CITY OF GRANTS PASS

WATER MANAGEMENT PLAN

FINAL REPORT

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June 2002

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CHAPTER 1

EXECUTIVE SUMMARY

The purpose of the Water Management Plan is to identify and analyze the water supply and demand issues facing the City of Grants Pass, develop a reasonable approach to resolving the issues, and serve as a guide for City water management policies. This plan was developed in accordance with Oregon Water Resources Department guidelines and contains a comprehensive discussion of the existing water distribution system, current and future development of water demand, existing and potential water conservation measures, water curtailment strategies, implementation schedules, and long range water supply issues.

EXISTING WATER SYSTEM

The City of Grants Pass gets its drinking water from the Rogue River. The Rogue River has historically provided a plentiful supply for the City and even at its lowest flows has sufficient flow for the City's current demand. Grants Pass holds four water rights on the river, totaling 87.5 cfs (56 mgd). One right for 12.5 cfs (8 mgd) is perfected.

The City's water system consists of a water treatment plant, eleven booster pumping stations, eight reservoirs, and an extensive water distribution system with over 130 miles of pipeline. Due to the extent of the distribution system and the highly varied local topography, the service area contains seven separate pressure zones. The overall water system is limited by the capacity of the water treatment plant, which is rated at 18 mgd.

WATER DEMAND

The water system serves the residents of Grants Pass with a current population of 23,170 and surrounding developing areas. Table 1-1 shows current water demand.

Table 1-1. Current Water Demand

Condition	Current Water Demand, mgd
Average Annual	4.5
Maximum Month	8
Maximum Day	10

A comparison of water sold to water produced shows that the system has an excellent delivery record. The unaccounted-for water rate was limited to 10.9 percent in calendar year 2000. A breakdown of water demand by customer categories is shown in Table 1-2.

Table 1-2. Water Demand by Customer Category

Customer Category	Percentage
Commercial	36
Multi-Family	16
Single Family	48
Total	100

WATER CONSERVATION MEASURES

The State requires in a Water Management Plan that the City examine the feasibility of six types of water conservation measures (WCMs 1-6) and that the City provide an implementation schedule for an additional six types of measures (WCMs 7-12). Grants Pass has a number of conservation programs in place and an analysis of potential additional conservation programs was performed. A list of measures was screened based on a list of criteria including projected water savings, cost, political feasibility and legal constraints, consistency with community values, and environmental impacts. From this process, six favored programs emerged and a detailed cost-benefit analysis was performed. Of these programs, five were recommended for implementation. Table 1-3 summarizes existing and recommended conservation programs.

Table 1-3. Grants Pass Water Conservation Measures

WCM	Program Description	Status
1	Leak reporting program	Existing
2	Low water use demonstration garden	Recommended (2002)
3	SDCs based on meter size Separate indoor and outdoor metering	Existing Existing
4	Enforces state building code regulations Distribute plumbing kits	Existing Recommended (2003)
5	Inverted block water rates	Recommended (2001)
6	Non potable water used at WWTP	Existing
7	Annual system accounting	Existing
8	Fully metered system	Existing
9	Visual leak inspection Customer tracking to spot leaks	Existing Existing
10	Random meter testing Customer tracking to spot dead meters Commercial meter replacement program	Existing Existing Existing
11	Pamphlet distribution, city newsletter Low water use demonstration garden	Existing Recommended (2002)
12	Bulk water dispensing station and fire hydrant flow meters Additional bulk water dispensing stations Water waste prohibition	Existing Recommended (2001) Recommended (2001)

WATER CURTAILMENT MEASURES

The City has not experienced any supply deficiencies within the last 10 years, but the potential exists for service interruption in the event of a supply contamination, treatment plant difficulties, transmission or pumping problems or prolonged drought. The City has in place a water curtailment ordinance; however, in compliance with OAR 690-086, the ordinance will be repealed and replaced with an ordinance that clearly defines three levels of water shortage alerts and contains specific water curtailment measures to be implemented at each level of alert. The citizens of Grants Pass will be well served to have in place a curtailment plan that defines levels of water shortage severity and mechanisms for dealing with the situation. Table 1-4 lists water shortage alert levels, operational triggers, and curtailment measure implementation requirements. Chapter 5 outlines specific curtailment measures for each alert level.

Table 1-4. Water Shortage Alert Levels, Triggers, and Curtailment Measure Implementation Requirements

Alert Level	Description	Trigger	Curtailment Measure Implementation
One	Potential Water Supply Shortage	A serious drought condition is occurring or is likely to occur in the region or Rogue River flow rates are measured or projected to be below a 1-in-10 year low flow level, or the County or State has declared a drought condition.	Voluntary
Two	Water Supply Shortage	The City's ability to deliver water is not adequate to meet demand due to supply, treatment, storage, or pumping restrictions, or extended treatment plant operation is required and storage cannot be maintained.	Mandatory
Three	Critical Water Supply Shortage	Supply is interrupted	Mandatory

LONG RANGE SUPPLY

Future demand requirements were developed using land use demand factors and zoning information. The rate of development for the area was estimated to continue at 2.8 percent. Peaking factors were developed using historical water use data. Resulting future water demand requirements are shown in Table 1-5.

Table 1-5. Future Water Demand Requirements

Year	Average Demand, mgd	Maximum Day Demand, mgd
2010	6.1	13
2020	8.1	18
Build-out	9.5	21

Generally, the Rogue River provides an ample and reliable water supply for future water needs as Grants Pass expands within the urban growth boundary. It is important to note, however, that there are special factors such as the listing of salmon as an endangered species and long-term climate change that may impact the future ability of the river to maintain its reliable yield. These factors bear watching but at this time are ill defined, so it is difficult to quantify their potential effect.

CHAPTER 2

EXISTING WATER SYSTEM

SOURCE OF WATER

Source Availability and Reliability

The source of supply for the City of Grants Pass is surface water from the Rogue River. The Rogue River drains a large watershed extending from the Pacific Ocean to the crest of the Cascade Mountains. Grants Pass is located at approximately River Mile 100 and there are approximately 2,460 square miles of watershed area upstream of the City. As a result of this extensive drainage area, the Rogue River is a plentiful and reliable source of drinking water for the community.

The U.S. Geological Survey (USGS) maintains a river gaging station near the Grants Pass water treatment plant that provides extensive historical data on the flow characteristics of the Rogue River. Since the Lost Creek Reservoir storage reservoir was constructed upstream of Grants Pass in 1977 to regulate flow, USGS statistical data for the river are typically based on records from 1978 to present. Based on USGS data for this station, Table 2-1 presents the average, maximum, and minimum monthly flow rates for the Rogue River. Since construction of Lost Creek Reservoir, the lowest daily average flow at Grants Pass was 744 cubic feet per second (cfs) on October 10, 1994, and the lowest seven-day average flow was 799 cfs during the week of September 22, 1994. In general, dry weather flows are maintained by the combination of snow melt from the Cascades in the early summer and the release of stored water from Lost Creek Reservoir in the late summer.

