Section 3 – Population, Water Demand, and Existing Water Systems

This section is subject to revisions based on the contents of the final update.

Section 3 – Population, Water Demand, and Existing Water Systems

3.0 Introduction

The State has given certain mandates on land use plans and utility services to individual counties as part of Growth Management legislation. The linkage between growth management and responsible water resource management for Whatcom County (County) exists where population and industrial/agricultural/fisheries water demands occur. As the County population continues to grow, the demand for water will increase and the competition for water for the various out-of-stream and instream uses will also increase. Management of water resources to provide a secure supply of water for all future uses is a high priority for Whatcom County and this Coordinated Water System Plan (CWSP) update is a facet of the County's comprehensive water resources management efforts.

3.1 Population Forecasts

As required by RCW 36.70A.110, the Washington State Office of Financial Management (OFM) developed a range of population projections for Whatcom County and its cities (including their Urban Growth Areas) extending from 2013 to 2036. The Growth Management Act requires the County to plan for population growth that is consistent with OFM population projections. The County's Draft 2016 Comprehensive Plan Update presents a population projection of 280,581 people in 2036, which is within OFM's range of projections. The County and each City plan for the distribution of this growth within and outside of the UGAs through their Comprehensive Plan processes.

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For this CWSP, population projections over the planning period were developed by linear interpolation of the County's distribution of the existing and projected population presented in the Draft 2016 Comprehensive Plan Update. The County's population estimates developed for the 2016 Comprehensive Plan Update are shown in **Table 3-1.** The projections in the table indicate that the proportion of the County's population that resides in urban areas is expected to increase from approximately 68 percent in 2013 to 72 percent in 2036.

Table 3-1
Population by County Areas

	Estimated 2013 Population (cities include Urban Growth Areas)	Forecasted 2036 Population (cities include Urban Growth Areas)
Bellingham	92,660	123,710
Birch Bay	7,540	13,040
Blaine	5,171	9,585
Columbia Valley	3,103	4,448
Everson	2,665	3,907
Ferndale	12,758	19,591
Lynden	12,872	19,275
Nooksack	1,435	2,425
Sumas	1,449	2,323
City/UGA Total	**139,653**	**198,304**
Unincorporated Whatcom County Non UGA	66,104	77,321
Whatcom County Grand Total	**205,757**	**275,625**

Source: Whatcom County 2016 Comprehensive Plan and Development Regulations Update and Urban Growth Areas Review, Final EIS, November 2015, BERK Consulting.

Longer term projections, 50 years into the future, are made in this CWSP Update in order to plan for water supply needs in the future. The average annual growth rates presented by the OFM were used to develop the three population projections shown in **Table 3-2**. Each population projection applies an annual growth rate of either 0.4% (low projection), 1.3% (medium projection), or 2.1% (high projection) to the population data presented in **Table 3-1** in order to project future population growth to the year 2065.

Table 3-2
County-Wide Population Forecast

	2015	2020	2030	2040	2050	2060	2065
Low Projection	212,300	216,500	225,400	234,500	244,100	254,000	259,200
Med. Projection	212,300	226,400	257,600	293,200	333,600	379,600	404,900
High Projection	212,300	235,500	289,900	356,900	439,300	540,800	600,000

While future uncertainties exist, for the purposes of water planning, the medium projection will be utilized as the "forecast" or most likely scenario. **Table 3-3** shows the estimated distribution of population in urban and rural areas. The values in the table were developed by linear interpolation of the change in the County's ratio of urban to rural population shown in **Table 3-1**. For years beyond 2035, it is assumed that the proportion of people who will reside in urban areas will continue to increase. It is the intent of the policies in the 2016 Comprehensive Plan Update to encourage a greater share of urban growth in the future.

Table 3-3
Urban and Rural Distribution for Population Projections

Land Use	2015	2020	2030	2040	2050	2060	2065
Urban	139,653	151,000	176,622	213,747	248,591	286,722	306,933
Rural	72,647	75,400	80,978	79,453	85,009	92,878	97,967
Total	212,300	226,400	257,600	293,200	333,600	379,600	404,900

It should be noted that the U.S. Bureau of the Census is projecting that the United States, as a whole, will grow less than 1 percent per year between 2015 and 2060. Growth rates in Whatcom County have been higher than the nation as a whole over the last 40 years. The Census Bureau also projects that the rate of increase in population for the nation will be declining between 2015 and 2060. Extrapolating the County's historical growth rates does not take into account changes that could take place in future trends. Therefore, population projections should be monitored closely and revised every five years in order to incorporate the most recent data. Additionally, a more sophisticated projection technique that incorporates trends in specific components of change (birth, death, and migration rates) could be employed in the future.

