Chapter 2 – Existing Conditions, Water Supplies and Infrastructure

2.1 Background

During the early settlement of the Snyderville Basin, population was concentrated within the boundaries of the mining town of Park City, with only a few scattered individual homes located within the rest of the Basin. In the late 1950's and early 1960's, a ski resort was developed on the mountains adjacent to Park City. Since then, the dynamics of the region have dramatically changed; initially to a winter vacation destination, and more recently to a year-round resort community.

With the increased recreational opportunities, residential developments expanded within Park City and into the surrounding unincorporated areas. Park City continued to expand its water supply system to meet the needs within its boundaries. Water development within the unincorporated portion of the Basin was initially a private enterprise. The earliest developments, Summit Park and Pinebrook, developed their own water companies and water systems. Most consisted of wells and small storage tanks. Some of these evolved into community systems and some eventually combined to serve more than one developed area. Summit Water Distribution Company was founded in 1979, to develop a Basin-wide water system that would supply numerous developments owned by the principles of the water company.

When a countywide wastewater system was developed in the 1970's, development within the unincorporated areas accelerated. Eventually, Summit County incorporated several service districts to take over ownership and operation of these smaller water systems. Several private water companies also emerged to own and operate systems. Some of these systems are operated as mutual water companies, where each user owns a portion of the system. Others remained as private companies governed by the Utah Public Service Commission.

In 2000, Summit County established MRWSSD. MRWSSD subsequently assumed ownership and/or operation of several smaller systems which were either privately owned or formerly in other special service districts. Several of these smaller systems had experienced difficulty in providing water to their customers for a variety of reasons. Some experienced problems with their supply wells, and their efforts to find new sources were unsuccessful. Others were under capitalized and unable to fund operation and maintenance needs.

2.2 Summit County Concurrency Requirements

In the Snyderville Basin, water has become a critical component in the ability to sustain growth. In addition to the State Engineer closing the area to new appropriations, Summit County has implemented a concurrency ordinance to all non-municipal public water supply providers in the Snyderville Basin, which requires them to demonstrate they have adequate water to meet current and approved growth demands within their boundaries. The ordinance requires that concurrency reports be submitted which provide the county with accurate data that is used to update the

carrying or design capacity of an existing water system. The concurrency review focuses on the existing public water supplies, and the dependable peak-day source capacity. This new capacity value is used by the county to determine if sufficient water source production capacity is available and if infrastructure improvements are in place before development approvals and building permits are issued for new construction. Reported 2004 concurrency capacities are listed in Table 2-1. This table shows the maximum capacity of the water supply sources and an estimate of the annual production capacity of that source, and it also shows the rated capacity. Rated capacity is a term used in the concurrency process to discount the available supply for drought and operational problems that reduce the capabilities of the source to produce water. In estimating the volumes of water produced, it is assumed that spring and surface sources are constant year around. However, since SWDC's East Canyon Water Treatment Plant only operates from April to September, it was rated at one-half the yearly maximum capacity. In the future, SWDC may choose to operate the treatment plant during the winter months to reduce its dependence on groundwater and reserve use of its wells for peak periods of demand. Due to operational constraints commonly associated with wells, well sources are considered to be operational one-half of the year. The rated capacities are determined for each system by the Utah Division of Drinking Water (UDDW), based on pump tests after well completion. The UDDW rules require that the wells be pumped at 150 percent of the anticipated design capacity. The county generally subtracts an additional 15 percent from the UDDW rated capacity as a drought reserve. These criteria are reflected in the tables.

2.3 Existing Water Systems and Source Descriptions

In describing existing water systems and sources, two factors are important to consider: (1) maximum water supply available under present conditions, and (2) reliable system source capacity. The maximum water supply is defined as the total water resource that is presently developed. The ability to use this total resource is limited by mechanical constraints (such as pump capacity or pipe size), hydrologic constraints (such as reliable streamflow or groundwater safe yield), or legal constraints (such as a water right or contract). For purposes of this study, the least water supply available after considering these constraints is considered to be the reliable system source capacity. Determination of well pump capacities, spring flow estimates, treatment plant capacities, and water right information all aid in the calculation of this value.

Because most culinary water system storage tanks are designed to store only about 1 day's worth of water demand, and many systems only use the full capacity of their wells during the peak season, not all of the maximum water supply is available to meet future water needs. Therefore, the system source capacity is more useful in determining future water capacities of the particular community water system sources (wells, springs, etc.). See Section 2.4.1, for a more detailed definition of a reliable supply. When the system source capacity is divided by the average annual per capita water use for the system, the result represents the population that can be reliably served by the present system sources.