Table 2-1. Rogue River Average Monthly Flows at Grants Pass
USGS Data for the 20-Year Period 1978 to 1997

Month	Average Monthly Flow, cfs	Maximum Monthly Flow, cfs	Minimum Monthly Flow, cfs
January	4,684	16,600	1,575
February	4,556	10,960	1,641
March	4,034	8,119	1,099
April	4,002	6,843	1,211
May	3,607	5,910	1,857
June	2,709	4,572	1,549
July	2,146	3,127	1,059
August	2,164	3,080	1,620
September	1,840	2,642	1,333
October	1,499	2,282	1,008
November	2,670	7,669	1,160
December	5,251	17,620	1,557

Long-Term Reliable Yield

Due to the nature of the City's surface water supply source, the long-term sustainability of drinking water supplies for Grants Pass is generally good. As noted earlier, the large size of the watershed drained by the Rogue River typically provides abundant water supplies throughout the year. Even during extreme dry weather periods when river flows are at their lowest, the reliable flow rate in the Rogue River is approximately 750 cfs or nearly fifty times larger than the highest drinking water demand ever experienced in Grants Pass. There are some special circumstances, which may affect the long-term reliable yield for the Rogue River. For example, the listing of the Coho Salmon as an endangered species in the Rogue River may influence operational procedures at the Lost Creek Reservoir, which in turn may affect dry weather flow levels. Another issue is related to climate change and snow pack levels in the Cascade Range. Any reduction in average precipitation or the average snow pack will tend to reduce dry weather flow rates in the Rogue River. Since these factors are complex in nature, it is difficult to quantify their potential effect on the river's reliable yield at this time.

Water Rights

The City of Grants Pass has water rights for the withdrawal of 87.5 cfs from the Rogue River. Table 2-2 summarizes the details related to these water rights. Documentation for the water rights is included in Appendix A.

Table 2-2. Grants Pass Water Rights

Permit Number	Priority Date	Permitted Use	Permitted Rate, cfs	Available Quantity, cfs	Source Availability Analysis		
					Reliability	Impact of ESA	Water Quality
D15839	1888	Municipal/ Irrigation	12.5		High	Undefined	Good
S26901	1960	Municipal	25.0	735[a]	High	Undefined	Good
S45827	1965	Municipal	25.0		High	Undefined	Good
S47346	1983	Municipal	25.0		High	Undefined	Good

[a]Restriction that water can be diverted only when flow at the mouth of the Rogue exceeds 735 cfs.

Intergovernmental Agreements

The City has no system interties that would provide additional water supply.

SYSTEM CAPACITY, LIMITATIONS, AND OPPORTUNITIES FOR EXPANSION UNDER EXISTING WATER RIGHTS

The Grants Pass water supply system currently distributes water to developed properties covering an area of more than 3,500 acres and serves a population of 23,170 within the City limits and several hundred outside the City limits in Harbeck-Fruitdale, Redwood, and North Valley. The overall system is composed of a water treatment plant, twelve booster pumping stations, eight reservoirs, two pressure reducing valves, and six altitude valves. Figure 2-1

illustrates the configuration of the Grants Pass water distribution system. The figure depicts all water distribution piping twelve inches in diameter and larger and shows future piping improvements recommended in the 2000 Water Master Plan including extension of service to the urban growth boundary and pipeline looping.

Water Treatment Plant

The City draws water from the Rogue River with a pumping station located next to the water treatment plant. The treatment plant was originally constructed in 1930 and has undergone many renovations over the years. The most recent plant expansion was completed in 1983, bringing the total rated plant capacity to 18 million gallons per day (mgd). Influent pumps deliver river water to the plant where the treatment process includes coagulation and sedimentation of suspended solids, filtration, and chlorination for disinfection prior to pumping into the distribution system.

Distribution Pipeline Network

The Grants Pass water distribution pipeline network consists of approximately 130 miles of existing pipeline. Table 2-3 details the water distribution system according to pipeline length and diameter. These pipelines are made of cast iron or ductile iron and range in age up to approximately 80 years.

Table 2-3. Water Distribution System Pipeline Network

Pipe Size, inches	Length, miles
2	5.23
4	1.80
6	40.89
8	43.63
10	7.64
12	19.49
14	0.38
16	7.88
20	2.40
24	1.02
30	0.95
36	0.01
Total	131.32

The urban growth boundary for the City of Grants Pass encompasses lands of wide ranging elevations. As a result, the water distribution pipeline network contains seven separate service pressure zones. Table 2-4 summarizes the service elevations and static pressure range for each pressure zone. The lower end of the pressure range is based on reservoirs at 80 percent full and the upper end is based on full reservoirs. At this time, there are properties receiving City water service in each of the pressure zones except Zone 5.

Table 2-4. Pressure Zone Ranges

Zone	Elevation, feet	Pressure, psi
1	900 – 1,020	36 – 90
2	1,020 – 1,140	41 – 95
2A	960 – 1,035	61 – 94
3	1,140 – 1,280	36 – 100
4	1,280 – 1,420	42 – 104
5	1,420 – 1,560	41 – 104
NV	995 – 1,165	101 – 177

In some areas, the pressure zone boundaries are modified slightly from these elevation ranges in order to accommodate special service pressure requirements. Pressure Zone 2A is a hybrid between Zones 1 and 2. The North Valley service area is actually a hybrid between Zones 1, 2, and 3, serving properties between the elevations of 995 feet and 1,165 feet. Due to the great range of elevations served in the North Valley, this pressure zone requires pressure reduction valves at service connections to maintain appropriate service pressures.

Storage Reservoirs

There are eight treated water storage reservoirs within the Grants Pass water distribution system that provide a total of 19 million gallons of treated water storage. These reservoirs were constructed between the years 1946 and 1999. Design information for these reservoirs is detailed in Table 2-5.

