

**Public Utility District No. 1
of Skagit County**

**Water Use Efficiency
Conservation Goals**

December 19, 2007



Water Supply System Characteristics

1.1 Overview

Public Utility District No. 1 of Skagit County is a municipal corporation of the state of Washington, established at the general election of November 3, 1936, to conserve the water and power resources of the state for the benefit of the people and to supply public utility service. The District is authorized to acquire, construct and operate water systems within and without the county boundaries and to furnish water service to the inhabitants of the District and other persons.

As a municipal corporation of the state, the District is governed under RCW Title 54 by its own three elected commissioners. The general manager and the District's staff execute the policies set by the District's commissioners. The administration and operations of the District are funded by water revenues from the District's customers, augmented by fees paid for impacts on the system and occasional grants from outside agencies.

In 1939, the District bought three water systems serving Burlington, Mount Vernon and Sedro-Woolley from the Peoples' Water And Gas Company, forming the basis for the District's present system. The sources for the original system were the southern Cultus Mountain streams and the Skagit River, and the system included approximately 50 miles of water mains, four million gallons of storage and 3,000 water services. The Cultus Mountain streams are now the District's principle source of supply and the system has grown through other acquisitions, improvements and outside development to near 600 miles of pipeline and over 31 million gallons of storage.

Today, the District operates the most expansive water system in Skagit County with over 22,400 metered services, serving approximately 65,000 people an average of nine million gallons of water per day. Population growth and development in the western one-third of Skagit County have been steady over the past 20 years, and requests for waterline extensions and additional services are being received regularly.

The majority of the District's services are within the Judy Reservoir System (PWSID 79500E), which serves the cities of Burlington, Mount Vernon and Sedro-Woolley as well as surrounding rural and suburban areas.

The District also operates remote water systems. Each of these existing public water systems was having problems meeting drinking water regulations. At the request of residents, the District offered assistance and, through the Local Utility District process (RCW 54.16), rebuilt each system (excepting Mountain View) to state and federal drinking water and District hydraulic standards. The Mountain View water system was accepted by the District at the system developer's request and at the urging of Department of Health and the Skagit County Health Department.

The remote water systems are as follows:

- Fidalgo Island (PWSID 00932 Y)
- Alger (PWSID 01400 K)
- Cedargrove (PWSID 11917 4)
- Marblemount (PWSID AA642)

- Mountain View (PWSID 03774 Y)
- Potlatch Beach (PWSID 69034 L)
- Rockport (PWSID 73600 6)
- Skagit View Village (PWSID 96879 5)

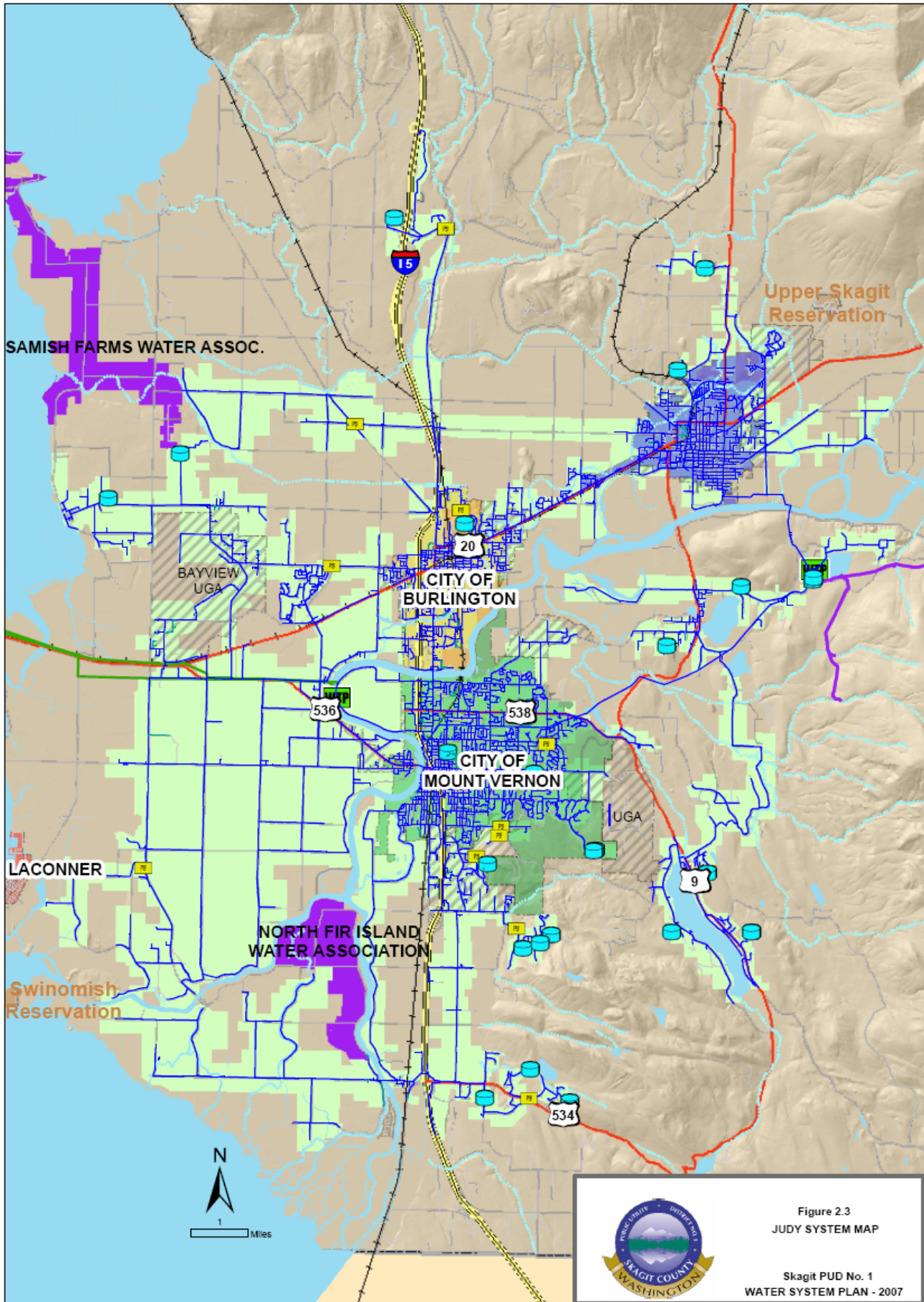
1.2 System Descriptions

1.2.1 Judy Reservoir System (PWSID 79500 E)

The Judy Reservoir system (Public Water System ID # 79500 E) has a retail service area including the cities of Mount Vernon, Burlington, and Sedro-Woolley; as well as surrounding communities including Bow Hill, Bayview, Fir Island, Conway, Big Lake, and Clear Lake. See Judy System Map.

The Cultus Mountain Watershed has historically been the principal source of supply for the District's Judy Reservoir system. Water is diverted from four creeks—Gilligan, Salmon, Turner and Mundt, and piped to Judy Reservoir, a 1.45 billion gallon impoundment reservoir. A new pump station and pipeline from the Skagit River to Judy Reservoir provides a more reliable, alternative source of supply.

The Judy Reservoir system currently includes over 595 miles of water mains and 31 million gallons of distribution storage capacity. About 40 percent of the mains are iron pipe, about 30 percent are plastic, and about 25 percent are asbestos cement. Most of the lines 3-inch and under are plastic, and over 84 percent of the mains predate 1995. The system is well maintained and has proven very reliable. New and replacement lines are installed according to current District standards.



1.2.2 Fidalgo Island System (PWSID 00932 Y)

The District began service on Fidalgo Island in 1956 after wells in the area began to produce water of unsatisfactory quality. The Fidalgo Island system now serves the communities of Gibraltar, Similk Beach, and Dewey Beach. Though originally supplied by the District's two Whitmarsh wells south of March Point near the Swinomish Slough, the system is now served through interties with the city of Anacortes water system at Saterlee Road, Thompson Road, and Sharpe's Corner.

