irrigation, and ground water is used to supply all potable water needs and some irrigation needs.

### **7.2 Presently Developed Municipal and Industrial Water Supply in Iron County and the Enterprise Area**

Sources of municipal and industrial supply for Iron County and Enterprise are presented in two categories: ground water and surface water. Presently developed water supply is defined as a resource which is currently developed. It is further defined as limited by either mechanical constraints such as pump capacity or pipe size, a hydrologic constraint such as reliable stream flow or ground water safe yield, or a legal constraint such as water rights and contracts.

#### *Ground Water*

Ground water is the principal source of the municipal and industrial water supply in Iron County and the Enterprise area. Ground water provides the total potable water supply for public community and public non-community water systems. Data collected for this study indicates that wells and springs serving customers of public community water supply systems have a total capacity to withdraw approximately 21,663 acre-feet per year. This amount includes ground water delivered by secondary water systems. Secondary water systems were assumed to have capacities equal to their present use. Amounts of water delivered by secondary systems are tabulated in Appendix C for each public community system with customers served by a secondary system. Ground water withdrawal capacities are tabulated for each public community water supplier in Iron County and the Enterprise area in Table 7-1.

Public non-community systems are assumed to have capacities equal to their present uses, which is 93 acre-feet. The estimated presently developed ground water supply from private domestic wells is 486 acre feet per year. Several self-supplied industries are located in Iron County and use 360 acre-feet per year.

The total currently developed ground water supply for Iron County and the Enterprise area is estimated to be 22,602 acre-feet per year.

**TABLE 7-1  
IRON COUNTY AND ENTERPRISE AREA  
PRESENTLY DEVELOPED GROUND WATER SUPPLIES  
FOR PUBLIC COMMUNITY SYSTEMS**

| PUBLIC COMMUNITY WATER SUPPLIERS   | POTABLE SUPPLY AVAILABLE IN PATTERN OF USE (AC-FT/YR) <sup>1</sup> | SOURCE CAPACITY <sup>2</sup> (AC-FT/YR) |                          |                                       |
|------------------------------------|--|---|--------------------------|---------------------------------------|
|                                    |  | POTABLE                                 | NON-POTABLE <sup>3</sup> | POTABLE PLUS NON-POTABLE <sup>3</sup> |
| Angus Water Company                | 61   | 142                                     | 6                        | 148                                   |
| Brian Head Water System            | 259  | 604                                     | 0                        | 604                                   |
| Cedar City Water System            | 6,354  | 14,741                                  | 501                      | 15,242                                |
| Enoch Water System                 | 637  | 639                                     | 0                        | 639                                   |
| Enterprise City Water System       | 537  | 1,043                                   | 0                        | 1,043                                 |
| Escalante Valley Housing Authority | 21   | 40                                      | 0                        | 40                                    |
| Kanarraville Water System          | 90   | 201                                     | 81 <sup>4</sup>          | 282 <sup>4</sup>                      |
| Meadows Ranch                      | 184  | 437                                     | 0                        | 437                                   |
| Mid-Valley Estates Water Co.       | 77   | 181                                     | 0                        | 181                                   |
| Monte Vista Community Water Co.    | 44   | 60                                      | 0                        | 60                                    |
| Mt. View Special Service Dist.     | 47   | 100                                     | 0                        | 100                                   |
| New Castle Water Co.               | 149  | 150                                     | 0                        | 150                                   |
| Old Meadows Water Co.              | 61   | 140                                     | 0                        | 140                                   |
| Paragonah Water System             | 98   | 212                                     | 0                        | 212                                   |
| Park West Water Co.                | 43   | 74                                      | 0                        | 74                                    |
| Parowan City Water System          | 745  | 1,606                                   | 469                      | 2,075                                 |
| Rainbow Ranchos Water Co.          | 33   | 65                                      | 0                        | 65                                    |
| Summit Special Service Dist.       | 71   | 171                                     | 0                        | 171                                   |
| <b>TOTAL</b>                       | <b>9,511</b>   | <b>20,606</b>                           | <b>1,057<sup>4</sup></b> | <b>21,663<sup>4</sup></b>             |

- 1) The potable water supply available in the pattern of use was calculated for each public community system using the source capacity and the estimated peak demand for each entity. See Table 7-4 for the calculation of these values.
- 2) Water was classified as potable or non-potable according to the system that delivered the water rather than the physical characteristics of the water.
- 3) Non-Potable water is supplied by secondary systems. Secondary water system capacities are assumed to be equal to secondary water use.
- 4) This amount includes non-potable water supplied by irrigation companies to customers of public community systems. (Secondary water is often supplied to customers of public community systems by irrigation companies that are separate entities from the potable water supplier.)