Table 2-5. Storage Reservoirs

Reservoir Location	Reservoir Number	Pressure Zone Served	Year Built	Construction Materials	Capacity, Mg	Bottom Elevation, feet	Overflow Elevation, feet
500 Block Woodson Dr.	3	1	1946	Concrete	3.5	1,089.5	1,108.5
1500 Block Ridge Rd.	4	2	1953	Concrete	0.75	1,216	1,240
1400 Block Sherman Ln.	5	1	1983	Concrete	3.5	1,079.5	1,108.5
2200 Block Crown St.	6	2	1982	Concrete	3.5	1,211	1,240
Heiglen Loop Rd.	8	3	1983	Concrete	2.0	1,341	1,370
1420 Denton Trail	11	1	1999	Concrete	4.5	1,080.1	1,108.5
1700 Block Sunset Ln.	13	4	1980	Concrete	0.08	1,510	1,520
3900 Block Highland Ave.	15	5	1985	Concrete	1.2	1,374	1,403

Booster Pumping Stations

The water distribution system includes the water treatment plant pumps and nine booster pumping stations that transfer water to the higher pressure zones. These pump stations either fill the reservoirs that serve these higher pressure zones or pump to maintain a minimum pressure in those areas that are not served by reservoirs. Table 2-6 details the technical information for each of the system's pumping stations.

WATER SYSTEM OPERATION

Water Treatment Plant

The water treatment plant operates as necessary to fill storage reservoirs in the distribution system on a daily basis. Therefore, the operating schedule varies with seasonal variations in water demand. During the winter months, the plant generally operates seven days per week for an eight hour period. Operational hours are extended during the high demand summer months, when the plant must operate up to twelve hours daily in order to keep the storage reservoirs full.

Booster Pumping Stations Serving Areas With Reservoirs

Those booster pumping stations that fill storage reservoirs are automatically controlled to maintain preset water levels. When sensors show that the water level in a reservoir has fallen below a preset threshold, the lead pump will activate and begin filling the reservoir to a high water level. If water demand on the reservoir is such that a single pump cannot maintain the water level, a lag pump (or pumps) will activate as necessary until the reservoir fills to a high water level.

Booster Pumping Stations Serving Areas Without Reservoirs

Booster pumping stations that serve areas without storage reservoirs are automatically controlled to maintain a minimum discharge pressure at the pumping stations. When pressure sensors show that the discharge pressure has fallen below a preset threshold, the lead pump activates and pumps until the discharge pressure exceeds a high pressure level. If water demand in the pump station's service area is such that a single pump cannot maintain the pressure level, a lag pump (or pumps) activates until the system pressure is restored.

Reservoirs

Reservoirs in the water distribution system are generally maintained between 80 and 100 percent full. This fluctuating volume represents the operating storage. The remaining storage is allocated to providing fire flow requirements and emergency reserves. In the case of Reservoir No. 15 in the North Valley, water levels are maintained at a much lower level due to limited demand in that portion of the distribution system.

Altitude valves control the flow into and out of Reservoirs Nos. 3, 4, 5, 6, 11, and 15. These valves are designed to close when the reservoir is full and open when the system pressure drops. The other reservoirs in the distribution system float on the system.

Table 2-6. Existing Booster Pumping Stations

Pumping Station Name	Pressure Zone Served	Reservoirs Served	Number of Pumps	Pump Motor Size and Speed, hp/rpm	Capacity of Each Pump, gpm	Rated Discharge Head, feet
Treatment Plant	1	No. 3 No. 5 No. 11	5	300/1,775 300/1,775 250/1,760 250/1,760 200/1,750	3,500 3,500 3,500 3,500 2,600	220 220 210 210 210
Lawnridge	2	No. 6 No. 4	4	25/1,750 50/1,750 50/1,750 100/1,750	400 1,000 1,000 2,000	120 120 120 148
Madrone	2	No. 4 No. 6	3	60/1,750 401,750 301,750	2,000 1,200 900	170 170 170
New Hope	2	--	4	30/3,600 30/3,600 30/3,600 150/1,800	350 350 350 2,000	212 212 212 200
Meadow Wood	2	--	4	5/3,500 15/3,600 60/3,600 60/3,600	50 150 500 500	240 155 275 275
Harbeck Heights	2	--	3	5/3,600 5/3,600 50/3,600	90 90 1,200	100 100 125
Hilltop	2	--	3	5/3,600 7.5/3,600 40/3,600	100 150 750	120 120 120
Champion	3	No. 8	3	50/1,750 150/1,750 100/1,750	800 2,300 1,600	165 165 165
Starlite	3	--	4	15/3,500 30/1,760 60/1,760 30/1,760	60 450 1,050 450	185 185 185 185
Hefley	4	No. 13	4	7.5/3,500 15/3,500 60/3,500 60/3,500	40 120 600 600	250 250 300 300
Laurelridge	4	--	3	15/3,500 15/3,500 75/3,500	300 300 1,000	150 150 162
North Valley	NV	No. 15	3	7.5/3,500 30/3,500 30/3,500	70 500 500	170 174 174

Pressure Reducing Valves

There are two pressure reducing valve stations in the Grants Pass water distribution system. These stations control the flow of water from Pressure Zone 2 to Pressure Zone 2A. Pressure Zone 2A extends to slightly lower elevations than Pressure Zone 2 and thus requires some pressure reduction. Each station contains a single 6-inch pressure reducing valve

Supervisory Control and Data Acquisition (SCADA) System

The City upgraded the water distribution system SCADA system in 1999. The SCADA system monitors reservoir levels, pump operating status, and local pressures throughout the system. The central computer system for the human-machine interface is located at the water treatment plant.

SYSTEM CAPACITY LIMITATIONS

The capacity of the Grants Pass water system is dependent on three components: the supply source, permitted water rights, and the water supply infrastructure. The limitations of each of these components are discussed in the following sections.

Rogue River Supply Capacity

As noted earlier, the large size of the watershed drained by the Rogue River typically provides abundant water supplies throughout the year. Even during extreme dry weather periods when river flows are at their lowest, the reliable flow rate in the Rogue River far exceeds present and projected future water demands. Identified, but undefined factors such as the listing of Coho Salmon under the Endangered Species Act may impact the amount of water available to the City in the future.

Permitted Water Rights

The water rights currently held by the City are sufficient for present and future water needs. The City holds a perfected water right of 12.5 cfs and three water right permits totaling 87.5 cfs.

Water Treatment Plant Capacity

The Grants Pass water treatment plant has a rated water treatment capacity of 18 mgd. However, the capacity of the plant is currently limited to 16 mgd by its firm pumping capacity. This limit is only relevant in the event one of the influent pumps is out of service. The available capacity is sufficient to meet current maximum day demand with at least an additional ten percent capacity available. The additional ten percent is necessary to allow for backwashing filters, meeting drinking water quality standards with difficult raw water, or repairing equipment failures.

The existing water treatment plant has ample capacity relative to current demand and will continue to be sufficient for the near term future. This situation allows the City to operate the water plant on a part-time basis even during the current water demand peaks in the summer. An extension of the plant operating hours will forestall the need for treatment capacity expansions. With extended operating hours and a two percent annual water demand growth rate, a plant

expansion will not become necessary until well after the year 2020. Table 2-7 summarizes the treatment plant capacity evaluation for current and build-out demand conditions.