The Fidalgo Island system includes over 17 miles of water mains and 800,000 gallons of distribution storage capacity. While the District has constructed major high capacity distribution improvements since 1994, the majority of the mains are less than six-inch diameter and most of the lines three-inch and under are plastic; about 50 percent of the mains are asbestos cement and predate 1970. The system is well maintained and provides reliable domestic service. Some lines are undersized for fire flow capacity, though fire flow is not a requirement everywhere in this rural service area. New and replacement lines are installed according to current District standards.

1.2.3 Potlatch Beach (Public Water System ID No. 69034L)

The Potlatch Beach water system on Guemes Island includes one mile of two- and four-inch plastic water mains and has 30,000 gallons of distribution storage capacity. The system was experiencing saltwater intrusion in its groundwater well prior to District ownership, so the District replaced the source with a new reverse osmosis water treatment system, supplying the water system with desalinated water from Guemes Channel in the Puget Sound. The system has capacity for up to 182 water hookups according to physical capacity determinations. The District accepted ownership of the system in 1998.

1.2.4 Alger (Public Water System ID No. 01400K)

The Alger system includes a groundwater well, a manganese filtration system, 4.9 miles of four-inch, six-inch, eight-inch, 12-inch and 16-inch water mains and 132,000 gallons of distribution storage capacity. The system has capacity for up to 219 water hookups according to physical capacity determinations. The District accepted ownership of the system in 1999.

1.2.5 Rockport (Public Water System ID No. 736006)

The Rockport system includes a groundwater well, 2.7 miles of four-inch, six-inch and eight-inch water mains and 60,000 gallons of distribution storage capacity. The system has capacity for up to 138 water hookups according to physical capacity determinations. The District accepted ownership of the system in 1991.

1.2.6 Cedargrove (Public Water System ID No. 119174)

The Cedargrove system includes a groundwater well, an iron and manganese filtration system, 2.9 miles of four-inch, six-inch, eight-inch and 10-inch ductile iron water mains and 270,000 gallons of distribution storage capacity. The system has capacity for up to 466 water hookups according to physical capacity determinations. The District accepted ownership of the system in 1992.

1.2.7 Mountain View (Public Water System ID No. 03744Y)

The Mountain View system is designed for a maximum of 16 connections, but has no storage at this time. The system can serve up to 14 connections before standby storage is required. The District accepted the system in 1993 with the understanding that it would be incorporated into the Judy Reservoir system at some future date.

1.2.8 Skagit View Village (Public Water System ID No. 96879 5)

The Skagit View Village system includes a groundwater well, aeration treatment for carbon-dioxide removal, 2.6 miles of four-inch, six-inch, eight-inch, and 12-inch water mains, and 200,000 gallons of distribution storage capacity. The system has capacity for up to 128 water hookups according to physical capacity determinations. The District accepted ownership of the system in 2004.

1.2.9 Marblemount (Public Water System ID No. AA642)

The Marblemount system includes a groundwater well, 1.9 miles of eight-inch water mains, and 64,000 gallons of distribution storage capacity. The system is approved for a maximum of 43 water hookups according to physical capacity determinations. The District accepted ownership of the system in 2007.

Planning Data and Water Demand Forecasting

1.3 Current Population

Federal census information was gathered in 1990 and 2000. Between census-years, annual projections from the Office of Financial Management (OFM) provide estimates of population. Table 2.1 indicates the historical trend of population levels within Skagit County as a whole. As evidenced in the table, population has been steadily increasing since 1990.

Table 2.1 – Historical Population Levels within Skagit County (1990-2006)

Census	OFM Estimates								
1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
79,545	82,882	85,574	88,938	91,316	93,584	95,962	97,848	99,847	102,071

Census	OFM Estimates					
2000	2001	2002	2003	2004	2005	2006
102,979	104,100	105,100	106,700	108,800	110,900	113,100

1.3.1 Current Population Distribution

Table 2.2 presents population as distributed by location within the County.

Table 2.2 –Population By Locality within Skagit County (2000-2006)

Population by Municipality	Census	OFM Estimates					
	2000	2001	2002	2003	2004	2005	2006
Anacortes	14,557	14,840	14,910	15,110	15,470	15,700	16,170
Burlington	6,757	6,995	7,190	7,315	7,425	7,550	8,120
Concrete	790	790	790	780	785	815	840
Hamilton	309	325	340	340	340	330	330
La Conner	761	765	775	760	785	795	839
Lyman	409	410	415	425	440	450	450
Mount Vernon	26,232	26,460	26,670	27,060	27,720	28,210	28,710
Sedro-Woolley	8,658	8,700	8,805	9,080	9,380	9,800	9,755
All Incorporated	58,473	59,285	59,895	60,870	62,345	63,650	65,214
All Unincorporated	44,506	44,815	45,205	45,830	46,455	47,250	47,886
Total Skagit County	102,979	104,100	105,100	106,700	108,800	110,900	113,100
Countywide Rate of Increase		1.08%	0.95%	1.50%	1.93%	1.89%	1.95%
Mount Vernon, Burlington, Sedro-Woolley, Rate of Increase		1.21%	1.20%	1.82%	2.40%	2.27%	2.20%

1.3.2 Current Customers

The District tracks customer accounts and water consumption through its billing system. The billing system database is queried and recorded on a monthly basis. Based upon these queries the total number of services, active services, and billed consumption are tracked. The billing system also characterizes each service by system, meter-size, customer type, general location, etc.

As Table 2.3 demonstrates, the number of customer accounts has grown steadily since 1998. The rate of increase in services has outpaced the rate of growth in the county as a whole. This is to be expected as growth is occurring at a faster pace in the urban areas served by the District than in the county as a whole.

Table 2.3 – Total Number of District Services (2000-2006)

	2000	2001	2002	2003	2004	2005	2006
Active Services	19339	19693	20210	20773	21300	21784	22462
Total Installed Services	19908	20331	20840	21351	21827	22310	22923
<i>Rate of increase</i>	1.96%	1.80%	2.56%	2.71%	2.47%	2.22%	3.02%

1.3.3 Location and Customer Type

Through the District’s billing system, customer types and general locations are monitored. Table 2.4 indicates the number of active services by customer type and water system from 2006.

Table 2.4 – Active District Services by Customer Type (2006)

2006	Number of Active Services by Customer Type										
	Residential	Multi-Family	Commercial /Non-Profit	Farms	Govt	Resale	Irrigation	Com, Indust, Tribal	Fire Protection	Other	Total Accounts by System
Judy	18308	1196	1693	125	171	2	151	3	113	9	21771
Fidalgo Island	648	15	11	-	4	-	-	-	-	-	678
Alger	91	-	6	-	2	-	-	-	-	-	99
Cedargrove	157	-	1	-	-	-	-	-	-	-	158
Mountain View	14	1	-	-	-	-	-	-	-	-	15
Marblemount	-	-	-	-	-	-	-	-	-	-	0
Potlatch	32	-	-	-	-	-	-	-	-	-	32
Rockport	52	-	2	-	4	-	-	-	-	-	58
Skagit View Village	56	-	-	-	-	-	-	-	-	-	56
TOTAL	19358	1212	1713	125	181	2	151	3	113	9	

1.4 Current Water Demands

The District monitors water production and consumption via 81 source and pressure zone meters, as well as nearly 22,000 distribution meters. Source and zone meters are read on a monthly basis; whereas customer meters are read on either a monthly or bi-monthly basis.

1.4.1 Production

Table 2.5 presents annual water demands by water system for the 2000-2006 timeframe.