3.2 Water Demand Forecasts

3.2.1 Current and Future Demand Forecasts

Planning for future water supply needs requires projection of demand for both near- and long-term periods. The near-term projections are generally necessary to define needed capital improvements anticipated within the near future. Such improvements require lead time for financing, design, and construction. Long-term forecasts are necessary to quantify probable water resource requirements. Such forecasts guide the identification and sizing of long-range supply facilities, the water rights process, and management of water resources necessary to meet future demands. The time required to plan and develop water sources and systems is such that near-term planning is for a period of 20 years (consistent with GMA 20-year planning requirements), and long-term planning must consider a 50-year horizon. This is much further into the future than land use plans generally project development. In contrast, however, the current key issues of water supply in Whatcom County were created by actions taken in the late 1800s and early 1900s.

Population growth and competing uses for water resources are the factors with the most influence on future water demands. Not only does the magnitude of future population have an impact, but the location of new population centers will greatly affect delivery of future water supplies. Therefore, water supply and systems must be coordinated with, and based on, population growth according to approved land use plans and policies.

3.2.2 Current and Future Water Consumption Data

The existing water use for most Group A community public water systems was obtained by reviewing the annual water use efficiency reports for those individual systems that submitted them to DOH. The metered annual supply volume from the reports was divided by the number of existing connections identified by DOH to calculate the system's annual average use per connection.

Table 3-4 presents the range and average daily water consumption per connection for both urban and rural Group A public water systems in Whatcom County. For the purposes of this analysis, urban water systems are defined as systems serving the primary urban population centers in Whatcom County, as identified in **Table 3-1**. Water systems not serving the cities listed in **Table 3-1** are defined as rural water systems. Rural water use discussed in this section is associated with rural public water systems and does not encompass all water use that occurs outside of urban population centers and incorporated portions of the county. Rural water use has the largest range in customer supply needs due, in part, to the mix of residential, commercial, and agricultural connections present in many of the rural water systems. Water consumption data is from either 2013 or the most recent data set available at the time of this report. As shown in the table, there is a large range in water consumption per connection for the water systems throughout the county. This is due to the wide range in connection types, from individual single family services to dairies or large industrial customers who may only be served by one connection.

Table 3-4
Water Consumption for Group A Community Water Systems

Water System Category	Range (gal/conn/day)	Average Daily Use (gal/conn/day)
Urban	125 to 918	309
Rural	38 to 2191	258

Table 3-5 summarizes the water demands for Group A public water systems in Whatcom County in 2015 and at full buildout, based on current zoning and land use classifications. Due to the lack of metering data available for Group B public water systems, they were not included in this analysis. Using GIS data, the County estimated an additional number of connections for each system, representing full build-out conditions in accordance with the zoning densities within each water service area boundary. Each system's average consumption per connection was applied to the additional connections at full buildout and added to the existing demand of the system to estimate the build-out water demands for each system. For systems with high water use per connection, the future consumption per connection for additional connections was limited to 350 gallons per day working under the assumption that most future development will be residential in nature and that there will be few new high water use connections.

Table 3-5
County-wide Water Demands for Group A Public Water Systems
Average Daily Demands - Million Gallons per Day (MGD)

System Classification	Existing (2015)	Build-Out
Urban	13.7	37.3
Rural	5.9	8.1
County-wide	19.6	45.4

Note: Build-out represents estimated year 2065 data for urban systems and build-out demands for rural systems.

3.3 Water Right Capacity Analysis

In evaluating public water systems and their ability to provide water to their customers now and in the future, there are several factors that must be considered. Many of these factors are addressed by the DOH Water Facilities Inventory process which considers the capacity of the system, the number of existing connections, and the number of approved connections for future use. As part of the development of the Comprehensive Plan, Whatcom County is evaluating projected population and must allocate the forecasted population growth to locations within the County. When the County identifies an anticipated population increase in a specific area, it is important to determine whether the public water system slated to serve that population can, in fact, provide that service. A key component of that determination is an analysis of each system's water rights compared to their existing and future water demands.