Table 2-7. Water Treatment Plant Capacity Evaluation

Period	Maximum Day Demand, mgd	WTP Capacity Requirement, mgd	Existing WTP Capacity, mgd	Additional WTP Capacity Required, mgd
Current	10	11	18	None
UGB Build-Out	20	22	18	4

Treated Water Storage Capacity

The Grants Pass water distribution system includes eight treated water reservoirs serving five separate pressure zones. The treated water storage reservoirs serve three principal purposes: operational storage to meet diurnal fluctuations, emergency storage, and fire flow storage. The required storage volume for these three purposes is determined individually and then combined to identify the total amount of storage volume required within a given pressure zone and for the overall system. For added reliability, storage is located to allow gravity flow into the pressure zone where it is required. This arrangement eliminates the need for pumping facilities that require a backup power system during power outages. Storage located in higher pressure zones also benefits lower zones by providing a potential source of gravity supply through the addition of pressure reducing stations to the system. The City of Grants Pass maintains the following treated water storage standards for evaluating system capacity:

1. Operational storage equal to 45 percent of maximum day demand for current demand and part-time plant operation. Operational storage equal to 25 percent of maximum day demand for future demand and full-time plant operation.

2. Emergency storage equal to 75 percent of maximum day demand.

3. Fire flow storage based on the largest fire flow requirement in the pressure zone.

Table 2-8 summarizes the evaluation of treated water storage requirements for current demand conditions. The existing system contains an overall treated water storage capacity of 19 million gallons which is ample for overall current levels of demand. The significant volume of storage that is available in the system relative to maximum day demand provides ample operating storage, thus allowing the water treatment plant to effectively operate on a part-time basis without compromising emergency storage or fire flow storage supplies. Existing storage volumes are also sufficient for current demand on a zone-by-zone basis except in Pressure Zone 4 where only 80,000 gallons of storage volume is available. The existing available storage in North Valley is somewhat overstated since only approximately one third of the 1.2 million gallon storage volume available in Reservoir 15 is actually utilized due to limited demand in that portion of the system. Otherwise, the quality of water will degrade due to long-term storage.

Table 2-8. Treated Water Storage Evaluation

Pressure Zone	Current Max Day Demand, mgd	Required Operational Storage, mg	Required Emergency Storage, mg	Required Fire Flow Storage, mg	Required Total Storage, mg	Existing Available Storage, mg
1	7.0	3.2	5.3	0.96	9.4	11.5
2	2.1	0.9	1.6	0.96	3.5	4.3
3	0.6	0.3	0.5	0.24	1.0	2.0
4	0.2	0.1	0.2	0.18	0.5	0.1
NV	0.1	0.1	0.1	0.24	0.4	1.2
Total	10.1	4.5	7.6	2.6	14.7	19.0

Booster Pumping Capacity

There are eleven booster pumping stations in the Grants Pass water distribution system. The booster pumping facility criteria require that pumping stations are able to supply the maximum day demand within all dependent pressure zones over a 24 hour period. This criteria assumes that there is sufficient treated water storage within the pressure zone to meet the operational, emergency, and fire storage criteria and that the pumping station is equipped with a backup energy source of sufficient capacity to operate the pumping plant at its rated capacity. The rated capacity of a pumping station is based on the largest pump being out of service. However, for small pressure zones, the pump station is sized so that it can supply peak hour demand with one pump out of service and includes a redundant pump to meet fire flow requirements.

Based on these criteria, Table 2-9 summarizes the booster pumping capacity evaluation for the water distribution system with current demand levels. The water treatment plant pumping capacity is significantly higher than the system-wide maximum day demand, allowing the pumps to operate on a part-time basis. Table 2-9 includes the New Hope Pump Station, which was recently built to serve Zone 2 developments in the southwest. Although construction is complete, the existing connections to the system and associated demand are currently limited.

Table 2-9. Booster Pumping Capacity Evaluation

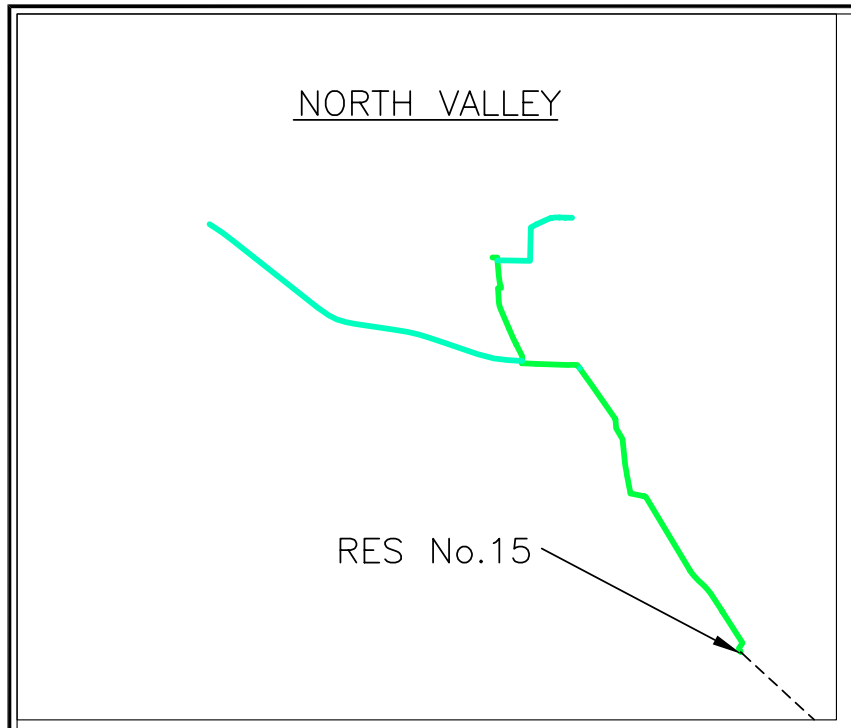
Pump Station	Current[a] Max Day Demand, mgd	Current[a] Max Day Demand, gpm	Existing Pumping Capacity, gpm
Plant[b]	10	6,940	11,100
Lawnridge & Madrone	3.1	2,150	4,500
Champion	1	690	2,400
North Valley	0.1	70	570
Hefley[c]	0.2	140	760
Starlite[d]	0.08	60	960
Hilltop[e]	0.04	30	250
Harbeck Heights[f]	0.04	30	180
New Hope[g]	NA	NA	1,050