Table 2.5 Annual Water Production and Purchases

Water System	Total Annual Production Including Water Purchases (1000's of Gallons)						
	2000	2001	2002	2003	2004	2005	2006
Judy	2,687,636	2,684,333	2,715,928	2,948,180	2,881,292	2,792,635	2,861,020
<i>Purchased</i>	429,652	178,721	179,732	397,662	306,574	152,841	323,212
Fidalgo Island	50,653	43,736	45,661	54,235	59,326	49,205	
Alger	4,358	6,733	6,391	6,803	8,028	7,826	8,656
Cedargrove	9,477	10,697	13,404	12,200	14,874	15,177	21,318
Marblemount	-	-	-	-	-	-	-
Mountain View	905	882	829	1,339	1,041	1,018	1,157
Potlatch Beach	585	544	577	625	615	422	456
Rockport				3,817	3,811	3,240	3,676
Skagit View Village	-	-	-	-	not full year	1,640	3,165
<i>Total</i>	<i>2,753,614</i>	<i>2,746,925</i>	<i>2,782,790</i>	<i>3,027,199</i>	<i>2,968,987</i>	<i>2,871,163</i>	<i>2,899,448</i>

As Table 2.4 demonstrates, around 97 percent of all District water demand is within the Judy System. Not included in the table is beneficial water use for reservoir flushing. Also, all the water use for Fidalgo Island is purchased from the city of Anacortes.

1.4.2 Demand Types

The majority of the District's water demands are billed customers; however, other water demands include the District's hydrant meter program, distribution system flushing program, raw water reservoir flushing program, fire department water usage, water theft, and leakage. Water demand which is not metered and billed is substantially more difficult to account for.

1.4.3 Demand by Location

Based on master meter readings, it is possible to track water demands for portions of the District's Judy water system. Figure 3.1 illustrates the average day demands within the areas that are tracked in the Judy system.

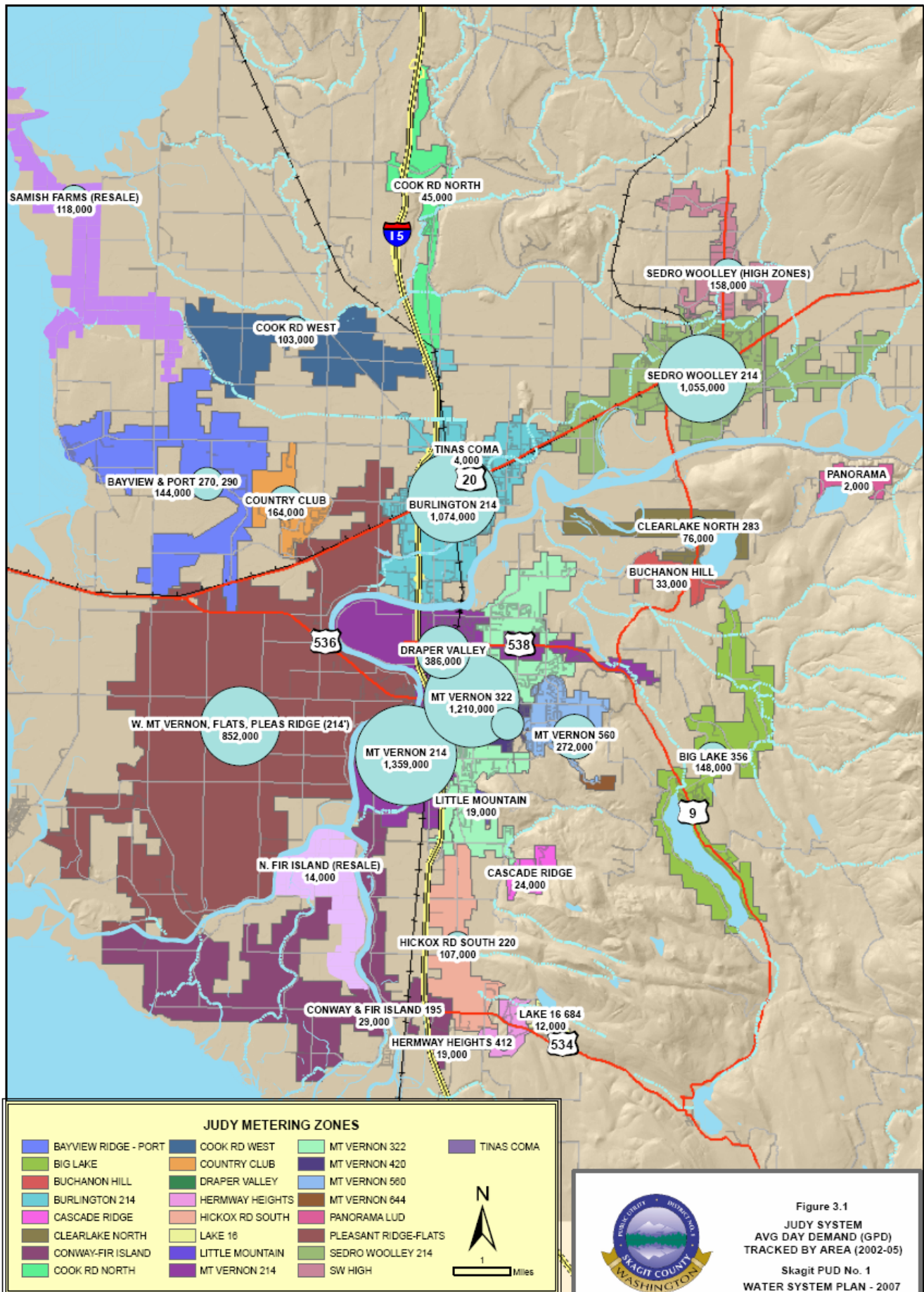


Figure 3.1
JUDY SYSTEM
 AVG DAY DEMAND (GPD)
 TRACKED BY AREA (2002-05)
 Skagit PUD No. 1
 WATER SYSTEM PLAN - 2007



1.4.4 Equivalent Residential Units

Billing data for the 2004-2006 timeframe indicate an average consumption of 178 gallons-per-service-per-day (gpsd) for single-family residential services in the Judy Reservoir service area. By definition, the District will use 178 gallons per service per day (gpsd) for Equivalent Residential Unit (ERU) calculations relating non-residential or multi-family water used to single family residences for the Judy System. Values for each system are given in Table 2.6 below.

Table 2.6 - Equivalent Residential Units by water system

Water System	Avg Consumption Per ERU (gpsd)	Systemwide ADD (GPD)	Total ERU'S
Judy	178	7,838,000	44,080
Fidalgo Island	121	135,000	1,114
Alger	156	24,000	154
Cedargrove	103	58,000	563
Marblemount	-	-	-
Mountain View	189	3,000	16
Potlatch Beach	44	1,000	23
Rockport	143	10,000	70
Skagit View Village	113	9,000	80

As seen in Table 2.6, there is a variation in the usage per ERU depending on water system. This variation appears to be a function of the rate structure, typical lot sizes, and full-time versus part-time residency of water users.

Peak Factors. Based on real time data collected at the District’s Judy Reservoir Water Treatment Plant, the District has calculated water consumption use factors to compare average and maximum day use. For calendar year 2006, the water use and peaking factors in the Judy Reservoir system were as shown in Table 2.7:

Table 2.7 – 2006 Judy Reservoir Average Day Demand and Peaking Factors

	Overall Production	Peaking Factor
Average day demand	9.5 mgd	1.0
Maximum day demand	15.9 mgd	1.7

The numbers presented in Table 2.7 indicate the total water processed by the plant for a given average day or maximum day. This is a different quantity than the finished water produced by the plant, and does not include intertie purchases.

1.4.5 Regional Water Demands

The District is responsible for water service consistent with the conditions of the Coordinated Water System Plan throughout the entire Skagit County, and adjacent areas including the Stanwood/Camano Island area in Snohomish County, and the Lake Samish area in Whatcom County. The District’s service area is also concurrent with the city of Anacortes, which includes North Whidbey Island, the city of Oak Harbor, and the Whidbey Naval Air Base. Because of the regional coverage of the District’s service area, a discussion of regional water demands is prudent.