A water rights capacity analysis was conducted in order to compare each water system's existing water rights against current and anticipated future demands. Both the existing and build-out water demands for each system, as described in the previous section, were compared against their respective annual water rights (Qa) in an effort to determine whether systems are projected to meet their future requirements, have surplus water, or have insufficient water rights in the near future. The results of this analysis are summarized in **Table 3-6** and are depicted in **Figure 3-1**. A larger version of **Figure 3-1** is included in **Appendix XX**. Based on the results of the water rights analysis (including the presence of interties) and the existing and projected population and the historic and projected water demand, a water rights status for each Group A public water system is assigned on this map. The total annual water rights held by Group A public water systems in the CWSSA and the buildout demands are shown in **Table 3-7**. As indicated in the table, there is sufficient water rights County-wide to meet the projected buildout demands of the Group A public water systems. However, it should be noted that the City of Bellingham holds approximately 85 percent of the total annual water rights for Group A public water systems in the CWSSA. This analysis is planning level in nature to help identify potential problem areas. Analyses prepared in the individual water system plans will be more accurate and should be utilized if available.

Comment [JB1]: Based on comments at the 2015-12-16 WUCC meeting, do we need more detail about how the projections were made?

The six Group A public water systems that are currently exceeding their water rights include Delta Water Association (198 afy exceedance), Flemings Platt Water Association (2 afy exceedance), Guide Meridian Water Association (27 afy exceedance), Skookum Chuck Water Association (60 afy exceedance), Tall Cedars Estates Water Association (14 afy exceedance), and Wickersham Water Association (8 afy exceedance). The total exceedance is approximately 309 afy. The only water rights identified for Flemings Platt Water Association, Tall Cedars Estates Water Association, and Wickersham Water Association were the groundwater exemption, which is limited to 5,000 gallons per day, which is equivalent to a maximum annual volume of 5.6 afy, for group domestic use. The remaining three systems have state-issued water rights, but they appear inadequate to meet their existing demand. None of these systems currently have permanent interties with other systems that have excess water rights. Permanent interties and intertie agreements with nearby public water systems could be a viable option for meeting the existing demand for many of these systems.

Table 3-6
Group A Public Water Systems Water Right Status Summary Table

Water Right Status [1]	Number of Systems	Description
Currently Exceeding Water Right Limits	6	Water rights are insufficient to meet current demand
Projected to Exceed Water Right Limits at Full Build-Out	16	Water rights may be insufficient to meet projected demand at full build-out
Enough Water Rights to Meet Current and Future Projected Water Demand	15	Water rights are satisfactory to meet current and future projected water demand at full build-out
More Water Rights than Current and Future Projected Water Demand	52	Water rights exceed the current and future projected water demand (i.e. surplus water may be available)
No Data on System Water Use	12	No data available
To Be Determined	1	The City of Lynden is classified as "To Be Determined" due to the City and Ecology's disagreement related to the extent of the City's water rights and the existing memorandum of agreement between the two parties

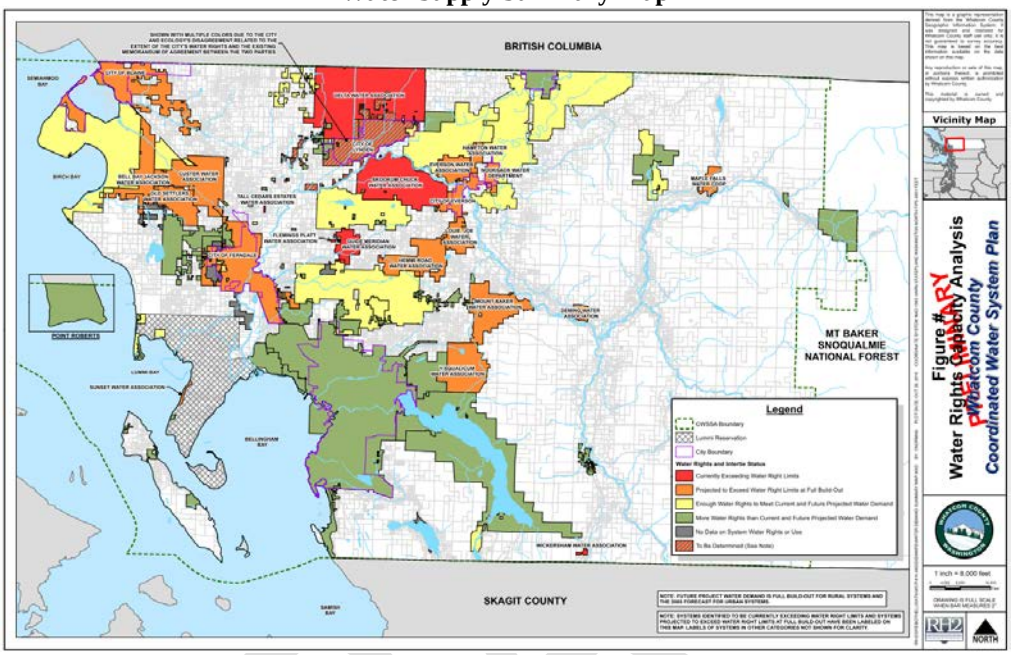
[1] In this table, the water right status includes not only water rights held by the system, but also intertie agreements currently in place for receipt of water from other systems. Any water included as part of an intertie agreement was subtracted from the water available to the system providing the water to meet its own projected demand.