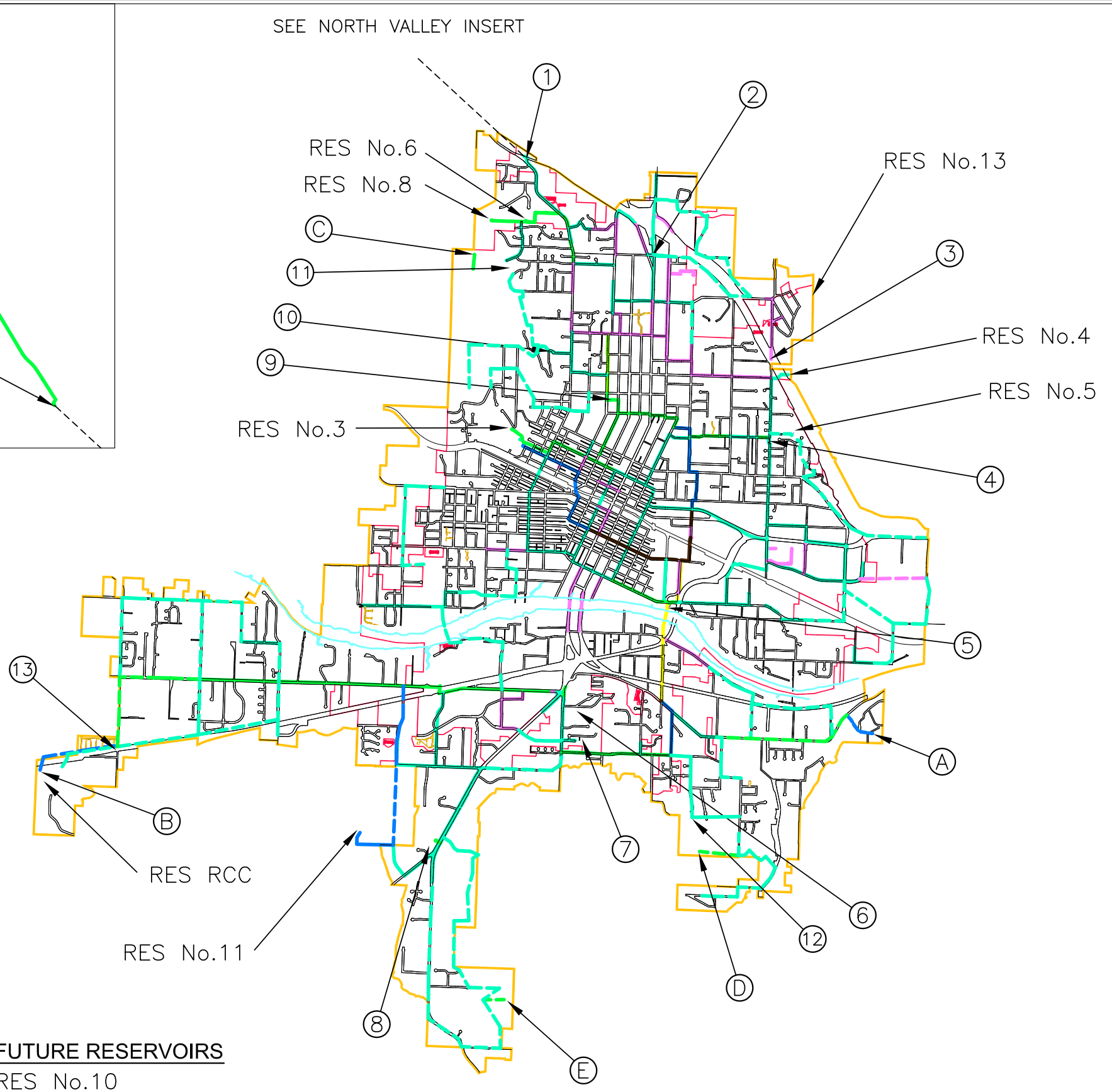
[a]Peak hour demand is used for those stations that serve areas without reservoirs.
[b]Noted capacity is based on plant operator measurement of the firm capacity for the plant effluent pumps. The capacity of the plant influent pumps is 9,600 gpm with one pump out of service.
[c]The Hefley station has two fire flow pumps with a total capacity of 1,200 gpm.
[d]The Starlite station has a fire flow pump with a capacity of 1,050 gpm.
[e]The Hilltop station has a fire flow pump with a capacity of 750 gpm.
[f]The Harbeck station has a fire flow pump with a capacity of 1,200 gpm.
[g]The New Hope station has a fire flow pump with a capacity of 2,000 gpm.

FIGURE 2-1

CITY OF GRANTS PASS

FUTURE
WATER DISTRIBUTION SYSTEM





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SCALE IN FEET

NOTES:

LEGEND:

- FUTURE PIPELINE
- CITY LIMITS
- UGB
- 10”
- 12”
- 14”
- 16”
- 20”
- 24”
- 30”
- 36”

EXISTING PUMP STATIONS

1. NORTH VALLEY/HIGHLAND
2. CHAMPION
3. HEFLEY
4. MADRONE
5. WATER TREATMENT PLANT
6. HILLTOP
7. HARBECK HEIGHTS
8. NEW HOPE
9. LAWNRIDGE
10. STARLITE

FUTURE PUMP STATIONS

11. LAURELRIDGE
12. MEADOW WOOD
13. RCC

FUTURE RESERVOIRS

- A RES No.10
- B RES No.12
- C RES No.14
- D RES No.16
- E RES No.17

WEST YOST & ASSOCIATES

CAD FILE: I:/512-99-08 (GntPasMstrPlan)/SysWater3.dwg CFG FILE: SysWater.PC2 DATE: 6-11-01 VLF

CHAPTER 3

WATER DEMAND

This chapter presents historic water production and water demand data for the City of Grants Pass and provides a basis for estimating future water demand in the community. Additional analysis relates the various measures of water demand (maximum monthly demand, maximum daily demand, and peak hour demand) to the average annual demand through the use of peaking factors.

The projection of future water demand is based on unit demand factors developed by land use type and corresponding customer classifications. These future demand projections provide the basis for assessing the adequacy of the existing water distribution system and planning for future improvements.

POPULATION

The most recent population estimate for the City of Grants Pass is 23,170 according to the Year 2000 National Census report. The 1990 population was 17,503 indicating an annual growth rate of 2.8 percent during the 1990s. Table 3-1 presents the Grants Pass population for 1990 and each of the past six years. This significant increase between 1999 and 2000 is due to the more comprehensive counting techniques used for the 2000 census relative to the estimates prepared by Portland State University in intermediate years.