1.4.5.1 Anacortes

Anacortes is the region’s largest water producer. Per Anacortes’ 2000 Water System Plan, their average daily demands are approximately as shown in Table 2-8 below:

Table 2.8 – City of Anacortes Water System Average Day Demands

	2000
Tesoro Refinery	5.1 mgd
Equillon Refinery	7.0 mgd
City of Anacortes	1.8 mgd
Oak Harbor and NAS Whidbey Island	2.4 mgd
Town of LaConner and Shelter Bay	0.4 mgd
Swinomish Indian Tribal Community	0.1 mgd
District’s Judy Reservoir System	0.3 mgd
District’s Fidalgo Island System	0.2 mgd
Est’d Unaccounted-for Water	0.2 mgd
TOTAL Average Demands:	17.6 mgd

Domestic Demands Only: 5.5 mgd
 Peak Factor 1.5

1.4.5.2 Other Water Systems

The 2000 Coordinated Water System Plan (CWSP) Regional Supplement identified 22-expanding community systems, 45 non-expanding/non-community systems, 24 non-expanding/community systems, and 93 Group B systems within Skagit County. Due to the large number of these water systems, and their unique characteristics, it is difficult to summarize these existing regional demands.

1.5 Current Land Use

There are five agencies with land use authority within the service areas of the District: Skagit County, the city of Mount Vernon, the city of Burlington, the city of Sedro-Woolley, the Upper Skagit Tribe, and the Samish Indian Nation (although it is unclear what the requirements are for consistency review for the tribal nations under the municipal water law).

As indicated in the Table 2.9 that follows, 90 percent of Skagit County is comprised of Natural Resource Lands or Public Lands.

Table 2.9 Generalized Land Use within Skagit County

Generalized Land Use Class	Land Use Designations	Acres	% of Total
Natural Resource Lands	Agriculture, Industrial Forest, Secondary Forest, and Rural Resource. Note: Mineral Overlay acreage is 23,620.	476,000	43%
Rural	Rural Reserve, Rural Intermediate, and Rural Village Residential	82,000	7%
Urban Growth Areas	Unincorporated, and Cities/Towns	35,400	3%
Public Lands	National Forest, and Federal Park, Wilderness, and Recreation Areas	519,900	47%
Total		1,113,300	100%

Source: Growth Management Indicators Report, December 2002

1.6 Forecasted Population

The District is a municipal corporation; however, it does not govern the creation of land use plans, comprehensive plans, or development regulations within its service area. However, with the passage of the Municipal Water Law (Municipal Water Supply - Efficiency Requirements Act Chapter 5, Laws of 2003) the District requires local government consistency determinations between this Water System Plan and local land use plans, comprehensive plans, coordinated water system plans, watershed plans, and development regulations (RCW 90.03.386).

Therefore, those population projections used in development of this plan are taken from outside agency approved plans.

1.6.1 Adopted GMA Projections

The Skagit County Growth Management Act Steering Committee has adopted a 2025 population forecast of 149,080 for Skagit County. This is near the mid-point between the Office of Financial Management’s Low and Medium Projections. Based on the 80 percent urban / 20 percent rural goal for new growth, this amounts to 105,750 urban residents and 43,330 rural residents in 2025. A higher rate of growth is expected in the areas near the I-5 corridor. The adopted population forecast is detailed in table 2.10.

Table 2.10 GMA Steering Committee adopted Population Projections

Jurisdiction	2000 Population	Location	Adopted 2025 Allocation	Increase by 2025	
				Number	Percent
Cities					
Anacortes	14,647		18,300	3,653	25%
Burlington	8,728	I-5 Corridor	12,000	3,272	37%
Concrete	960		1,350	390	41%
Hamilton	309		450	141	46%
La Conner	761		950	189	25%
Lyman	409		550	141	34%
Mount Vernon	28,332	I-5 Corridor	47,900	19,568	69%
Sedro-Woolley	10,358	I-5 Corridor	15,000	4,642	45%
Subtotal Cities & UGAs	64,504		96,500	31,996	50%
UGAs					
Swinomish	2,664		3,650	986	37%
Bayview	1,700	I-5 Corridor	5,600	3,900	229%
Subtotal UGAs	4,364		9,250	4,886	112%
Total Urban	68,868		105,750	36,882	54%
Total Rural	34,110		43,330	9,220	27%
Total Skagit County	102,978		149,080	46,102	45%

Source: Growth Management Act Steering Committee, March 2003.

As mentioned, the adopted projections are based on projections of potential population change as developed by the Office of Financial Management. Those projections are for increasing population growth through 2025 as summarized in Table 2.11.

**Table 2.11 OFM Projections of Total Skagit County Population (2000-2025)
(released January 2002)**

	Avg Annual Rate of Increase	2000	2005	2010	2015	2020	2025
High	2.67%	102,979	121,451	137,054	154,785	176,627	198,992
Intermediate	1.90%	102,979	113,136	123,807	135,717	150,449	164,797
Low	1.21%	102,979	106,914	113,902	121,467	130,891	139,253

1.6.2 Coordinated Water System Plan Projections

The Skagit County CWSP included population forecast beyond 2025. The basis for this projection appears to be the OFM trends, but extrapolated over a longer time span. For the purposes of examining potential long-range water usage, these projections from 2000-2050 are included in Table 2.12.

Table 2.12 2000 Coordinated Water System Plan Projections

	Low	Medium	High
2000	101,617	103,475	106,454
2010	118,853	125,510	136,644
2020	139,560	152,812	176,067
2030	161,890	183,374	220,083
2040	187,792	220,049	275,104
2050	217,839	264,059	343,880

1.7 Forecasted Water Demands

Projections of water demands are closely tied to the projections of population increase for Skagit County, as well as the possibility of large new customers (i.e., new industrial demands, or regional wholesale water customers). Because of the unknown nature of water usage needs, a range of projections are examined in the following sections.

1.7.1 High Growth Scenario

The analysis presented in Table 2.13 presents a combination of the OFM high population growth projections for Skagit County, as well as outside of County demand and new industrial demands as presented in the 2000 Coordinated Water System Plan.

Table 2.13 Projected High Population Growth and Water Demands 2025

Public Utility District	Population	Water Demand (MGD)		
	2025	ADD	MDD	GPCD
Burlington	16,866			
Mount Vernon	54,748			
Sedro-Woolley	20,015			
Bayview	3,285			
Rural Judy SVC area	21,625			
Outside of County Demand	-	1.5	3.5	
New Industrial Demand	-	5.0	5.0	
Subtotal Judy:	116,539	22.15	38.24	134
Fidalgo Island	2,566	0.271		
Alger	444	0.039		
Cedargrove	694	0.068		
Rockport	213	0.039		
Skagit View Village	483	0.019		
Marblemount	242	0.063		
Mountain View	56	0.006		
Potlatch	131	0.002		
Subtotal PUD Remote:	4,829	0.50	0.96	105

1.7.2 Intermediate Growth Scenario

The analysis presented in Table 2.14 presents a combination of the OFM medium population growth projections for Skagit County, as well as outside of County demand and new industrial demands as extrapolated from the 2000 Coordinated Water System Plan.

Table 2.14 Projected Medium Population Growth and Water Demands 2025

Public Utility District	Population 2025	Water Demand (MGD)			
		ADD	MDD	GPCD	
Burlington	13,972				
Mount Vernon	45,356				
Sedro-Woolley	16,582				
Bayview	2,721				
Rural Judy SVC area	17,915				
Outside of County Demand	-				
New Industrial Demand	-				
	Subtotal Judy:	96,547	12.97	24.64	134
Fidalgo Island	2,126	0.223			
Alger	368	0.039			
Cedargrove	575	0.060			
Rockport	176	0.018			
Skagit View Village	400	0.042			
Marblemount	200	0.021			
Mountain View	46	0.005			
Potlatch	109	0.011			
	Subtotal PUD Remote:	4,001	0.42	0.80	105

1.7.3 Low Growth Scenario

The analysis presented in Table 2.15 presents a combination of the OFM low population growth projections for Skagit County, and assumes no new out-of-county demands or large new industrial users.