## *Surface Water*

Surface water sources in Iron County and the Enterprise area include numerous small perennial streams. Surface water supplies are delivered by either pressurized or ditch secondary systems for irrigation use. Surface water delivered by secondary systems (to customers of public community systems) within the Iron County and Enterprise area is estimated to be 1,003 acre-feet per year. There were no public non-community systems that indicated they were served by secondary systems. Total surface and ground water supplies for municipal and industrial purposes within Iron County and the Enterprise area is 23,605 acre-feet per year. Water supply amounts by source and system category are presented in Table 7-2.

### **7.3 Present Water Use**

The previously presented water supply information includes the developed water which could be used for municipal and industrial purposes within Iron County and the Enterprise area. The present water use includes the developed water which is actually diverted from surface water or withdrawn from ground water. An estimate of the present water use by source of supply and use category in Iron County and the Enterprise area is presented in Table 7-3. Potable and secondary water use by individual public community systems are presented in Tables 7-4 and 7-5. Potable water use by public non-community systems is presented in Table 7-6.

### **7.4 Per Capita Water Usage**

Average per capita water use in Iron County and the Enterprise area was calculated using the water use amounts for 1992. The population totals for areas supplied by public systems were provided by the individual water supply entities. The population served by private domestic water systems was estimated using 1990 census data and population projections by the Utah Office of Planning and Budget. The procedure used to estimate the population served by private domestic systems is included in Appendix B. Per capita water use for several categories of water use are presented in Table 7-7.

**TABLE 7-2  
IRON COUNTY AND ENTERPRISE AREA  
PRESENTLY DEVELOPED MUNICIPAL AND INDUSTRIAL WATER SUPPLIES**

| SOURCE                    | DESCRIPTION                  | SUPPLY <sup>1,2</sup> (AC-FT/YR) |                          |                             |
|---------------------------|------------------------------|----------------------------------|--------------------------|-----------------------------|
|                           |                              | POTABLE                          | NON-POTABLE              | POTABLE PLUS<br>NON-POTABLE |
| GROUND<br>WATER           | Public Community Systems     | 20,606                           | 1,057 <sup>3</sup>       | 21,663 <sup>3</sup>         |
|                           | Public Non-Community Systems | 93                               | 0                        | 93                          |
|                           | Self-Supplied Industries     | 0                                | 360                      | 360                         |
|                           | Private Domestic Systems     | 486                              | 0                        | 486                         |
|                           | <b>Ground Water Total</b>    | <b>21,185</b>                    | <b>1,417<sup>3</sup></b> | <b>22,602<sup>3</sup></b>   |
| SURFACE<br>WATER          | Public Community Systems     | 0                                | 1,003 <sup>3</sup>       | 1,003 <sup>3</sup>          |
|                           | Public Non-Community Systems | 0                                | 0                        | 0                           |
|                           | <b>Surface Water Total</b>   | <b>0</b>                         | <b>1,003<sup>3</sup></b> | <b>1,003<sup>3</sup></b>    |
| <b>TOTAL WATER SUPPLY</b> |                              | <b>21,185</b>                    | <b>2,420<sup>3</sup></b> | <b>23,605<sup>3</sup></b>   |

- 1) Water was classified as potable or non-potable based on the system delivering the water rather than the characteristics of the water. Thus, all water supplied to secondary irrigation systems or self-supplied industries was classified as non-potable.
- 2) Water supplies for secondary water systems, self-supplied industries, public non-community systems, and private domestic systems are assumed to be equal to use.
- 3) This amount includes non-potable water supplied by irrigation companies to customers of public community systems. (Secondary water is often supplied to customers of public community systems by irrigation companies that are separate entities from the potable water supplier.)