Table 3-7
County-wide Water Rights Summary for Group A Public Water Systems

	Existing (2015)	Build-Out
Total Annual Water Rights (afy)	209,644	209,644
Annual Water Demand (afy)	21,972	50,869
Surplus Water Rights	187,672	158,775

Note: Build-out represents estimated year 2065 data for urban systems and build-out demands for rural systems.

Figure 3-1
Water Supply Summary Map



The strategy of meeting these demands through regional supply development, aggressive conservation measures, individual wells, surface supplies, desalinization, or other combinations is partially fulfilled with the update of the CWSP and adoption by the Council of portions of the update into the Whatcom County Code. The water right capacity analysis is intended to provide some perspective on the potential water resource requirements facing the County. It is acknowledged that future reduction in usage patterns, land use policy and/or water resource policy, and other factors are key variables in a supply plan. Subsequent water resources planning efforts and the individual water system plans are expected to further refine these numbers as part of an effort to quantify the anticipated out of stream water demands for Whatcom County.

3.4 Existing Water Systems

The estimated 2015 Whatcom County population is 212,300, of which approximately 80 percent were served by both Group A and Group B public water systems and approximately 20 percent were served by other non-public or private water systems (e.g., permit-exempt wells, surface water sources, etc.).

The number and type of systems are shown in **Table 3-8**. This table was created using data from the DOH SENTRY system, which is an online database containing information on public water systems and is maintained by DOH. The method used to determine the values in the Estimated Connections column is consistent with how DOH calculates existing connections in SENTRY. The Population column is the sum of the population values provided for each system.

Table 3-8
Number and Type of Public Water Systems

	Number of Systems	Estimated Connections	Estimated Population	Percent of Total
Group A				
Community Water System	102	64,794	168,283	98.666%
Non-Transient Non-Community Water System (NTNC)	15	123	5	0.003%
Transient Non-Community Water System (TNC)	64	3,673	137	0.080%
Group B	234	1,016	2,134	1.251%
Total	415	69,606	170,559	100%

3.4.1 DOH Operating Permits

Once a year, DOH mails to water system purveyors an annual fee statement form filled out with existing data previously provided by the water systems' Water Facilities Inventory (WFI) form. Once the completed form is returned to DOH either confirming the data or with any changes to the data noted, along with the permit fee, DOH issues the water system a colored operating permit based on the system's compliance. The operating permit color is updated on an annual basis or when significant changes have occurred to the water system such that the operating permit color needs to change.

The following permit colors are assigned to Group A community public water systems. Non-community water systems are not assigned operating permit colors from DOH.

> **Green** — In compliance with all requirements. Adequate for existing uses and additional connections up to the approved number of connection unless it is already at capacity.
>
> **Yellow** — In compliance with all requirements but the system was notified to submit a water system plan but has not satisfied the planning requirement or is under a compliance agreement for a state significant non-complier violation. Adequate for existing uses and additional connections up to the approved number, unless otherwise limited by a compliance agreement.

Blue — In compliance with requirements. However, the system does not meet design approval requirements or it has exceeded the number of approved connections established by DOH. Adequate for existing uses, but not adequate for adding new connections.

Red – In non-compliance with requirements. Inadequate for existing uses and no additional connections are allowed. This may result in denial of home loans, building permits, on-site sewage disposal permits, food service, liquor licenses and other permits or licenses for properties served by the system.