TABLE 2-1
Reported Concurrency Capacities

Water Supplier/ Source Name	Source Type	2004 Max Capacity (gpm)	2004 Max. Annual Capacity (ac-ft/yr.)	2004 Rated Capacity (gpm)	2004 Annual Rated Capacity (ac-ft/yr.)
Community Water Company					
Ambush #1	Well	40	32	-[1]	-[1]
Ambush #2	Well	25	20	-[1]	-[1]
Wagon Trail #2	Well	16	13	16	13
Gulch	Well	105	85	95	77
Bushwacker	Well	15	12	-[1]	-[1]
Willow Creek Treatment Plant	Surface	200	323	180	290
Totals		**401**	**485**	**291**	**380**
Gorgoza Mutual Water Company					
Two Mile Springs	Spring	70	113	60	96
Well #1	Well	125	101	85	69
Dan's Well	Well	120	97	85	69
Well #P3	Well	100	81	100	81
Well #4B	Well	547	441	425	343
Well #4R	Well	500	403	340	274
South Ridge #1 Well	Well	43	35	43	35
Ankareh	Well	225	181	150	121
Summit Water Connection	Intercon	300	242	300	242
Totals		**2,030**	**1,694**	**1,588**	**1,328**
High Valley Water					
High Valley Old Well	Well	150	121	128	103
Atkinson Well #2	Well	86	69	73	59
Totals		**236**	**190**	**201**	**162**
Mountain Regional Water Special Service District[2]					
Atkinson Well #2	Well	194	156	165	133
Jailhouse Well #3	Well	120	97	102	82
Silver Creek Well #10	Well	306	247	260	210
Starpointe Well #15b	Well	1,225	988	1,041	840
Three Mile Well	Well	150	121	128	103
Blackhawk Well #2R	Well	123	99	105	85
Gorgoza Well #6	Well	188	152	160	129
Nugget Well	Well	200	161	170	137
Spring Creek Spring	Spring	125	202	125	202
Lake Well #1	Well	194	156	165	133
Sun Peak Well #2	Well	35	28	30	24
Winter Park Well #3	Well	76	61	65	52
Summit Park Well #2	Well	37	30	25	20
Summit Park Well #4	Well	20	16	17	14
Summit Park Well #5	Well	72	58	61	49
Summit Park Well #7	Well	120	97	87	70
Spring Creek Well #1	Well	252	203	213	172
SWDC Sports Park	Intercon	80	65	80	65
Totals		**3,517**	**2,937**	**2,999**	**2,520**
Park City Corporation					
Spiro Tunnel	Spring	2,350	3,791	2,350	3,791
Judge Tunnel	Spring	1,200	1,936	650	1,048
Thiriot Spring	Spring	1,600	2,581	628	1,013
Middle School Well	Well	1,000	807	1,000	807
Divide Well	Well	1,000	807	667	538
Park Meadows Well	Well	1,000	807	-[1]	-[1]
JSSD Interconnect	Intercon	1,000	1,000	1,000	1,000
Totals		**9,150**	**11,726**	**6,295**	**8,196**
Summit County Special Service Area No. 3					
Well #1	Well	145	234	128	206
Totals		**145**	**234**	**128**	**206**

TABLE 2-1
Reported Concurrency Capacities (cont.)