**TABLE 7-3  
IRON COUNTY AND ENTERPRISE  
PRESENT MUNICIPAL AND INDUSTRIAL USE  
BY SOURCE AND USE CATEGORY**

| SOURCE                 | DESCRIPTION                  | USE <sup>1</sup> (AC-FT/YR) |                          |                          |
|------------------------|------------------------------|-----------------------------|--------------------------|--------------------------|
|                        |                              | POTABLE                     | NON-POTABLE              | POTABLE PLUS NON-POTABLE |
| GROUND WATER           | Residential & Institutional: |                             |                          |                          |
|                        | Public Community Systems     | 6,114                       | 1,057 <sup>2</sup>       | 7,171 <sup>2</sup>       |
|                        | Public Non-Community Systems | 2                           | 0                        | 2                        |
|                        | Private Domestic Systems     | 486                         | 0                        | 486                      |
|                        | Commercial:                  |                             |                          |                          |
|                        | Public Community Systems     | 558                         | 0                        | 558                      |
|                        | Public Non-Community Systems | 91                          | 0                        | 91                       |
|                        | Industrial:                  |                             |                          |                          |
|                        | Public Community Systems     | 62                          | 0                        | 62                       |
|                        | Self-Supplied Industries     | 0                           | 360                      | 360                      |
|                        | <b>Ground Water Total</b>    | <b>7,313</b>                | <b>1,417<sup>2</sup></b> | <b>8,730<sup>2</sup></b> |
| SURFACE WATER          | Residential & Institutional: |                             |                          |                          |
|                        | Public Community Systems     | 0                           | 1,003 <sup>2</sup>       | 1,003 <sup>2</sup>       |
|                        | Public Non-Community Systems | 0                           | 0                        | 0                        |
|                        | Commercial:                  |                             |                          |                          |
|                        | Public Community Systems     | 0                           | 0                        | 0                        |
|                        | Public Non-Community Systems | 0                           | 0                        | 0                        |
|                        | <b>Surface Water Total</b>   | <b>0</b>                    | <b>1,003<sup>2</sup></b> | <b>1,003<sup>2</sup></b> |
| <b>TOTAL WATER USE</b> |                              | <b>7,313</b>                | <b>2,420<sup>2</sup></b> | <b>9,733<sup>2</sup></b> |

- 1) Water was classified as potable or non-potable based on the system delivering the water rather than the characteristics of the water. Thus, all water supplied to secondary irrigation systems or self-supplied industries was classified as non-potable.
- 2) This amount includes non-potable water supplied by irrigation companies to customers of public community systems. (Secondary water is often supplied to customers of public community systems by irrigation companies that are separate entities from the potable water supplier.)