As of August 12, 2015, DOH reported the following Group A community water systems had operating permits as shown in **Tables 3-9, 3-10** and **3-11**. The breakdown of the operating permit colors for the 102 systems listed is shown in **Figure 3-2**. No systems currently have red operating permits in Whatcom County.

Figure 3-2
Group A Community Public Water System Operating Permit Status

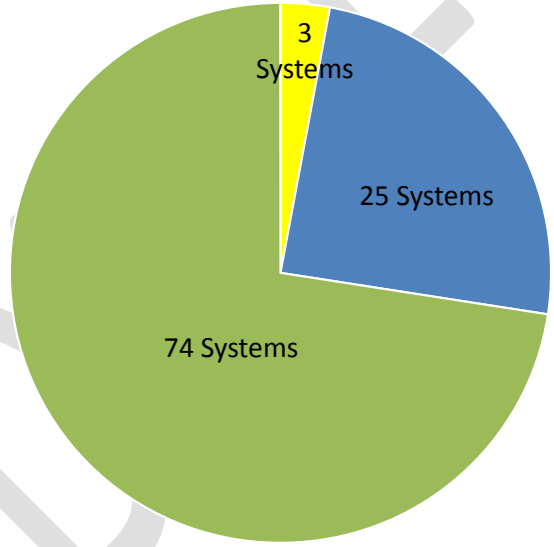


Table 3-9
Green Operating Permits - DOH Group A Water Systems in Whatcom County

DOH System ID #	Water System Name
250	ACME WATER DISTRICT NO 18
496	AGATE BAY TRAILER PARK
1200	ALDERGROVE WATER ASSOCIATION
5370	BELFERN WATER ASSOCIATION
9899	BELFERN WEST
5450	BELL BAY JACKSON WATER ASSOCIATION
5600	BELLINGHAM-WATER DIVISION, CITY OF
5875	BERTHUSEN ROAD WATER ASSOCIATION
95904	BIRCH BAY WATER & SEWER DISTRICT
7300	BLAINE, CITY OF
2011	CALMAN JAMES L.
12150	CENTRAL CITY WATER ASSOCIATION
601	CENTURY WATER ASSOCIATION
1383	CHUCKANUT TRAILS WATER SYSTEM
66110	COLUMBIA VALLEY WATER DISTRICT
17050	CUSTER WATER ASSOCIATION
AB912	DEER CREEK WATER ASSN/GUIDE SOUTH
18418	DEER CREEK WATER ASSOCIATION
18800	DEMING WATER ASSOC.
23480	ENTERPRISE ESTATES WATER ASSOC.
23485	ENTERPRISE TERRACE WATER ASSN.
24164	EVERGREEN RETREAT MHP
24195	EVERSON WATER ASSOC
24200	EVERSON, CITY OF
2601	FAIRFIELD MHP
24850	FERNDALE
24840	FERNDALE MOBILE VILLAGE
27450	GEORGIA MANOR WATER ASSOC
27755	GLACIER SPRINGS WATER SYSTEM
95915	GLACIER WATER DISTRICT
27950	GLEN COVE WATER ASSOCIATION
28050	GLENHAVEN LAKES CLUB
28950	GRANDVIEW BEACH WATER ASSOC INC
30200	GUIDE MERIDIAN WATER ASSOCIATION
32350	HEMMI ROAD WATER ASSOCIATION
33364	HILLTOP WATER OWNERS ASSOCIATION
36268	ISLE AIRE BEACH ASSOCIATION

Table 3-9 (cont.)
Green Operating Permits - DOH Group A Water Systems in Whatcom County