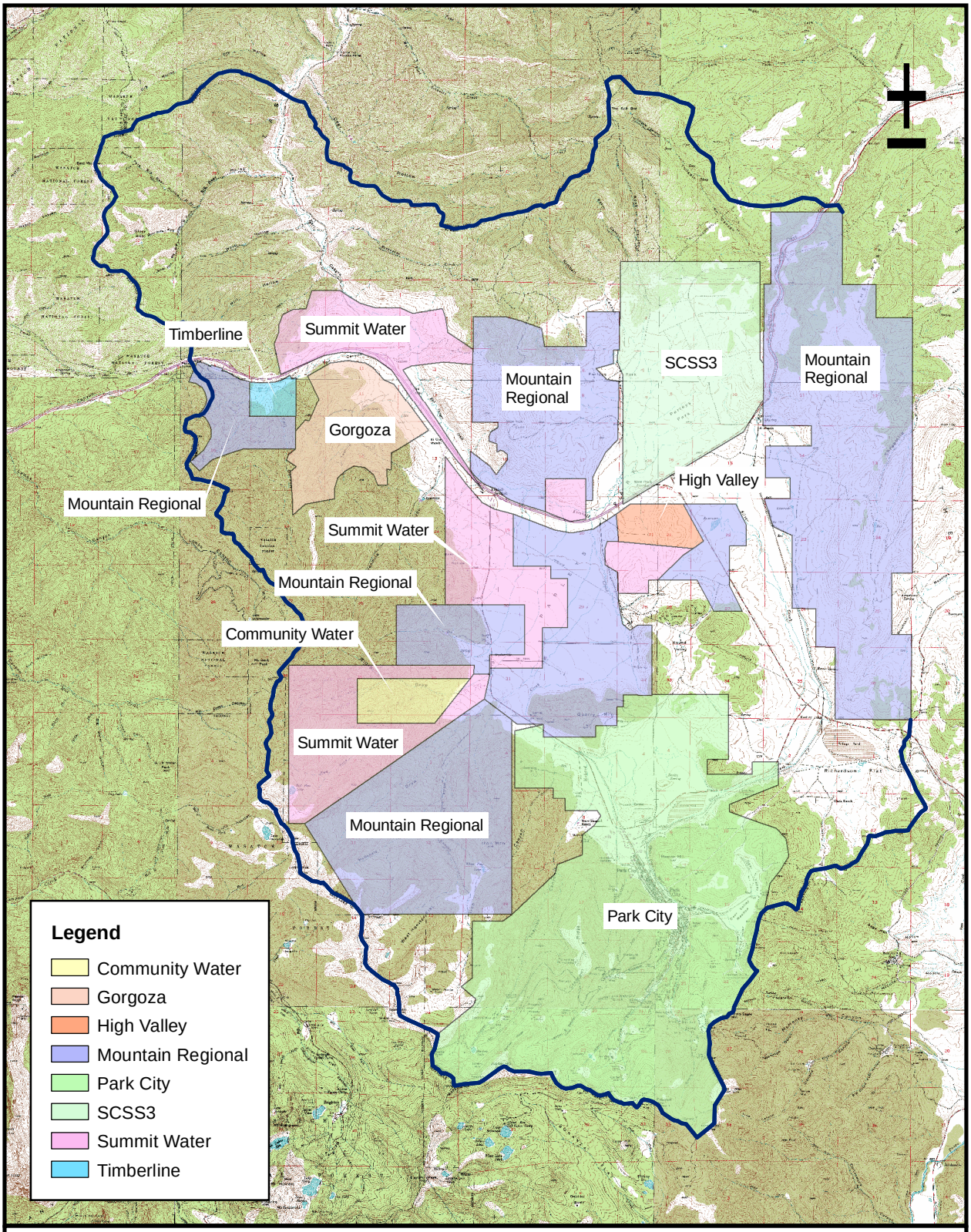
Water Supplier/ Source Name	Source Type	2004 Max Capacity (gpm)	2004 Max. Annual Capacity (ac-ft/yr.)	2004 Rated Capacity (gpm)	2004 Annual Rated Capacity (ac-ft/yr.)
Summit Water Distribution Company					
Rest Stop Well	Well	1,200	968	800	645
Hiute Well	Well	150	121	128	103
Jeremy Well	Well	511	412	434	350
Knight Well	Well	71	57	60	48
White Pine Well	Well	20	16	17	14
Church Well	Well	95	77	81	65
Storage Well	Well	750	605	638	515
Old F-7 Well	Well	185	149	157	127
U224 Well	Well	250	202	167	135
New F-7 Well	Well	468	377	398	321
Spring Creek Springs	Spring	500	807	425	686
East Canyon Treatment Plant[3]	Surface	3,820	907	1,120	452
Totals		**8,020**	**4,698**	**4,425**	**3,460**
Timberline Special Service District					
Ponderosa Well	Well	22	18	19	15
Cedar Well	Well	14	11	12	10
Gorgoza Interconnect	Inteconnect	20	16	20	16
Summit Park Well #7	Well	26	21	22	18
MR Interconnect	Interconnect	2	2	2	2
Totals		**84**	**68**	**75**	**60**

[1] Incomplete data
[2] Mountain Regional Water Special Service District includes systems formerly known as Atkinson Special Service District, Summit Park, Silver Springs, Spring Creek, Pivotal Promontory, and Quarry Mountain.
Well capacity for volume calculations was assumed to operate 50 percent of the time.
[3] Summit Water Treatment Plant was assumed to operate only 1/4 of the year due to water availability in East Canyon Creek. Annual Capacities are derived from converting capacity to annual use assuming full time availability of springs, 1/2 time for wells and 1/4 time for Summit Water's Treatment Plant.

The major water suppliers in the study area are composed of public water systems and privately controlled water systems. In addition, there are numerous individual systems that typically provide water to a single home or property using a well or spring. A description of each of the major water providers is presented in the following paragraphs to provide an understanding of the water supply system of the area. Figure 2-1 shows the present service area of each of the major water providers in the Basin. Summit County's Concurrency Officer, who oversees the reports and enforces the county's ordinance, has developed a definition of equivalent residential connections (ERC) with which the number of ERCs for each water system has been determined. The officer uses the ERC numbers to evaluate each water provider's capacity to meet expected peak day water demands. An ERC is defined to be 0.86 gallons per minute or 1,238 gallons per day.

Community Water Company

Community Water Company is a privately-owned water system serving an area of The Canyons Ski Resort and surrounding developments. Based on the 2004 Concurrency Report, submitted by Community Water Company, the system is currently servicing 286 ERCs, with an expectation of increasing to 439 ERCs at build-out. There are three connections to SWDC in Community Water Company's water system, and one connection to MRWSSD.