**TABLE 7-4  
IRON COUNTY AND ENTERPRISE AREA  
PUBLIC COMMUNITY WATER SUPPLIERS 1992 SUPPLIES AND USAGE**

| WATER SUPPLIER                     | Maximum Potable Reliable Source Capacity (Ac-Ft/Yr) | Secondary Residential and Municipal Outdoor Use (Ac-Ft/Yr) | POTABLE USAGE                      |                                   |                              |                           |                           |                            | Residential Secondary Outdoor Use Plus Total Potable M&I Use (Ac-Ft/Yr) | POTABLE PER CAPITA USAGE |   |                                      | POTABLE ESTIMATED PEAK DAY VALUES |                       |                       |   | Potable Supply Available In Pattern of Use (Ac-Ft/Yr) |
|------------------------------------|---|--|------------------------------------|-----------------------------------|------------------------------|---------------------------|---------------------------|----------------------------|---|--------------------------|---|--------------------------------------|-----------------------------------|-----------------------|-----------------------|---|---|
|                                    |   |  | Residential Outdoor Use (Ac-Ft/Yr) | Residential Indoor Use (Ac-Ft/Yr) | Institutional Use (Ac-Ft/Yr) | Commercial Use (Ac-Ft/Yr) | Industrial Use (Ac-Ft/Yr) | Total "M&I" Use (Ac-Ft/Yr) |   | Population               | Average Per Capita Water Use (Ac-Ft/C-Yr) | Average Per Capita Water Use (GPCPD) | Assumed Peaking Factor (PD/AD)    | Peak Day Supply (MGD) | Peak Day Demand (MGD) | Peak Day Supply In Excess of Demand (MGD) |   |
| Angus Water Company                | 142.0   | 6.0  | 16.6                               | 5.4                               | 0                            | 0                         | 0                         | 22.0                       | 28.0  | 44                       | 0.50                                      | 446.3                                | 2.39                              | 0.13                  | 0.05                  | 0.08                                      | 61  |
| Brian Head Water System            | 603.6   | 0  | 0                                  | 94.0                              | 0                            | 164.9                     | 0                         | 258.9                      | 258.9   | 763 <sup>(1)</sup>       | 0.34                                      | 303.5                                | 2.34                              | 0.54                  | 0.54                  | 0.00                                      | 259   |
| Cedar City Water System            | 14,741.0  | 500.9  | 2,036.0                            | 1,725.1                           | 253.4                        | 257.3                     | 42.2                      | 4,314.0                    | 4,814.9   | 14,000                   | 0.31                                      | 276.7                                | 2.32                              | 13.16                 | 8.99                  | 4.17                                      | 6,354   |
| Enoch Water System                 | 639.3   | 0  | 310.3                              | 262.3                             | 40.0                         | 24.5                      | 2.2                       | 639.3                      | 639.3   | 2,129                    | 0.30                                      | 267.8                                | 2.32                              | 0.57                  | 1.32                  | -0.75                                     | 275   |
| Enterprise City Water System       | 1,042.5   | 0  | 221.8                              | 143.6                             | 161.4                        | 11.0                      | 0                         | 537.8                      | 537.8   | 1,165                    | 0.46                                      | 410.6                                | 2.38                              | 0.93                  | 1.14                  | -0.21                                     | 438   |
| Escalante Valley Housing Authority | 40.0  | 0  | 2.0                                | 10.4                              | 0                            | 0.1                       | 0                         | 12.5                       | 12.5  | 84                       | 0.15                                      | 133.9                                | 2.13                              | 0.04                  | 0.02                  | 0.02                                      | 21  |
| Kanarrville Water System           | 201.0   | 80.8   | 61.8                               | 27.7                              | 0.3                          | 0.3                       | 0.7                       | 90.8                       | 171.6   | 225                      | 0.40                                      | 357.1                                | 2.36                              | 0.18                  | 0.19                  | -0.01                                     | 85  |
| Meadows Ranch                      | 436.8   | 0  | 70.0                               | 25.9                              | 0                            | 0                         | 0                         | 95.9                       | 95.9  | 210                      | 0.46                                      | 410.6                                | 2.38                              | 0.39                  | 0.21                  | 0.18                                      | 184   |
| Mid-Valley Estates Water Co.       | 180.7   | 0  | 13.6                               | 7.4                               | 0                            | 0                         | 0                         | 21.0                       | 21.0  | 60                       | 0.35                                      | 312.4                                | 2.34                              | 0.16                  | 0.04                  | 0.12                                      | 77  |
| Monte Vista Community Water Co.    | 60.0  | 0  | 23.3                               | 18.7                              | 0                            | 0                         | 0                         | 42.0                       | 42.0  | 152                      | 0.28                                      | 250.0                                | 2.30                              | 0.05                  | 0.09                  | -0.04                                     | 24  |
| Mt. View Special Service Dist.     | 100.0   | 0  | 35.0                               | 11.5                              | 0                            | 0                         | 0                         | 46.5                       | 46.5  | 93                       | 0.50                                      | 446.3                                | 2.39                              | 0.09                  | 0.10                  | -0.01                                     | 42  |
| New Castle Water Co.               | 150.3   | 33.0   | 43.0                               | 32.0                              | 17.8                         | 40.2                      | 17.3                      | 150.3                      | 183.3   | 260                      | 0.58                                      | 517.8                                | 2.40                              | 0.13                  | 0.32                  | -0.19                                     | 61  |
| Old Meadows Water Co.              | 140.4   | 0  | 15.7                               | 4.3                               | 0                            | 0                         | 0                         | 20.0                       | 20.0  | 35                       | 0.57                                      | 508.8                                | 2.40                              | 0.13                  | 0.04                  | 0.09                                      | 61  |
| Paragonah Water System             | 212.3   | 269.4  | 14.6                               | 40.5                              | 0.1                          | 0.0                       | 0                         | 55.2                       | 324.6   | 329                      | 0.17                                      | 151.8                                | 2.17                              | 0.19                  | 0.11                  | 0.08                                      | 98  |
| Park West Water Co.                | 74.0  | 0  | 29.4                               | 12.3                              | 0                            | 0                         | 0                         | 41.7                       | 41.7  | 100                      | 0.42                                      | 374.9                                | 2.37                              | 0.07                  | 0.09                  | -0.02                                     | 33  |
| Parowan City Water System          | 1,605.8   | 1152.0   | 0                                  | 224.7                             | 13.5                         | 59.1                      | 0                         | 297.3                      | 1,449.3   | 1873                     | 0.16                                      | 142.8                                | 2.15                              | 1.43                  | 0.58                  | 0.85                                      | 745   |
| Rainbow Ranchos Water Co.          | 64.5  | 0  | 0                                  | 15.9                              | 0                            | 0                         | 0                         | 15.9                       | 15.9  | 129                      | 0.12                                      | 107.1                                | 2.04                              | 0.06                  | 0.03                  | 0.03                                      | 33  |
| Summit Special Service Dist.       | 171.0   | 17.5   | 52.5                               | 20.3                              | 0                            | 0                         | 0                         | 72.8                       | 90.3  | 165                      | 0.44                                      | 392.8                                | 2.37                              | 0.15                  | 0.15                  | 0.00                                      | 71  |
| <b>Area Summary</b>                | <b>20,605.2</b>                                     | <b>2,059.6</b>   | <b>2,945.6</b>                     | <b>2,682.0</b>                    | <b>486.5</b>                 | <b>557.4</b>              | <b>62.4</b>               | <b>6,733.9</b>             | <b>8,793.5</b>  | <b>21,816</b>            | <b>0.31</b>                               | <b>276.7</b>                         | <b>2.32</b>                       | <b>18.39</b>          | <b>14.00</b>          | <b>4.39</b>                               | <b>8,880</b>  |
| <b>A</b>                           | <b>B</b>  | <b>C</b>   | <b>D</b>                           | <b>E</b>                          | <b>F</b>                     | <b>G</b>                  | <b>H</b>                  | <b>I</b>                   | <b>J</b>  | <b>K</b>                 | <b>L</b>                                  | <b>M</b>                             | <b>N</b>                          | <b>O</b>              | <b>P</b>              | <b>Q</b>                                  | <b>R</b>  |