DOH System ID #	Water System Name
44540	LAKE SAMISH TERRACE PARK
44950	LAKE TERRILL WATER ASSOC
43290	LISECC
29014	LOUIE, JOE WATER ASSOCIATION
52957	LWWSD - AGATE HEIGHTS
8118	LWWSD - EAGLERIDGE
95910	LWWSD - SOUTH SHORE WATER SYSTEM
49150	LYNDEN WATER DEPARTMENT
51100	MAPLE FALLS WATER COOP
53250	MEADOWBROOK WATER ASSOCIATION
56500	MOUNT BAKER WATER ASSOCIATION
56900	MOUNTAIN VIEW WATER ASSOCIATION
59850	NOOKSACK VALLEY WATER ASSOCIATION
59800	NOOKSACK WATER DEPT
62000	NORTHWEST WATER ASSOCIATION, INC
63350	OLD SETTLERS WATER ASSOCIATION
64150	ORCHARD WATER ASSOC
66116	PARADISE PARK WATER SYSTEM
67020	PERCIE ROAD WATER ASSOCIATION
67900	PLEASANT VALLEY WATER SYSTEM
95750	POINT ROBERTS WATER DISTRICT NO 4
68350	POLE ROAD WATER ASSOCIATION
27631	RASPBERRY RIDGE WATER ASSOCIATION
72800	RIVER RD WATER ASSOCIATION
74705	ROYAL COACHMAN MOBIL EST
76105	SANDY POINT IMPROVEMENT CO
79800	SKOOKUM CHUCK WATER ASSOCIATION
84850	SUMAS RURAL WATER ASSOCIATION
84870	SUMAS WATER DEPT
6514	SUNSET WATER & MAINTENANCE ASSOC
86200	SUNSET WATER ASSOCIATION
88050	THORNTON WATER ASSOCIATION
91000	VALLEY VIEW WATER ASSOC
95700	WHATCOM COUNTY WATER DIST #2
95900	WHATCOM COUNTY WATER DIST #7
95914	WHATCOM COUNTY WATER DIST 13
97110	WILLEYS LAKE TERRACE WATER ASSN
99550	Y-SQUALICUM WATER ASSN

Table 3-10
Blue Operating Permits - DOH Group A Water Systems in Whatcom County

DOH System ID #	Water System Name
2300	ANDERSON CREEK WATER ASSOCIATION
4050	BAKER VIEW WATER ASSOC
10562	CALMOR COVE CLUB
12112	CEDAR LYNN WATER ASSOC
15510	COUNTRY HAVEN WATER ASSOC
19890	DOUBLE L MOBILE HOME PARK
24151	EVERGREEN MOBILE PARK & SALES
25610	FLEMINGS PLATT WATER ASSOCIATION
30800	HAMPTON WATER ASSOCIATION
37950	KELLY ROAD WATER ASSOCIATION
119	KONTREE APARTMENTS WATER SYSTEM
46300	LAUREL WEST WATER ASSOCIATION
50900	MANTHEYS COUNTRY MOBILE PARK
56874	MOUNT BAKER MOBILE HOME PARK
58950	NEPTUNE BEACH WATER ASSOC
61350	NORTH STAR WATER ASSOC
7507	NORTHWEST MOBILE HOME PARK
62135	NORTHWOOD PARK SYSTEM
73750	ROEDERLAND WATER ASSOCIATION
80550	SMITH ROAD WATER ASSOCIATION
87120	TALL CEDARS ESTATES WATER ASSOC.
91650	VICTOR WATER ASSOCIATION
92150	WAHL WATER ASSOC
96700	WICKERSHAM WATER ASSOCIATION

Table 3-11
Yellow Operating Permits - DOH Group A Water Systems in Whatcom County

DOH System ID #	Water System Name
18750	DELTA WATER ASSOCIATION
62150	NORTHWOOD WATER ASSOCIATION
71290	RATHBONE PARK WATER ASSOC

3.5 Conclusions

Whatcom County is a desirable location and the population forecasts suggest that the population will increase by approximately 70,000 people by 2036 and by approximately 200,000 people by 2065. The 2065 population will be nearly double the existing population. This additional

population will place increasing demand on the County's public water systems to be able to meet the demand.

On a CWSSA-wide-basis, the public water systems collectively hold more than enough water rights to meet the projected demand. However, the ownership of the water rights creates a situation where there are some systems that have excess and some that have a deficit.

Comparison of existing water rights and intertie agreements held by Group A community public water systems with existing and forecasted demand was performed to identify which systems need additional supply now, which systems will likely need additional supply in the future, which systems appear to have sufficient water to meet their needs, and which systems appear to have water in excess of their needs that could potentially be utilized to alleviate other systems' shortfalls. In the future, it will be important for systems to work together to meet demands and the County should encourage cooperation and resource sharing among systems.

Three quarters of the Group A community public water systems in have green operating permits meaning that they are in compliance with all regulations and capable of meeting existing and authorized connections. However, one quarter of the Group A Community public water systems are operating under either blue or yellow operating permits, which means that they could be improved upon.