Snyderville Basin
Water Supply Study

Figure 2-1
Present Distribution Areas

Sources for Community Water Company includes: two wells (Wagon Trail No. 2 Well and Gulch Well) and one treated streamflow (Willow Creek Treatment Plant). UDDW rates the current total system source as 291 gallons per minute (gpm). In addition to the connections requiring service throughout the year, Community Water Company has a standby commitment to The Canyons Ski Resort to provide water for snowmaking.

Gorgoza Mutual Water Company

Gorgoza Mutual Water Company is a mutually-owned water system originally developed to provide water to the Pinebrook development. Based on the 2004 Concurrency Report, submitted by Gorgoza, the system is currently servicing 1,399 ERCs with an expectation of increasing to 1,540 ERCs by 2009. No additional growth or development is anticipated beyond that point.

Sources for the Gorgoza system include seven wells and one spring, with a total rated capacity of 1,588 gpm (in 2004). Additionally, up to 300 gpm is available through interconnections with SWDC's system on an emergency basis. Gorgoza recently completed drilling a new well. Well tests documented a maximum capacity of 300 gpm, and the State of Utah has approved a rated capacity of 200 gpm. Gargoza may drill an addition well in the future for reserve capacity. Gorgoza also has an interconnection with MRWSSD through which they can receive or supply water as needed.

High Valley Water Company

High Valley Water Company is a mutually-owned water system serving customers located in the area southwest of I-80/U.S. Highway 40 Junction. Based on the 2004 Concurrency Report, submitted by High Valley, the system is currently servicing 211 ERCs with an expectation of increasing to 225 ERCs by 2009. High Valley has no plans to increase their service area or build new developments in the current service area.

Sources for the High Valley Water Company system include: two wells (High Valley Old Well and Atkinson Well No. 2), with a total UDDW rated capacity of 201 gpm. Atkinson Well No. 2, is jointly owned by High Valley and MRWSSD. Because of the wells water quality problems, MRWSSD voluntarily exchanges the poor quality water for higher quality water and supplies it to High Valley. A replacement well for Atkinson Well No. 2 was drilled but found to be unproductive. Since then, High Valley Water Company has contracted with SWDC to provide additional water when needed.

Mountain Regional Water Special Service District

MRWSSD is a county organized water district. It includes systems formerly known as Atkinson Special Service District, Summit Park, Silver Springs, Spring Creek, Pivotal Promontory, and Quarry Mountain. Based on the 2004 Concurrency Report, the system is currently servicing 2,700 ERCs with an expectation of increasing to 5,540 ERCs by 2009.

Sources for the MRWSSD system includes: 16 wells and 1 spring, with a total UDDW rated capacity of 2,999 gpm. MRWSSD recently completed a surface water treatment plant (Signal Hill) that treats water pumped from shallow wells located along the Weber River just upstream from Rockport Reservoir. The plant has been operational since October 2004 and has an initial capacity of 3.0 million gallons per day (MGD).

Park City Municipal Corporation

Park City Municipal Corporation operates a public water system. Because it is a publicly operated system, no concurrency report is required. Based on information provided by the city, it services approximately 4,700 connections. These connections consist of single and multi-family homes, hotels, golf courses, two ski resorts, restaurants, and a variety of other businesses. Park City has projected future water needs and developed a Master Plan that assumes a growth build-out by about 2030.

Sources for the Park City system includes: three wells, one spring, and two tunnels, with a total UDDW rated capacity of 6,295 gpm. Currently, one of the three wells has been taken off line due to water quality issues. Once adequate treatment can be provided, this well will add another 670 gpm to the total rated capacity. Additionally, the city currently imports 1,000 gpm, up to a maximum of 1,000 acre-feet per year, from Jordanelle Special Service District (JSSD). JSSD is a water district located in Wasatch County that serves water to the area surrounding Jordanelle Reservoir and is described below.

Summit County Service Area No. 3

Summit County Service Area No. 3 (SCSA3) is classified as a county authorized water system that provides water to the area north of the I-80/U.S. Highway 40 Junction. Based on the 2004 Concurrency Report, the system is currently servicing 149 ERCs with an expectation of increasing to 194 by 2009.

The source for the SCSA3 includes: Well No. 1, with a UDDW rated capacity of 128 gpm. It is important to note, that there are a significant number of individual wells serving homes in this area. As growth occurs in this area, it is probable that there will be a move to a greater dependence on the public water system and the numerous small existing wells will not be acceptable as a public water source. Thus, as existing individual well owners convert to the public system, even without growth, there will be a greater need for water supply in the public system serving this area. MRWSSD operates this system under an inter-local agreement.

Summit Water Distribution Company

SWDC is a user-owned exempt mutual water company. This means that the operation side of the company cannot make a profit, but can only charge the costs for operation, maintenance, repair, and replacement of the water distribution system. All costs and necessary actions associated with expansion of the SWDC system is the responsibility of the shareholder(s) proposing the expansion (Flitton 2005). The system serves a wide area of the Snyderville Basin, extending from Jeremy Ranch to U.S. Highway 40, and south to The Canyons Ski Resort area. Based on the 2004 Concurrency Report, the system is currently servicing 2,805 ERCs, with an expectation of increasing to 4,305 ERCs by 2009.