(1) The population given for Brian Head includes the average daily number of recreational visitors. Brian Head reports 134 full time residents.

(2) Peak Day Demand exceeds the calculated Peak Day Supply. Per DWR, 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.

B, C, D, E, F, G, H and K are all input data.

$I = D + E + F + G + H$

$J = C + I$

$L = I / K$

$M = L * 892.682$  (converts from ac.ft./yr to GPD)

$N = (2.5 * M - 49.4) / M$

$O = B * 892.682 / 1,000,000$  (except as provided in note 2 above)

$P = K * M * N / 1,000,000$

$Q = O - P$

$R = \{O / (N * M)\} * M * (1120.22)$ , (1120.22 converts from MGD to Ac-Ft/Yr)

This value represents only Potable M&I Water Use.

This value represents Secondary Water Use combined with Potable M&I Water Use.

Average per capita water use based only on use of potable water.

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 potable water supply is less than the peak day potable water demand, this value was set equal to the Peak day potable water demand.

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 water supply above the amount of peak day potable water demand.

The actual quantity of the maximum reliable source capacity 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 potable water sources can serve.

**TABLE 7-5  
IRON COUNTY  
SECONDARY WATER USE  
BY CUSTOMERS OF PUBLIC COMMUNITY WATER SYSTEMS**

| Public Community Water System   | Secondary Water Use <sup>1</sup> |                             |                          |
|---------------------------------|----------------------------------|-----------------------------|--------------------------|
|                                 | Ground Water<br>(ac-ft/yr)       | Surface Water<br>(ac-ft/yr) | Total<br>(ac-ft/yr)      |
| Angus Water Co.                 | 6                                | 0                           | 6                        |
| Cedar City Water System         | 501                              | 0                           | 501                      |
| Kanarraville Water System       | 81 <sup>2</sup>                  | 0                           | 81 <sup>2</sup>          |
| New Castle Water Co.            | 0                                | 33 <sup>2</sup>             | 33 <sup>2</sup>          |
| Paragonah Water System          | 0                                | 269 <sup>2</sup>            | 269 <sup>2</sup>         |
| Parowan City Water System       | 469                              | 683                         | 1,152                    |
| Summit Special Service District | 0                                | 18 <sup>2</sup>             | 18 <sup>2</sup>          |
| <b>Sum</b>                      | <b>1,057<sup>2</sup></b>         | <b>1,003<sup>2</sup></b>    | <b>2,060<sup>2</sup></b> |

- 1) Secondary water use for non-metered sources was calculated by assuming an irrigation demand of about 4 acre-feet per irrigated acre.
- 2) This amount includes non-potable water supplied by irrigation companies to customers of public community systems. (Secondary water is often supplied to customers of public, community systems by irrigation companies that are separate entities from the potable water supplier.)