Table 3-1. Grants Pass Population

Year	Population
1990	17,503
1995	19,660
1996	20,255
1997	20,535
1998	20,590
1999	20,935
2000	23,170

The Population Research Center at Portland State University has observed that the counties of Southern Oregon in general have been experiencing substantial growth during the 1990s. Many communities along the Interstate 5 corridor, including Grants Pass, have experienced steady in-migration. This trend is expected to continue for Southern Oregon in the future.

EXISTING WATER USE

Average, Maximum Month and Maximum Day Use

The Grants Pass Water Treatment Plant operators record water production volumes for each day of operation. Analysis of this data allows for the identification of annual average, maximum month, and maximum day water demand. Table 3-2 presents water production data for the past six years.

Table 3-2. Average, Maximum Month, Maximum Day Water Use

Year	Average Day, mgd	Maximum Month, mgd	Maximum Day, mgd	Peaking Factors	
				Maximum Month	Maximum Day
1995	3.73	6.48	8.32	1.74	2.23
1996	4.11	7.22	9.09	1.76	2.21
1997	3.97	6.20	8.83	1.72	2.22
1998	4.17	7.62	9.47	1.83	2.27
1999	4.50	7.79	9.35	1.73	2.08
2000	4.45	7.82	9.73	1.76	2.18
Average	--	--	--	1.76	2.20

Per Capita Water Demand

Per capita demand is a useful measure of household consumption of water. Table 3-3 presents the population for Grants Pass along with the average annual demand during the past six years, which allows for calculation of the average demand in gallons per capita per day (gpcd). Ranging from 190 to 215, the average daily water demand is 200 gpcd. This figure does not take into account water users outside the city limits, for which data is not readily available. Inclusion of these numbers would slightly decrease the per capita usage rate.

Table 3-3. Grants Pass Water Use for 1995 to 2000, gpcd

Year	Population[a]	Average Demand, mgd	Average Demand[b], gpcd
1995	19,660	3.73	190
1996	20,255	4.11	203
1997	20,535	3.97	193
1998	20,590	4.17	203
1999	20,935	4.50	215
2000	23,170	4.45	191
Average	--	--	200

[a]Includes City of Grants Pass population only.
[b]Demands include all uses, including residential, commercial, industrial, public/institutional, and unaccounted for water.

Unaccounted for Water

All water distribution systems experience losses of water during transmission from the treatment plant to the end user. These losses, known as unaccounted for water, result from many situations including unmetered customers, transmission system leaks, main breaks, faulty meters, fire fighting activities, system flushing, and other miscellaneous hydrant uses. Thus, the total volume of water metered for all end users is always somewhat less than the volume of water produced at the water treatment plant.

Since the City of Grants Pass meters water use for all customers, a comparison of water billing records and water treatment plant production data provides a good estimate of the volume of unaccounted for water in the system. Table 3-4 shows the estimated volume of unaccounted for water in millions of gallons and also as a percentage of total production during the past three years. Based on industry standards, a water loss rate of 10 to 15 percent is considered good and the City's loss rate indicates that the distribution system is in good condition.

Table 3-4. Unaccounted for Water; 1998 -2000

Year	Million Gallons	Percent of Total Water Production
1998	146	9.6
1999	190	11.6
2000	177	10.9

DESCRIPTION OF CUSTOMERS SERVED

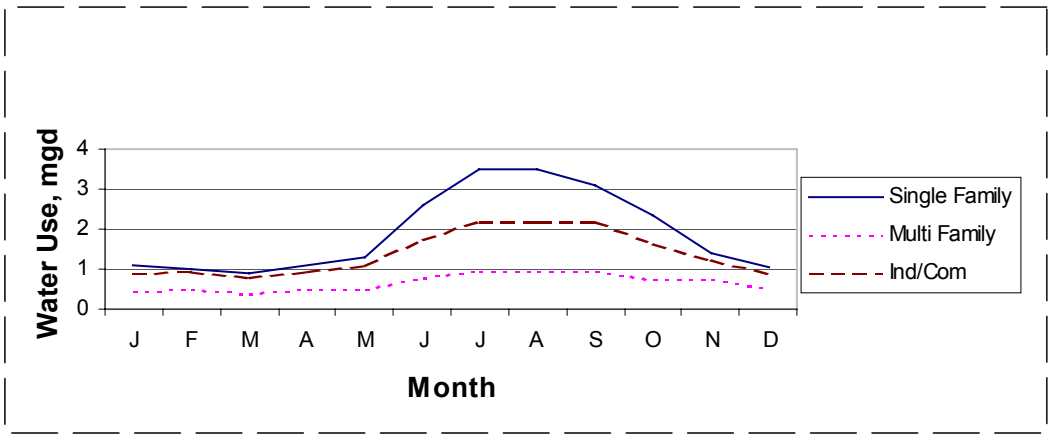
Water Demand by Customer Classification

Water demand related to customer class provides information as to the characteristics of water demand in the community and help to determine where conservation efforts would be most effective. Based on historical billing data provided by the City's Utilities Department for 1998 and 1999, Table 3-5 shows average water demand within three customer classifications: commercial, single family residential, and multi-family residential. There are 1000 commercial accounts, 3175 multi-family accounts and 6027 residential accounts. The commercial classification includes general business, industrial, institutional, and governmental-public land use categories. Single- and multi-family residential users consume 64 percent of the water in Grants Pass. The City serves a few industrial users each with consumptive water use comparable to commercial users. Seasonal demand for each of these three classifications is shown in Figure 3-1.

Table 3-5. Water Use by Customer Classification

	Demand (mgd)			
	Commercial	Multi-Family Residential	Single-Family Residential	Total
1998 Annual Average	1.36	0.61	1.80	3.77
1999 Annual Average	1.40	0.67	1.91	3.98
Average	1.38	0.64	1.86	3.88
Percent of Total Demand	36	16	48	100

Figure 3-1. Seasonal Water Use by Customer Classification*



* Based on 1999 records

Water Demand by Land Use

To develop a unit demand factor for the three different land use patterns, in Grants Pass, the water demand data presented in Table 3-5 is combined with estimated areas for each land use classification. The resulting demand by land use is shown in Table 3-6 and provides the basis for projecting future water demand.

Table 3-6. Unit Demand by Land Use

Land Use	1999 Average Demand[a], mgd	Land Use Area, Acres	Average Unit Demand, gal/acre day
Commercial/Industrial/Public	1.56	1,146	1,400
Multi-Family Residential	0.75	435	1,700
Single Family Residential	2.13	1,977	1,100

[a]The 1999 average demand is based on billing records plus an additional 11.6 percent to reflect unaccounted for water.