Sources for the SWDC system includes: a surface water treatment plant, 10 wells, and 1 spring, with a total rated peak capacity of 4,425 gpm. The water treatment plant currently receives source water from a diversion on East Canyon Creek. The long-range plan is to construct a water line and pump stations to withdraw water from East Canyon Reservoir to supply the

treatment plant. This would increase the production from that plant to match the installed capacity and facilitate future expansion.

In an agreement dated May 26, 1998, by and between Utah Division of Wildlife Resources (UDWLR) and SWDC, SWDC agreed to a variety of stream enhancement measures, including a forbearance from diverting water from East Canyon Creek, unless its base flows exceeded 3.5 cubic feet per second (cfs), and an intent to continue cooperating to increase base flows above 3.5 cfs level. With respect to the flows of East Canyon Creek arising naturally above the project's water treatment plant at Jeremy Ranch, Summit Water agreed to not divert any water directly from East Canyon Creek, unless the creek's flow rate at the above-mentioned location is greater than 6.0 cfs, thereby establishing 6 cfs as the base flow rate at which Summit Water will stop its direct diversions from East Canyon Creek and begin taking water from East Canyon Reservoir (any diversion made when the flow is greater than 6 cfs will not reduce the flow to less than 6 cfs). As part of the mutual cooperation between the parties, there is a commitment to provide incremental augmentation from upstream sources to increase base flows above the 6 cfs base flows established by this agreement. Summit Water also agreed to recognize cumulative increases to the 6 cfs base flow, when such flows are made possible by quantifiable augmentation to upstream flows in East Canyon Creek or its tributaries. During low flow periods from droughts, etc. which extend into the identified winter months, the 6 cfs base flow will be respected. During low flows occurring at any other time of year, 3.5 cfs base flows will be respected (no diversion will reduce the base flow below 3.5 cfs). As a consequence of these commitments, SWDC will provide the UDWLR a right to use 2 cfs capacity of the proposed East Canyon Pipeline to deliver water for fish, and thereby receives credit toward the 6 cfs minimum streamflow.

Timberline Special Service District

Timberline Special Service District is a community water system that provides water to the Parleys Summit area. Based on the 2004 Concurrency Report, the system is currently servicing 87 ERCs with an expectation of increasing to 95 ERCs by 2009. Timberline has contracted with MRWSSD to provide management, service, and maintenance. They have also been approved for annexation into MRWSSD.

Sources for the Timberline system includes: two wells with a UDDW rating of 31 gpm. Timberline also receives 20 percent of the production from two wells jointly owned by Timberline and MRWSSD (formerly Summit Park Special Service District). Additionally, Timberline receives 20 gpm through a connection with Gorgoza Mutual Water Company. The total peak source capacity for Timberline is 75 gpm. MRWSSD operates this system under an inter-local agreement.

Weber Basin Water Conservancy District

The Weber Basin Water Conservancy District (WBWCD) was formed in 1950 to develop the water resources of the Weber River Drainage Basin. WBWCD provides primarily wholesale treated and untreated water to customers located in Summit, Morgan, Davis, Box Elder, and Weber Counties. WBWCD operates a number of reservoirs located on the Weber River and its tributaries, conveyance facilities, treatment plants and wells, to provide culinary and secondary water to its customers. Since its inception, WBWCD has intended to provide water to the

Snyderville Basin, but until recently it had not developed any systems to do so. With the completion of the Lost Creek Canyon Project, MRWSSD will provide about 1,600 acre-feet of WBWCD water to the Snyderville Basin. Recently, a diversion at Rockport Reservoir was examined to evaluate the feasibility of providing an additional 5,000 acre-feet of WBWCD water to the MRWSSD treatment plant for use in the Snyderville Basin. Weber Basin has contracted with both Park City and MRWSSD to deliver 2,500 acre-feet per year of Weber River water to each entity.

Jordanelle Special Service District (JSSD)

JSSD was established by Wasatch County to provide water to developments located around Jordanelle Reservoir. Although it is not located in the Snyderville Basin, JSSD has a treatment plant and distribution system with an existing connection that provides water to Park City through Deer Valley Resort. The source of JSSD's water is the Ontario Tunnel, and it is treated prior to use. In 2002, Park City and JSSD entered into a 20-year lease agreement to purchase 1,000 acre-feet per year of M&I water at a maximum rate of 1,000 gpm from JSSD through this connection. The city is currently in the third year of that agreement.

2.4 Existing Water Supply

2.4.1 Methodology

To estimate the annual water production capacity of the existing water sources in the Basin, several methods were used. The first method was to use the maximum installed capacity of the sources within each system. These values were derived by summing the capacity values shown in Table 2-1 under the column entitled maximum annual capacity. Table 2-2 lists the total maximum source capacity as reported in each water supplier's 2004 Concurrency Report, along with the 2001 actual water usage. The actual 2001 supply values were provided by UDWR based upon data collected from water providers.