**TABLE 7-6  
IRON COUNTY AND ENTERPRISE AREA  
WATER USE AND SUPPLY FOR PUBLIC NON-COMMUNITY SYSTEMS**

| WATER SUPPLIER                        | USAGE                        |  |                                |                             |                             |                        |
|---------------------------------------|------------------------------|--|--------------------------------|-----------------------------|-----------------------------|------------------------|
|                                       | Residential Use (Acre-Ft/Yr) | Recreational & Commercial Use (Acre-Ft/Yr) | Institutional Use (Acre-Ft/Yr) | Irrigation Use (Acre-Ft/Yr) | Industrial Use (Acre-Ft/Yr) | Total Use (Acre-Ft/Yr) |
|                                       |                              |  |                                |                             |                             |                        |
| Cedar Breaks National Monument        | 0.3                          | 0.0  | 3.5                            | 0.0                         | 0.0                         | 3.8                    |
| Cedar Canyon Campground               | 0.0                          | 0.0  | 0.1                            | 0.0                         | 0.0                         | 0.1                    |
| Deer Haven Campground                 | 0.0                          | 0.0  | 0.2                            | 0.0                         | 0.0                         | 0.2                    |
| Escalante Valley School               | 0.0                          | 0.0  | 1.4                            | 20.0                        | 0.0                         | 21.4                   |
| Honeycomb Rocks Campground            | 0.0                          | 0.0  | 0.1                            | 0.0                         | 0.0                         | 0.1                    |
| Kanarraville State Highway RS         | 0.0                          | 0.0  | 13.4                           | 14.0                        | 0.0                         | 27.4                   |
| Lunt Park Highway RS                  | 0.0                          | 0.0  | 13.4                           | 18.0                        | 0.0                         | 31.4                   |
| Rainbow Meadows Ranchos               | 0.0                          | 0.2  | 0.0                            | 0.0                         | 0.0                         | 0.2                    |
| Sunshine Truck Stop                   | 0.6                          | 7.8  | 0.0                            | 0.0                         | 0.0                         | 8.4                    |
| Self Supplied Industries <sup>1</sup> | 0.0                          | 0.0  | 0.0                            | 0.0                         | 360.3                       | 360.3                  |
|                                       |                              |  |                                |                             |                             |                        |
| <b>AREA SUMMARY</b>                   | 0.9                          | 8.0  | 32.1                           | 52.0                        | 360.3                       | 453.3                  |
| A                                     | B                            | C  | D                              | E                           | F                           | G                      |

- 1) Self supplied industries include; a chemical production plant, Western Electrochemical Company near Cedar City; a dairy farm, Christenson Brothers in New Castle; and two green houses, Troy Hyro Systems in New Castle and Legant Green House Partnership near Cedar City.

**TABLE 7-7  
IRON COUNTY AND THE ENTERPRISE AREA  
AVERAGE PER CAPITA M&I WATER USE**

| CATEGORY   | AVERAGE PER<br>CAPITA USE<br>(AC-FT/CAP/YR) | AVERAGE PER<br>CAPITA USE<br>(GALLONS/CAP/DAY) |
|--|---|--|
| Residential & Institutional<br>Potable Use <sup>1</sup>                | 0.29  | 256.2  |
| Residential & Institutional<br>Potable Plus Secondary Use <sup>1</sup> | 0.38  | 335.6  |
| Public Community Systems<br>Potable Use <sup>2</sup>                   | 0.31  | 275.8  |
| Public Community Systems<br>Potable Plus Secondary Use <sup>2</sup>    | 0.40  | 359.8  |

- 1) Based on a population of 23,036 for Iron County and the Enterprise Area.
- 2) Based on a population of 21,816 supplied by Public Community Systems in Iron County and the Enterprise area.