Table 2.15 Projected Low Population Growth and Water Demands 2025

Public Utility District	Population	Water Demand (MGD)			
	2025	ADD	MDD	GPCD	
Burlington	11,790				
Mount Vernon	38,270				
Sedro-Woolley	13,991				
Bayview	2,296				
Rural Judy SVC area	15,117				
Outside of County Demand	-	-	-		
New Industrial Demand	-	-	-		
Subtotal Judy:		81,464	10.94	20.79	134
Fidalgo Island	1,794	0.189			
Alger	311	0.027			
Cedargrove	485	0.047			
Rockport	149	0.027			
Skagit View Village	338	0.013			
Marblemount	169	0.031			
Mountain View	39	0.004			
Potlatch	92	0.001			
Subtotal PUD Remote:		3,376	0.34	0.65	101

1.7.4 Discussion

The maximum day demand for the Judy System projects to be in the range of 20.79 MGD to 38.24 MGD (by 2025). The expanded 30 MGD water treatment facility at Judy Reservoir should cover demands except maximum days under the high-growth projections. However, the District will explore cooperative water supply strategies for any make-up water which may be necessary.

1.7.5 Water Rights

The District has water rights for all water systems, except the Potlatch System which withdraws seawater and does not require a water right; and Fidalgo Island which purchases water from the city of Anacortes.

1.7.6 Judy Reservoir System

The Judy Reservoir System has traditionally diverted water from Cultus Mountain streams (Mundt, Turner, Salmon, and Gilligan) and impounded that water in Judy Reservoir. This cyclical operation of the District’s water resources meant that the District

would collect water through fall and winter, and fill Judy Reservoir by spring. During the summer the reservoir level falls as water demands exceed water collected from streams.

The District is in the process of significantly modifying its raw water collection protocol. In the 1996 Memorandum of Agreement Regarding Utilization of Skagit River Basin Water Resources for Instream and Out Of Stream Purposes (MOA), the District agreed to operate its raw water collection in a manner that was protective of minimum instream flows in the Cultus Mountain Streams and the Skagit River.

The District's Judy Reservoir water rights are significantly linked to the 1996 MOA. At the time of this writing, the raw-water diversion pump station on the Skagit River has not been completed. Full implementation of the MOA water rights is contingent on the operation of this pump station.

The Judy System water rights are summarized in Table 2.16.

Table 2.16 – Judy System Water Rights
Certificated Rights

Name	Status	Certification #	Priority Date	Qi, Max Diversion (cfs)	(MGD)	Qa, (ac-ft)	Comments
MUNDT CREEK	CERTIFICATED	VOL 1, PG 26	9/28/1917	2.5	1.62	1810	TOGETH W/ S1-00737C, Qi <= 8.0cfs & Qa <= 3886 afy
TURNER CREEK	CERTIFICATED	CLAIM 9333	PRE-1917	4.3	2.78	2300	Vested Right Transferred to District
TURNER CREEK	CERTIFICATED	S1-00739C	10/30/1963	6.2	4.01	0	SUPPLEMENTAL TO 8738 AND R1 00673C
MUNDT CREEK	CERTIFICATED	S1-00737C	10/30/1963	8	5.17	3886	SUPPLEMENTAL TO 26, 8738 AND R1-00673C
SALMON CREEK	CERTIFICATED	CLAIM 9332	PRE-1917	1.8	1.16	307	Vested Right transferred to District
GILLIGAN CREEK	CERTIFICATED	VOL 1, PG 441	10/10/1929	1.5	0.97	0	From Puget Sound Pulp and Timber
GILLIGAN CREEK	CERTIFICATED	S1-00724C	10/30/1963	7.39	4.78	3700	Supplemental to existing 1.5cfs right
SKAGIT RIVER RANNEY WELL	TRANSFERRING	VOL 5, PG 2107-A	5/12/1954	8.91	5.76	6400	Approved for transfer to Skagit River Diversion
SEDRO WOOLLEY WELL	TRANSFERRING	VOL 4, PG 1904-A	3/26/1953	2.01	1.30	1440	Approved for transfer to Skagit River Diversion

Claims

Name	Status	Certification #	Priority Date	Qi, Max Diversion (cfs)	(MGD)	Qa, (ac-ft)	Comments
PIGEON CREEK	CLAIM	CLAIM 9335	PRE-1917	0.2	0.13	40	Vested Right Transferred to District - not active
ROCK SPRINGS CREEK	CLAIM	CLAIM 9334	PRE-1917	0.2	0.13	2900	Vested Right Transferred to District - not active
UNNAMED CREEK	CLAIM	CLAIM 9336	PRE-1917	0.1	0.06	20	Vested Right Transferred to District - not active
COLD SPRINGS CREEK	CLAIM	CLAIM 9337	PRE-1917	0.2	0.13	40	Vested Right Transferred to District - not active
E FORK NOOKACHAMPS	CLAIM	CLAIM 9338	PRE-1917	-	-	-	Vested Right Transferred to District - not active

Applications

Name	Status	Application #	Priority Date	Qi, Max Diversion (cfs)	(MGD)	Qa, (ac-ft)	Comments
MUNDT CREEK	APPLICATION	S1-27861	10/22/1997	18.56	10.38	-	Part of MOA
TURNER CREEK	APPLICATION	S1-27862	10/22/1997	6.6	4.27	-	Part of MOA
SALMON CREEK	APPLICATION	S1-*18219	10/30/1963	4.0	2.58	-	Part of MOA, Oring Applic for 0.1 cfs
GILLIGAN CREEK	APPLICATION	S1-25129	11/16/1987	13.15	8.50	-	Part of MOA, Oring Applic for 9.6 cfs
SKAGIT RIVER PUMP STATION	APPLICATION	S1-27860	-	12.8	8.27	-	Part of MOA
JANICKI CREEK	APPLICATION	S1-18220	-	9.0	5.82	-	
DAY CREEK	-	4566, 14220	-	-	-	-	
STARBIRD, T33, R04, 28	APPLICATION	G1-26742	9/29/1992	1.11	0.72	-	
STARBIRD, T33, R04, 33	APPLICATION	G1-27030	3/31/1993	0.78	0.50	-	

Certificated Storage Rights

Name	Status	Certification #	Permit #	Priority Date	Volume (ac-ft)
JUDY RESERVOIR	CERTIFICATED	VOL 18, PG 8738	R-142	1/16/1946	1500
JUDY RESERVOIR	CERTIFICATED	R1-00673C	BOOK 2, R-	4/24/1963	4250

Storage Right Applications

Name	Status	Application #	Permit #	Priority Date	Volume (ac-ft)
DAY LAKE	APPLICATION	R-14221		1/24/1957	11200

The District’s total certificated and recorded surface water claims and rights in the Judy Reservoir system sum to a Qi of 31.69 cfs (20.48 mgd). The Qi for the Ranney Well and Sedro-Woolley Well sum to 10.90 cfs, bringing the total current “surface water” rights of the District to 42.59 cfs (27.52 mgd). This amount is not subject to Lower Skagit River Instream Flows, however any additional Qi approved by Ecology on the Skagit River for the District will be subject to Lower Skagit River Instream Flows. The total Qa for these

surface water claims and rights supporting the Judy Reservoir water system is 18,755 Ac-Ft/yr, including both primary and supplemental rights. The individual Qa breakdown is also shown in Table 2.16.