SYSTEM INTERCONNECTIONS

The City supplies water to two areas outside City boundary through agreements with Josephine County. Through the first agreement, the County constructed a 16-inch water line and reservoir (Reservoir 15) to serve North Valley. The City has exclusive operating rights to the system and will eventually assume ownership of the infrastructure. A copy of the agreement is included in Appendix B.

The City also supplies water to an urbanizing area known as Redwood, outside of the southwest City boundary. Under an agreement with the County, the City administers the planning process in the area. As the area develops, areas that are currently served by wells will be connected to the City water system. A copy of this agreement is included in Appendix C.

CHAPTER 4

WATER CONSERVATION MEASURES

Conservation of resources, including water, is a value that is traditionally held by Oregonians. It is consistent with our respect for natural resources and our shared sense of environmental stewardship. In keeping with this philosophy and in accordance with OAR 690-086-0140, the City is considering feasibility and applicability of the following water conservation measures:

Table 4-1. Water Conservation Measures (WCM) To Be Considered

WCM	Description
1	A system-wide leak repair program or line replacement to reduce system leakage to 10 percent (since system leakage is less than 15 percent).
2	Programs to encourage low water use landscaping.
3	Incentive programs to encourage conservation.
4	Retrofitting or replacement of existing inefficient water-using fixtures.
5	Adoption of rate structures that support and encourage water conservation.
6	Water reuse opportunities.

Further, the City is required to develop an implementation schedule for the following conservation measures:

Table 4-2. Water Conservation Measures To Be Implemented

WCM	Description
7	An annual audit of all water supplied.
8	If the system is not fully metered, a program to install meters on all unmetered water service connections. The program must begin immediately after the plan is approved and must identify the number of meters to be installed each year with full metering compliance within five years.
9	A regularly scheduled program for leak detection for the transmission and distribution system.
10	A meter testing and maintenance program.
11	A public education program on efficient water use.
12	Any other conservation measures that would improve water use efficiency.

EXISTING CITY MEASURES

While the City has not previously submitted a Water Management Plan, the City has implemented several water conservation measures. Many of the existing programs are consistent with the water conservation measures listed in Tables 4-1 and 4-2. Table 4-3 lists the City's

existing water conservation programs and shows how they conform to the state's list of recommended and required water conservation measures.

Table 4-3. Grants Pass Existing Water Conservation Programs

WCM	Existing Programs
1	The City has a 24-hour emergency number where residents can call to report a water leak during non-business hours.
3	The City has a fully metered system so that all users pay for their water consumption. System development charges (SDCs) are based on meter size. In addition, separate metering for indoor and outdoor use is available for commercial and industrial customers.
4	The City enforces compliance with state regulations.
6	Treated effluent (non-potable) water, rather than potable city water, is used at the wastewater treatment plant where feasible on all new fixtures.
7	The City currently provides an annual accounting of water in compliance with the measurement standards in OAR 690, Division 85. The City meters water as it is diverted and as it leaves the water treatment plant and compares that with metered uses. The City tracks usage by category such as residential, industrial, commercial, and multi-family.
8	All service connections are metered.
9	Staff currently walks the lower elevation portions of the water system annually during flushing activities. Staff and citizens report approximately six leaks per year. Leaks are repaired immediately upon notification. For customer leaks, the City's finance system automatically generates work orders so that customers whose usage is substantially higher than the previous billing period are notified of the possibility of a leak. As an incentive for timely repair, the City forgives 50 percent of the bill over and above normal usage.
10	The City has standardized on Neptune and Badger meters with 15-year warranties. Staff has recently completed replacing older Neptune and Badger residential meters with the new meters. As the meters approach their warranty life, staff will randomly test hundreds of meters. This practice, when conducted in the past, showed that less than 1 percent of the meters are faulty; replacement of the faulty meters is a key component to the City's low unaccounted for water rate. Should a meter fail, the City's finance system automatically generates work orders for meter checks where usage is substantially lower than the previous billing period so that faulty meters can be replaced quickly. The City is currently replacing existing compound commercial meters with Metron single jet meters, which staff has found to be more dependable.
11	The City currently distributes water conservation pamphlets in water bills annually. In addition, conservation information is distributed in the annual Consumer Confidence Report and in the spring City newsletter. Examples are included in Appendix D.
12	To provide accountability for bulk water users, the City has a bulk water dispensing station at the Hillcrest Fire Station. In addition, the City has six 3-inch hydrant flow meters for use by area contractors.

EVALUATION OF ADDITIONAL CONSERVATION MEASURES

The water conservation screening process began with a review of the available literature and Water Management Plans from other Oregon communities. A complete bibliography is given in Chapter 8. From this review, a list of water conservation measures was developed. The list included the following:

- Offer rebates for costs of replacement of lawns with alternative landscaping
- Offer rebates for installation of drip irrigation systems for shrub or tree areas and automatic timers or controllers for turf areas
- Offer rebates for water efficient appliances
- Require water efficient landscaping in the plan approval process
- Construct a water-efficient demonstration garden
- Institute a residential audit program beginning with those single- and multi-family users with the highest consumption
- Distribute free Plumbing Fixture Check-up Kits
- Distribute free low flow shower heads and faucet aerators
- Offer rebates for ultra-low flow toilets
- Retrofit public facilities
- Adopt rates that support and encourage water conservation
- Backwash water treatment filters with untreated water
- Use treated wastewater effluent for irrigation of public areas
- Install additional bulk water dispensing stations to reduce unauthorized users
- Hire a firm to electronically detect system leaks
- Prohibit the wasting of water

These measures were qualitatively evaluated based on the following criteria:

- **Projected Water Savings** – Water savings depend on the applicability of the program to the water market. For Grants Pass, residential is the single highest water use category so programs that focus on residential conservation will likely be the most effective. Savings also depend on user participation and the volume of water saved per participant. Savings are also defined as the relative water savings compared to the estimated cost of implementation.
- **Supplier Cost –** The cost of the measure includes the City's cost to start up, operate, and maintain the conservation program. It may also include additional cost to the consumer in higher rates or reduced cost in water savings and rebates. Costs were estimated based on information from manufacturers, estimated staffing cost, and other communities' experiences.

- **Political Feasibility and Legal Constraints** – The compatibility of the measure with the local political situation is necessary to consider in the evaluation of a measure. Legal constraints may include conflicts with existing City or State regulations.
- **Consistency with Community Values –** For a measure to be successful, it must be compatible with community-held values. For example, users may participate willingly in a measure to do their part for the community and environment or they may see it as an inconvenience or reduction in service. Consistency with community values was determined by discussions with City leaders and staff.
- **Environmental Impacts –** Measures may have direct or indirect environmental impacts, such as energy conservation, associated with them.