The use of the 2001 data raises the question of why more recent data was not used. UDWR, the agency collecting this data, believes the 2001 data is more representative of the long-term water deliveries in the Basin than more recent data. While water use data for 2003 and 2002, was available and could have been used, the water use in both of these years was significantly impacted by drought conditions. Utilizing water use during a known drought year (2003 was one of the most severe on record) to project future water demands is undesirable because it would result in a significant underestimation of actual future water needs.

Given that the County Concurrency Officer has rated each source, a second method was used to estimate the annual water production capacities based on the rated capacity of the sources. Table 2-3 lists these capacities for each water supplier.

A third method was developed to estimate annual water production capacity using a peaking factor. Standard practice in water system planning and operation is to install sufficient capacity to meet expected peak demands of the system. This practice typically recognizes that peak capacity only needs to be available for short periods of time when peak demands occur. Peak demands are generally two to three times the average demand of the system. Given that each

water provider has designed their system taking into account peaking factors, an approach that evaluates peaking factors was considered appropriate for this analysis.

Table 2-4 lists the adjusted peak capacities for each source. These capacities were adjusted by dividing the maximum annual production capacity (for spring and surface sources) in Table 2-1 by a peaking factor of 2.3. Well capacities were doubled to reflect year-round operation and then divided by the same peaking factor. This peaking factor was calculated in the Park City Municipal Corporation Water Supply and Water Demand Update, May 2000 using 1995 through 1999 water use data.

Peaking factors define the relationship between infrastructure flow rates and delivery volume – the greater the peaking factor, the lower the delivery volume, and visa-versa. Peaking factors are influenced by the demand distribution pattern (magnitude and timing of the peak use periods versus base flow), available storage volumes, and other factors. While it can be argued that different peaking factors should be used for the different areas and/or water companies, doing so is beyond the level of accuracy of this study. Importation volumes are provided generally to the entire Snyderville Basin and not to specific areas. Also, a primary objective of the study is to compare options to determine which best meets the projected water needs within the area. Therefore, one peaking factor rate was used in the study for the entire study area. This 2.3 peaking factor is considered to be representative of the demands in the Basin. Table 2-4 shows the capacities available to reliably serve the water demands in the Basin.

Interviews were also conducted with water providers in Snyderville Basin. Many of the major suppliers interviewed stated that their actual production volumes are approaching the capacity of their sources to produce water. Based upon this information, the third method's estimate (Table 2-4) for water production is considered to be a more reasonable estimate of the annual production capacities than the first two methods. Each of the other methods estimates the overall production capacity higher than experience with these systems would indicate. The peaking method appears to more closely estimate the reliable capacity of these systems. The estimate of existing production capacity for the Basin is approximately 14,000 acre-feet per year.

TABLE 2-2
2003 Annual Water Production Estimate Method One (Using Maximum Installed Capacities)

Water Supplier	Springs (Ac-Ft/Yr)	Wells (Ac-Ft/Yr)	Surface (Ac-Ft/Yr)	Import (Ac-Ft/Yr)	Total (Ac-Ft/Yr)	*Total In Basin* (Ac-Ft/Yr)	2001 Actual Usage (Ac-Ft/Yr)
Community Water Company		162	323		485	485	163
Gorgoza Mutual Water Co.	113	1,581			1,694	1,694	583
High Valley Water Co.		190			190	190	75
Mountain Regional SSD	202	2,736			2,937	2,937	1,697
Park City Municipal Corporation	8,307	2,420		1,000	11,726	10,726	4,728
Summit Water Distribution Co.	807	2,984	907		4,698	4,698	2,065
Summit Co. Service #3		234			234	234	80
Timberline Special Imp. Dist.		68			68	68	16
Others		427			427	427	427
Totals	**9,428**	**10,801**	**1,230**	**1,000**	**22,459**	**21,459**	**9,834**
					Surplus/(Deficit)		**11,625**

Assumptions: Use 1/2 well capacity and full spring and surface water capacities shown in Table 2-1.
Most of the flows shown under springs for Park City are actually tunnels.