As evidenced by the above discussion, the actual amount of annual water available to the District is subject to the streamflows during a given year. The District is studying the streamflow and Skagit River flow data, and will eventually develop a probable quantity of water available, and an operation plan for the stream and river diversions.

These rights are sufficient to supply the current usage (2861 MG in 2006) plus water being diverted and bypassed through the Judy Reservoir spillway / drain system to purge the impounded water, a form of water treatment that requires the bypass of an estimated 1,401 MG (about 4,300 Ac-ft) each year. This is an operating requirement that the District must divert water for, and is quantified and included as part of the District's water rights even though it is essentially being returned to other surface waters of the Skagit River basin.

For water quality reasons, the District has not in recent years regularly used its ground water rights within the Judy Reservoir system for production purposes; these sources are reserved for situations (emergency/ summer supply) when Judy Reservoir and city of Anacortes intertie sources can not meet District demands. Once the Skagit River raw water pumping station is completed and in use, the Ranney Well and Sedro-Woolley Well are expected to be dismantled and properly abandoned.

1.7.7 Interties

The District currently has four major interties between its Judy Reservoir system and the city of Anacortes' water system. The frequency of use and hydraulic capacities of these interties are as indicated in Table 2-17. The Avon and Riverbend Interties have general benefit to the 214' HGL pressure zone of the Judy Reservoir system.

The city of Anacortes currently designates a committed volume of 405 MG per year for use by the District (as of 2006, though this number can be changed by agreement between the city and District). Volumes in excess of 405 MG may be available but involve a higher cost per unit of water.

Table 2.17 – Judy Reservoir – Anacortes System Interties

Description	Capacity (mgd)	Historical Peak Month	Frequency of Use
Avon Intertie	2	73.3 MG	Emergency/demand peak
Fredonia Intertie	4.3	4.1 MG	Daily (fire/demand peaks only)
Lefebber Intertie	10	20.6 MG	Daily (2.5 mgd MDD in year 2020)
Riverbend Intertie	4.7	113.5 MG	Emergency/demand peak
Twin Bridges	4	0.04 MG	Daily (domestic/fire demand)

1.7.8 Remote System Water Rights

The water rights for the District’s remote systems are summarized in Table 2.18 below:

Table 2.18 – Remote System Water Rights

Name	Status	Certification #	Permit #	Priority Date	Q1, Max Diversion (gpm)	Qa, (ac-ft)	Comments
MOUNTAIN VIEW WELL	CERTIFICATED	G1-25755C	G1-25755P	6/26/1990	41	3.8	Orig. Permit done by Hendrickson, for 46gpm, 8acfy Supplemental with G1-22623C nte 100gpm, 38.6acfy
ROCKPORT WELL	CERTIFICATED	G1-25509 C	G1-25509 P	8/25/1989	95	19	
CEDARGROVE WELL	CERTIFICATED	G1-25994 C	G1-25994	12/5/1990	262	53.8	Canceled 10/10/2001 - emergency only Certificated to Alger Community Club, LLC Not in use - SOLD RESOLUTION # 1622-94 Not in use - SOLD RESOLUTION NO. 1619-94
POTLATCH WELLS 1 AND 2	CANCELED PERMIT		G1-24396 P	10/17/1983	30	9	
ALGER WELL	CERTIFICATED	VOL 8, PG 3885-A	BOOK 11, PG 5401	9/21/1960	100	100	Requires stream augmentation 80 gpm interruptible
WHITMARSH WELL #1	CERTIFICATED	VOL 6, PG 2790-A	3916	12/1/1955	80	128	
WHITMARSH WELL #2	CERTIFICATED	VOL 9, PG 4210-A	5543	3/20/1961	75	120	Requires stream augmentation 80 gpm interruptible
MARBLEMOUNT	PERMIT		G1-28137P	6/4/2002	150	19.4	
SKAGIT VIEW VILLAGE	PERMIT		G1-20763P	7/24/1973	200	38.4	

1.8 System Capacity Analysis

Per the Municipal Water Law (SESSH B 1338) the District has a ‘duty to serve’ new connections within the District’s Retail Service Area, so long as certain criteria are met. One of these criteria is that the water system has sufficient capacity to serve the new connection.

The physical capacity of a water system is defined per WAC 246-290-222. The physical capacity is the number of ERUs which can be served by a system based on an analysis of average day demand per ERU, water rights, source of supply, and storage capacity. The methodology to determine physical capacity is contained within the Department of Health Water System Design Manual.

A summary of the physical capacity for each water system is provided in Table 2.19:

Table 2.19 – Physical Capacity of District Water Systems

Water System:	Physical Capacity (ERUs)	Consumption per ERU	Total Water Sold 2006 (kgal)	2006 ERUs	Remaining Capacity	Most Limiting Element
Judy Reservoir	57900	178	2,861,020	44,036	13,864	Standby Storage
Fidalgo Island	2505	121	49,275	1,116	1,389	Source Pump Station
Alger	219	156	8,656	152	67	Source Well
Cedargrove	466	103	-	160	306	Annual Water Right
Rockport	138	143	3,676	70	68	Capacity Rel Storage
Skagit View Village	128	113	3,165	77	51	Water Right Cap
Marblemount	43	400	n/a	-	43	Annual Water Right
Mountain View	14	189	1,157	14	At capacity	Group B - no storage
Potlatch	182	44	456	28	154	Capacity Rel Storage

*Cedargrove water sold data skewed because of anomalous large use

Certain systems are outside the norm in terms of average day demand because of rates, or seasonal nature of the residency. Therefore caution and professional engineering principles should be exercised in evaluating how many additional connections can be made.

2 Existing Conservation Program

2.1 Water Use Efficiency

The District's existing Water Use Efficiency Plan was developed with the Conservation Planning Requirements manual, which was written jointly by the Washington Water Utilities Council, Department of Health, and Department of Ecology.

2.2 Goals and Objectives

The District's water use efficiency goal is:

“Provide all District customers with the knowledge and incentive(s) to use water wisely and eliminate wasteful water use practices.”

To meet this goal, the District has established the following objectives:

- Continue to support public education
- Provide technical assistance
- Implement system measures
- Provide incentives and other water use efficiency measures

2.3 Evaluation of water use efficiency measures

The District's Water Use Efficiency Program does not include emergency/drought-related short-term regulatory or mandatory measures, which are characteristic of an emergency response plan. This Program, rather, deals with water use efficiency as a long-term source of supply. As recommended in the Conservation Planning Requirements manual, the District has evaluated public education, technical assistance, system measures, incentives and other water use efficiency measures in the development of its Conservation Program. These measures are all addressed as follows with regard to current and planned implementation.

2.3.1 Public Education Program

2.3.1.1 School Outreach

The District staff visits classrooms of local elementary schools and provides students with guided tours of a stream diversion and water treatment plant on the average of two times per school year. The District has made a standing offer to the local Educational Service District for further school involvement to help the schools meet their state mandated environmental education requirements. The District has been active in this school outreach program since around 1980.

2.3.1.2 Speakers Bureau

The District has historically provided information to local civic, commercial and water-oriented organizations since its inception. Water use efficiency has become a requested topic at these presentations most noticeably since 1987. The District staff averages two to three such presentations per calendar year.

2.3.1.3 Program Promotion

The District uses its quarterly newsletter to customers, its Web site, its political relationships to the county and local cities, and its service relationship with its customers to promote its water use efficiency program.

Handouts. The District maintains a stocked display of free water use efficiency handouts in the customer service area of its headquarters office in Mount Vernon. These may include publications by the state Building Code Council, DOH, Washington State Energy Office and American Water Works Association (AWWA). The District also offers water conserving fixture information to new customers. The District offers this same information through the county and local city building departments and permit centers. Handouts have been available from the District since around 1992.