TABLE 2-3
2003 Annual Water Production Estimate Method Two (Using Rated Capacities of Systems)

Water Supplier	Springs Ac-Ft/Yr)	Wells (Ac-Ft/Yr)	Surface (Ac-Ft/Yr)	Import (Ac-Ft/Yr)	Total (Ac-Ft/Yr)	*Total In Basin* (Ac-Ft/Yr)	2001 Actual Usage (Ac-Ft/Yr)
Community Water Company		90	290		380	380	163
Gorgoza Mutual Water Co.	96	1,232			1,328	1,328	583
High Valley Water Co.		162			162	162	75
Mountain Regional SSD	202	2,318			2,520	2,520	1,697
Park City Municipal Corporation	5,852	1,344		1,000	8,196	7,196	4,728
Summit Water Distribution Co.	686	2,323	452		3,460	3,460	2,065
Summit Co. Service #3		206			206	206	80
Timberline Special Imp. Dist.		60			60	60	16
Others		427			427	427	427
Totals	**6,835**	**8,162**	**742**	**1,000**	**16,739**	**15,739**	**9,834**
					Surplus/(Deficit)		**5,905**

Assumptions: Summit Water Treatment Plant is rated at 1/4 the annual production because it operates in summer months only.
Park City Import is contract water delivered by Jordanelle Special Service District under long-term contract.
Assumes wells at 1/2 installed capacity, springs at full capacity and surface water as shown in Table 2-1.
Most of the flows shown under springs for Park City are actually tunnels.

TABLE 2-4
2003 Annual Water Production Capacity Estimate Method Three (Using Peaking Factor Adjustment)

Water Supplier	Springs (Ac-Ft/Yr)	Wells (Ac-Ft/Yr)	Surface (Ac-Ft/Yr)	Import (Ac-Ft/Yr)	Total (Ac-Ft/Yr)	*Total In Basin* (Ac-Ft/Yr)	2001 Actual Usage (Ac-Ft/Yr)
Community Water Company		141	140		281	281	163
Gorgoza Mutual Water Co.	49	1,375			1,424	1,424	583
High Valley Water Co.		166			166	166	75
Mountain Regional SSD	88	2,379			2,467	2,467	1,697
Park City Municipal Corporation	3,612	2,104		1,000	6,716	5,716	4,728
Summit Water Distribution Co.	351	2,595	394		3,340	3,340	2,065
Summit Co. Service #3		203			203	203	80
Timberline Special Imp. Dist.		59			59	59	16
Others		371			371	371	427
Totals	**4,099**	**9,393**	**535**	**1,000**	**15,026**	**14,026**	**9,834**
					Surplus/(Deficit)		**4,192**

Assumptions: Use Installed or maximum flow rate shown in Table 2-1 and adjust for peak by dividing by the peaking factor of 2.3 (for springs and surface water (for wells, the maximum is doubled and then divided by 2.3).
Most of the flows shown under springs for Park City are actually tunnels.

2.4.2 Limiting Factors

The actual available water within the Snyderville Basin is somewhat lower than the Method 3 Estimate, due to several factors. The most significant limiting factor is the lack of long-term storage capacity available in the Basin. Typically, the storage is short-term in nature and designed to meet daily demands only. If large storage facilities were available, the surplus water currently available during the winter and spring months could be utilized to a greater extent than is currently possible.

Another limiting factor is that each system is operated independently from the others. When one system is experiencing its peak demand, it cannot be met using another system's resources. There are interconnections between some water systems to provide this capability, but they are not wide spread. The history of competition among water providers in the Snyderville Basin, limits the amount of cooperation achievable to meet each other's needs.

2.4.3 Water Rights and Groundwater Systems

A review of the water rights in the Snyderville Basin, indicates that there are significantly more paper water rights than physical water. The 2004 Water Use Plans submitted to the State Engineer by the various public water suppliers, indicate that they have asserted water rights in the Snyderville Basin totaling just over 28,000 acre-feet. However, during the recent series of dry years, these entities have only been able to withdraw approximately 10,000 acre-feet per year. In addition to the water rights held by the public water supply agencies, there are many private water rights for which water use plans are not submitted.

The U.S. Geological Survey (USGS) performed a surface and groundwater budget study of the Snyderville Basin in 1998, (USGS, Tech. Pub. No. 115) and concluded that surface and groundwater systems are closely connected. The USGS divided the Snyderville Basin into six sub-basins and estimated the movement of surface and groundwater between the subbasins. The USGS further concluded that, "The rapid increase in discharge to streams and springs that results

from the recharge effects of snowmelt is indicative of a groundwater system with little storage." This leads to the conclusion that an increase in groundwater pumping will quickly reduce surface water discharge. Conversely, increased surface water usage will decrease groundwater infiltration in adjacent areas.

2.4.4 Surface Water Sources

There are currently three sources of surface water supplying public water systems within the Snyderville Basin. The first is Willow Creek. The Willow Creek supply is treated in one of the oldest treatment plants in the area. This plant is operated by Community Water Company and is located in Willow Draw just north of The Canyons Ski Resort. This plant was constructed in the early 1980's, and is a traditional filter plant that has a maximum capacity of 0.29 MGD (200 gpm) and is rated by the county at 0.26 MGD (180 gpm). This plant provides water to the Community Water Company and The Canyons Ski Resort.