News Media. District executive and staff members have appeared in the local newspapers and on local radio spots and shows dealing with water issues. The interview topic will sometimes turn to water use efficiency. The District supports water use efficiency as an avenue for reducing customers' water consumption and mitigating the need for additional water source development; both of these will lead to slower long-term growth of utility bills.

2.3.2 Technical Assistance

2.3.2.1 Purveyor Assistance

The District wholesales water to two customers: the Samish Farms Water Association and the North Fir Island Water Association. The District has ensured both customers have copies of this Conservation Program and the Water Conservation Requirements manual for their own use, and has offered assistance in the development of their respective water use efficiency plans, if needed.

2.3.2.2 Customer Assistance

The District provides limited leak detection assistance to its customers, both from its headquarters office in Mount Vernon and from District employees in the field. Free dye tablets are available to customers to check for toilet tank leaks, as are copies of the District's step-by-step checklist that customers can follow to determine if they have a leak in their service line or plumbing. This service has been available since around 1987.

2.3.2.3 Bill Showing Consumption History

Prior to 1991, the District's utility billing was done by a consultant based on meter readings done by District personnel. In 1991, the District purchased the necessary computer and accessory equipment and began performing utility billing in-house. At that time, the billing configuration was changed to include a block on the bill for consumption history. Bills produced now show up to 12 past bills, including billing date, consumption during each cycle, number of days in each billing cycle, and average daily consumption for each cycle. The District believes this will help customers identify seasonal use patterns and limit peak consumption, easily identify substantial increases and help the customers identify leaks they may have on their side of their water meter.

2.3.3 System Measures

2.3.3.1 Source and Mainline Meters

The District has metered its diversions from the streams, its production from Judy Reservoir and wells, and mainline flow within the system since the District began operation. All source meters and mainline meters are read on the first working day of each month. Meter records dating back to 1971 are in a standardized format and are on file available for review in the District's Engineering Department.

The District's water treatment plant for the Judy Reservoir system went on line in 1989, complete with an automated trending package for flows and process functions. The District has used the historical data gathered from this data accumulator to calculate the average day, peak day and overall peak production demands of the Judy Reservoir system; those figures are used in this plan. The newest source and mainline meters in the District systems are modern positive displacement and turbine meters (Sensus), paddlewheel meters (Data Industrial), and reversible-flow magnetic meters (Toshiba); many of the older mainline meters are propeller (Sparling) meters. The District has identified some of these older mainline meters that are not functional at the writing of this plan, and others whose accuracy may be in question. In support of future water audits, the District is continuing its meter rehabilitation/replacement program that will ensure high reliability and accuracy of mainline meter readings.

2.3.3.2 Service Meters

All water services in the District's water systems are metered. Service meters range in size from 5/8-inch positive displacement water meter (the standard residential service) to 8-inch fire line meters with detector check assemblies. All new service meters, other than for single-family residential water services, are sized based on the International Association of Plumbing and Mechanical Officials Uniform Plumbing Code.

The District tracks high use meters to check up on their accuracy, and meter readers routinely replace service meters which show signs of inaccuracy and failure. Approximately 680 service meters one-inch and under were replaced in 2000, plus 21 meters between one and one-half-inch and four-inch. The District has recently started to track annual flow through its meters as a gauge of meter accuracy, and is looking at

testing/replacing the 280 identified service meters that exceed the meter manufacturer’s warranted volume.

During 2006/07, the District has significantly increased its service meter replacement program. Over 6,000 radio-read meters were installed, which will both reduce the workload associated with reading meters, and also increase the overall accuracy of the system resulting in a decrease in unaccounted for water.

2.3.3.3 Unaccounted-For Water/Leak Detection

The District’s recorded unaccounted-for water (fire flows, hydrant testing, water system flushing, unmetered consumption and leaks) had averaged around 25 percent for the period 1984 through 1990, peaking at 26.59 percent at the end of 1990. In 1991, the District established an in-house water accountability program. District field employees, especially water quality technicians, followed up on suspected leaks and tested ponded and flowing water near existing District water lines for chlorine residuals. Several large leaks were discovered and repaired. The District reduced the 12-month average from over 25 percent in 1990 to under 15 percent as of October 1992. The District actually produced less water in 2000 than in 1990 while providing service to approximately 4,000 additional customers. The amount of water unaccounted for in 2006 averaged seven percent for the year for all District water systems.

The next proposed step in reducing unaccounted-for water is to perform a water audit. Each District water system is divided into sub-areas based on the placement of source and mainline meters in each water system. The District will follow the guidance in the AWWA M36, Water Audits and Leak Detection manual, to identify areas with meter inaccuracies and/or leakage losses. Once these areas have been identified, the District will first verify and reinstate as needed the accuracy of large meters and second, if water loss is still greater than AWWA allowable leakage standards, have a consultant perform leak detection analysis of transmission and distribution pipelines in the sub-area. Identified leaks will be verified and repaired. These measures are dependent on the District repairing and/or replacing deficient mainline meters as identified above. Also, the District’s existing customer billing information is insufficient to audit by sub-area. An update to the Districts billing system should allow for an opportunity to audit on zones of the system measured by master meters.

The District also hired a leak detection service in 2004 through 2006 to investigate approximately 25-miles of pipeline annually. This leak detection service investigates the sounds of leaks, and overall has found the District’s facilities to be in good condition.

Unaccounted Water For All District Systems

Year	2004	2005	2006
<i>Total Production (MG)</i>	2,978	2,879	2,952
<i>Total Unaccounted (MG)</i>	260	282	197
Percentage Unaccounted	9.7%	9.9%	7.0%

As evidenced by the above table, the District has averaged less than 10 percent unaccounted water for the past three years. This indicates that the District is not required to develop a water-loss control action plan as would be required by the Municipal water law if the unaccounted water is greater than 10 percent.

2.3.4 Incentives/Other Measures

2.3.4.1 Effects of water conserving fixtures on future demand

The Washington State Building Code, RCW 19.27, was revised in 1989, requiring all plumbing fixtures installed in new construction and remodels on or after July 1, 1993, to meet specified water use efficiency standards. The District's 2007 single-family residential consumption averaged 178 GPSD gallons per service per day.

The District's projected growth is expected to be predominantly from new construction. The District expects new homes to average approximately 150 GPSD.

2.3.4.2 Single-Family/Multi-Family Kits

As addressed above in Program Promotion and Customer Assistance, the District already provides assistance to its customers on request. This assistance is currently limited to providing access to water use efficiency literature at its headquarters office and through local building departments and providing free toilet tank leak detection dye tablets on request. The District is developing a list of simple water conserving retrofits, their approximate cost, local suppliers and payback potential. This list will be distributed to existing customers as a billing insert, and will be provided to new customers when they sign up for a service.

2.3.4.3 Nurseries/Agriculture

The District has identified its largest water consumers to be commercial and agriculture customers with large demands for process water, livestock and irrigation watering. Many of the agriculture irrigation customers are already using drip irrigation systems to optimize water use. Several of these irrigators have interruptible flow contracts with the District, requiring them to stop consumption if their high demands are adversely impacting domestic use in their area of the distribution system. The District requires new large irrigation customers to submit Blaney-Criddle Water Balance calculations to the District for review before the new irrigation service is approved and installed.

2.3.4.4 Landscape Management/Playfield

The District has developed a demonstration garden in the front of its Mount Vernon headquarters facility, replacing portions of the grass area behind the existing fountains. This garden is an educational tool for local residents, public agencies and commercial enterprises that focuses on low maintenance, low water use, and native plants.

The District hopes to include water use comparisons and other information for the various landscape scenarios presented. The garden may also present information on evapo-transpiration (ET) rates for the area and include a small weather station and soil

moisture probes to control the District’s irrigation system. The District is also considering sponsoring workshops for low water-use landscaping, possibly using a portion of the garden as a training site.