The second water supply is diverted from East Canyon Creek, under water rights owned by SWDC. The diversion point is located just south of SWDC's treatment plant. However, SWDC has agreed to not divert to its treatment plant during periods when the stream flow is less than 3.5 cfs (2.3 MGD/1,570 gpm). To treat this water, SWDC constructed a water treatment plant along East Canyon Creek, just upstream from the Snyderville Basin Wastewater Reclamation Facility, in 2002. This plant is a pressure membrane plant that has an installed capacity of 5.5 MGD (3,820 gpm). Due to the limited water supply to the plant the County has rated the capacity of the plant at 1.6 MGD (1,120 gpm). It operates primarily in the spring and summer months when there is sufficient water flowing in East Canyon Creek.

Plans have been developed to further develop this water supply by construction of pump stations and a pipeline from East Canyon Reservoir to the treatment plant site. A portion of the pipeline has been installed in the Jeremy Ranch Development with the balance of the system awaiting development. With the construction of the pipeline and pump stations, it is anticipated that the full 5.5 MGD (3,820 gpm) existing capacity would be utilized. Space is provided in the treatment plant to increase the capacity of the plant to 22 MGD (15,500 gpm) by adding additional treatment equipment. Initial plans are to import up to 5,000 acre-feet of water from East Canyon Reservoir each year, with an ultimate capacity of up to 12,500 acre-feet per year. These plans are further discussed in Chapter 5 as a part of future development options.

The third surface water source is water imported from the Weber River through the new Lost Creek Canyon Pipeline to MRWSSD's new Signal Hill Water Treatment Plant, located in The Promontory Point Development, east of Highway U.S. Highway 40. The facilities to pump 1,600 acre-feet per year have been operational since October 2004. This plant is a pressure membrane plant with an initial capacity of 3.0 MGD (2,080 gpm). The source of the water supply is the Weber River above Rockport Reservoir. MRWSSD has constructed a series of infiltration wells near the banks of the river where water is pumped to a booster pump station then transmitted up the mountainside to Promontory Point Treatment Plant. The plant is expandable to 6.0 MGD (4,200 gpm) within the treatment building. Water is purchased from WBWCD to supply the system. WBWCD and MRWSSD have been investigating ways to increase the water supply to this system from either Rockport Reservoir or from the Weber River just upstream of the reservoir. A study was conducted by Reclamation to examine the possible

diversion options. The preferred option from that study is incorporated into the list of potential options presented in Chapter 5 of this report.

2.4.5 State Engineer's Interim Groundwater Management Plan

To determine available in-Basin water supplies, the State Engineer used modeling software to extend the stream gauging data for East Canyon Creek and Silver Creek and develop 50 years of synthetic record. From this data, annual discharge from the Basin was determined for each creek. The State Engineer then selected the driest year at each gauge (the dry years were not the same for both gauges), summed the two total annual values, and came up with 23,700 acre-feet of total "dry year" or "safe" yield of the Basin. The State Engineer further determined that public water supply agencies should only depend on this 23,700 acre-feet of dry year supply. In the analysis, the State Engineer determined that this is the amount that can be depleted, not just diverted. However, if this amount were to be fully depleted, discharge from the Basin would be reduced to zero in the driest year.

In order to determine the distribution of the 23,700 acre-feet per year, the State Engineer proportionately distributed this volume between the six subbasins found in the USGS study. The State Engineer then estimated using a standard methodology, the amount of current depletion in the Basin based on approved uses. That effort resulted in an estimate of between 11,000 and 12,000 acre-feet of existing approved annual depletion. The State Engineer then found that in two of the six subbasins, all of the allocated depletion has been committed under existing rights. In reviewing future change applications to move water rights, the State Engineer will use these totals to determine if additional water can be developed in each subbasin. Using the single driest year in each basin to calculate the safe yield is a very conservative method. In the absence of better data, this was considered a reasonable approach. However, the water needs to be physically available when needed in order to be a legitimate source.

The 23,700 acre-feet of safe or dry year yield from the Snyderville Basin is sufficient to supply the present and most future needs of the Basin residents if the supply matched the demand or if there was significant storage. However, the water that is available in the high runoff period as shown in Figure 2-2, does not correspond with the same time period as peak demands. Further, much of this high flow or runoff water discharges from the Basin and cannot be used because of downstream water rights that require the runoff water to be stored in East Canyon or Echo Reservoirs.

2.4.6 Comparison of Available Supplies with Basin Safe Yield

Figure 2-2 below depicts two hydrographs charted over the water year of October 1 to September 30. The area under the top hydrograph represents the 23,700 acre-feet of safe yield of the Basin, including the East Canyon Creek and Silver Creek drainages. The shape of this graph was patterned after the hydrograph of the data from the streamflow gage on East Canyon Creek for the years 1990-1995. Using this pattern, the graph was developed for the total volume of 23,700 acre-feet. The area under the lower hydrograph represents the 2003 Adjusted Peak Water Supply Production Capacity of the Basin water supply systems, which is estimated at approximately 14,000 acre-feet as shown in Table 2-4. This graph is represented on the figure as Available Supply.

FIGURE 2-2
Snyderville Basin Safe Yield vs. Available Supply