The District has a water contract with a 730-acre golf course/country club, which identifies their peak projected irrigation demands, requires that they have an interruptible supply for irrigation, and allows the District to provide recycled water at the District’s discretion for irrigation purposes. The District has similar irrigation agreement with commercial agriculture customers. While these “interruptible supply” terms are more for emergency response to a water shortage, they send the strong message to these customers that their individual actions towards water use efficiency and reductions in peak demands will mitigate emergency shutoffs. The District’s design standards require submission of Blaney-Criddle water balance calculations for large irrigation services to ensure water use efficiency planning.

2.3.4.5 Conservation Pricing

The District had historically used a declining block scale for its water rates, as recommended by consultants from the 1960s and before.

The District calculated that single and/or elderly customers on a fixed income use approximately 300 cubic feet of water per month. Rate structures had offered the first 300 cf of water “free” every month for the minimum charge (based on meter size). This first 300 cf was considered by the District to be “survival water.” Water over 2,000 cf was available at a lower unit cost as it was relatively inexpensive to produce. Skagit County appeared to have a plentiful water supply and water use efficiency was not a strong consideration in the past.

The 1999 rates, through 2,000 cf/month, are more than twice that of the 1981 rates, but are about four times the 1981 rate over 2,000 cf/month. As a result of the 1992 and subsequent rate increases, some of the larger customers have reduced their overall water consumption.

2.3.4.6 Recycling/Reuse

As indicated above, specific commercial enterprises are pursuing reusing water in their processes in an effort to reduce their utility bills. There is increased interest in Skagit County regarding recycling/reuse of sanitary wastewater per the new Interim Wastewater Reuse Regulations. An engineer for a local golf course/housing development has indicated that the reclaimed water from the proposed homes surrounding the golf course will be used for irrigating the course. Irrigation demands exceeding available reclaimed water supply will be augmented by potable water. This approach is consistent with over 1,000 similar systems nationwide, and will be supported by the District to the extent that District operations associated with the system remain economically viable and financially feasible, and meet state water quality requirements.

Local municipalities are largely leading the effort for wastewater reuse, as they own and operate wastewater treatment facilities within their jurisdictions. The cities of Burlington and of Sedro-Woolley are both in the preparation stage to use recycled effluent for irrigation of some of their parks.

Figure 20 indicates the current sewage treatment facilities within Skagit County. These facilities are all operated by local government groups other than the District. The District is supportive of the use of recycled effluent, but has not been directly involved because the District does not process wastewater.

Figure 20. Sewage Collection and Treatment Facilities

System	Current Load (Gallons per day)	Design Capacity (Gallons per day)	% of Design Capacity Use	Current Upgrade Projects
Big Lake*	70,000	200,000	35%	
Burlington	1,300,000	1,600,000	81%	3.8 MGD by November 2000.
Anacortes*	3,200,000	6,400,000	50%	
Sedro-Woolley	800,000	1,900,000	32%	2.3 MGD by August 1999.
Concrete	75,000	100,000	75%	Currently in planning process.
Mount Vernon	5,600,000	8,200,000	68%	Implementing several upgrades.
La Conner	250,000	520,000	48%*	Stated upgrade to be complete May 1999.

* Note: Big Lake and Anacortes load and capacity amounts based on 1994 data.
 Source: Skagit County Sewage Treatment Facilities, April 1999.

2.4 Water Use Efficiency Alternatives

2.4.1 Mainline Meter Rehabilitation/Replacement Program

Description: Repair/replace all mainline meters which are not functional and install new meters where there are none. At the writing of this plan, there are four dead mainline meters in the Judy Reservoir system which will be replaced or repaired:

- Blodgett Rd PRV meter
- SR 20 and District Line Road
- Clear Lake reservoir
- Ninth Street 214 Meter

All source and mainline meters in all other District water systems appear to be running accurately. However, repairs and replacement are often required on a non-predictable basis.

Schedule: As indicated.

Budget: \$10,000 per year.

Monitoring Requirements: The District will continue to check mainline meter readings monthly.

Target Water Savings Projections: None initially. This is the first step in performing the water audit and reducing unaccounted-for water.

2.4.2 Water Audit

Description: Perform a water audit of all District water systems.

Schedule: In 2010, assuming new billing software is functional.

Budget: The 2010 engineering budget will allot time for District staff to perform audits on Judy Reservoir water systems. This audit requires the implementation of new financial software which will track consumption by location more accurately than the current system.

Monitoring Requirements: District engineering and operations staff must monitor fire, flushing and meter reading operations in the year prior to the audit to ensure maximum accountability of water produced.

Target Water Savings Projections: None initially. This is the first step in performing the water audit and reducing unaccounted-for water.

2.4.3 Meter Accuracy Check/Transmission Line Leak Detection

Description: The District will calculate the total allowable leakage per AWWA standards by area. Once these areas of higher calculated loss have been identified by water audits, the District will check major service meters for inaccuracies. Once satisfied of meter accuracy and if more than the allowable loss remains, the District will schedule a pipeline leak detection service.

Schedule: Those areas with more than the allowable loss should be prioritized based on water lost, and meters tested in that priority. It is expected that all large meters in an area would be tested and verified/replaced within three years after that area was identified with excessive losses. It is also expected that those areas with remaining losses should have a leak detection survey completed within two years after completion of meter accuracy

checks. The Judy Reservoir systems may take up to 10 years to complete leak detection if all sub-areas of the system are involved.

Budget:

No specific budget has been allotted. Meter accuracy checks are considered “maintenance,” as are leak detection activities. Actual leak detection activities may not commence until the year after meter checks are complete to allow for budget adjustments. Leaks detected will be repaired as soon as practical and financially feasible.

Monitoring Requirements:

District engineering staff performing the original audit will regularly follow up on the progress of meter accuracy checks, and will prepare budgets and monitor progress of any leak detection activities.

Target Water Savings Projections:

None initially. This is the first step in performing the water audit and reducing unaccounted-for water.

2.4.4 Selected Water Use Efficiency Activities

Selection of the most cost-effective water use efficiency alternatives from the list above is based on evaluation of each alternative as a source of future water. Through the public process required by the Municipal Water Law, additional water use efficiency activities will be evaluated by the District and be included in future water system plan updates.

3 Water Use Efficiency Goals: 2008-2014

4.1 Objective

The District's objective for the water use efficiency program is to conserve the water resources of the state for the benefit of the people. The District will do so while providing safe and reliable utility services to our customers in a financial and environmentally responsible manner.

4.2 Goals

4.2.1 Supply Side

Reduce unaccounted for water by one percent in the next six years.

4.2.1.1 Timeframe

2008 to 2014

4.2.1.2 Cost-Effective Support Measures

- Create better tracking mechanisms for permissible water use by cities, fire departments, and other non-billed use.
- Continue leak detection survey program.
- Continue proactive pipeline replacement program.
- Update the billing software for greater flexibility in auditing by area.

4.2.1.3 Funding Source

- The funding for the program would be expected to be District revenue funds.

4.2.2 Demand Side Goal 1

Reduce consumption per ERU from 178 gallons per service per day to 175 gspd in the next six years.

4.2.2.1 Timeframe

2008-2014

4.2.2.2 Cost-Effective Support Measures

- Explore a program to allow customer water audits and leak detection provided by the District.
- Explore programs for rebates on water efficient appliances and fixtures.

- Provide ongoing public education.
- Explore the District's rate structure to promote conservation-based rates.

4.2.2.3 Funding Source

- The funding for the program would be expected to be District revenue funds.

4.2.3 Demand Side Goal 2

Reduce the summer peak flows from 1.7 times ADD to 1.6 times ADD.

4.2.3.1 Timeframe

2008-2014

4.2.3.2 Cost-Effective Support Measures

- Provide public outreach and education
- Provide public education.
- Explore the District's rate structure to promote conservation-based rates.
- Encourage water reuse or raw water irrigation.

4.2.3.3 Funding Source

- The funding for the program would be expected to be District revenue funds.