Two measures were dropped from consideration before the initial screening because they were not feasible. The measure that would require using untreated water to backwash filters was eliminated because it will threaten public health given the design of the water treatment process. The measure that would require using treated wastewater to irrigate public areas is not feasible because the City's wastewater treatment plant does not produce effluent of a quality that meets the standards for reuse of wastewater, OAR 340-55.

Table 4-4 shows the result of the preliminary screening of the remaining water conservation alternatives.

Of the thirteen measures that were screened, five resulted in an unfavorable rating. Two of the unfavorable measures involved sizable rebates. These measures were judged as too costly relative to the water savings.

The measure that would require water-efficient landscapes through the planning approval process is not feasible immediately. The City recently completed the lengthy process of updating their code; the update did not include conservation landscaping. However, the code is updated periodically and landscaping conservation requirements will be included in a future update.

The fourth measure receiving an unfavorable rating involved hiring a consultant to electronically detect leaks in the transmission system. The City's unaccounted for water rate for 2000 was 10.6 percent. Since this includes system flushing and fire fighting as well as leakage, it is certain that the leakage rate is below the 10 percent goal established by the State. Further, the City's capital improvement program already includes replacement of the City's oldest pipes, which are the most likely to leak. Therefore, the benefit from this measure was seen as minimal and it was dropped from further consideration.

Last, since public facilities are small, retrofitting them was determined to be too costly for the actual water that would be saved. They will be retrofitted per the state regulations as fixtures are replaced during regular maintenance and any new construction will comply with state regulations for low flow fixtures.

The two measures receiving neutral ratings were rebates for efficient irrigation systems and residential audits. These measures can be considered in more detail in the future if the top-rated measures do not provide expected results or if it is determined that additional measures are necessary.

Six measures received a favorable rating and were subjected to a detailed cost/benefit analysis. These measures are described in the following section.

Table 4-4. Initial Water Conservation Program Screening

Program	Water Savings	Supplier Cost	Political/Legal Feasibility	Community Values	Environmental Impacts	Summary
Rebate for lawn replacement	●	○	○	○	⊖	○
Rebate for efficient irrigation systems	●	○	○	●	●	⊖
Require water efficient landscapes	●	⊖	○	○	○	○
Construct demonstration garden	⊖	●	●	●	⊖	●
Conduct residential audits	○	⊖	⊖	○	⊖	⊖
Distribute plumbing fix-up kits	⊖	⊖	●	●	●	●
Rebates for shower heads and faucet aerators	●	⊖	⊖	●	●	●
Rebates for ultra-low flow toilets	⊖	○	○	○	●	○
Retrofit public facilities	○	○	●	●	○	○
Adopt rates to encourage conservation	●	●	⊖	⊖	●	●
Install additional bulk water dispensers	●	⊖	●	●	●	●
Hire a firm to electronically detect leaks	○	○	⊖	○	⊖	○
Implement a water waste prohibition	⊖	●	⊖	●	●	●

● = favorable; ⊖ = neutral; ○ = unfavorable

Description of Measures

Additional Bulk Water Dispensing Stations. Although this measure is not strictly a conservation measure in that it does not reduce water use, it is important in reducing the quantity of unaccounted-for water in the system. Installing bulk water dispensers where water use would be metered and sold for a nominal fee would reduce unauthorized use of water. The City proposes installing up to three stations. For the analysis, it was assumed that water would be sold for an amount that would cover the operation of the stations. The cost of producing the water, $0.04/100 gallons according to City staff, was income previously lost and would be recouped to pay back the capital cost of the stations.

Inverted Block Water Rates. Currently the City has a uniform water rate. Customers are charged a flat monthly rate for the first 500 cubic feet of water and a flat commodity charge by customer class for water over and above 500 cubic feet. A surcharge is added for higher pressure zones. The City's Bill Equalizer Payment Plan allows residents to pay an average monthly rate year round. While this allows residents to more easily budget for their utility bills, it does not encourage conservation, particularly in the high-use summer months. An inverted block rate would establish increasing prices for successive consumption blocks. This rate structure will effectively reduce summer usage and if the rate is structured correctly, maintain current levels of water department funding.

Low Water Use Demonstration Garden. The City proposes constructing a demonstration garden at the water treatment plant. The garden would showcase drought tolerant plants and efficient irrigation practices and equipment. With the garden, literature would be made available to further educate citizens on the advantages of low water use landscaping.

Distribute Plumbing Kits. Plumbing kits are available for distribution to single- and multi-family residential customers. For this analysis, it was assumed that over a period of two years, the City would distribute up to 1,500 plumbing kits to residents who requested them. The plumbing kits would include a low flow showerhead, a faucet aerator, and dye tablets to detect leaks. According to literature, the kits will reduce indoor water use up to 12.5 gpcd in the households where they are installed.

Fixture Rebates. As a follow-up program to the plumbing kit distribution, the City could offer rebates for low flow showerheads and faucet aerators. The City could initiate the program by itself, or in partnership with the power utility. It was assumed for this analysis that the program would be operated by the City and that 100 of the showerheads and aerators would be sold. Pacific Power and Light recently offered rebates on plumbing fixtures along with high-efficiency light bulbs.

Water Waste Prohibition. This measure has no capital cost associated with it; nor does it have a definable water savings associated with implementation. However, implementation of this measure is important because it defines the City's values as to the use of water as a limited resource. It is therefore included as a proposed water conservation measure. The measure would consist of passing an ordinance with a specific enforcement component.

Basis of Analysis

For each measure listed in this section, an estimate was made of implementation costs and the amount of water that would be conserved. The estimated amount of water conserved was based on the experiences of similar programs cited in the available literature. The financial benefit of implementing each measure could be calculated as the reduced operation cost to produce the water and delayed or eliminated capital projects due to lower water use. However, the reduced operation cost is offset by revenue lost by not selling the water (with the exception of the bulk water dispensing station). In addition, the capital projects listed in the Grants Pass Distribution System Water Master Plan are related to growth and system performance and would not be affected by reduced water consumption. Therefore, the programs were evaluated strictly on their cost per unit of water saved.

Analysis Results

Table 4-5 summarizes the estimated cost for each 100 gallons of water saved for the proposed conservation measures.

Table 4-5. Conservation Measure Analysis Summary

Measure	$/100 gallons saved
Bulk Water Dispensing Stations	0.16
Inverted Block Water Rates	0
Low Water Use Demonstration Garden	0.10
Distribute Plumbing Kits	0.10
Showerhead and Faucet Aerator Rebates	0.29
Water Waste Prohibition	0

Table 4-5 shows that implementing new water rates to discourage high water use is the most cost-effective conservation measure. The demonstration garden, plumbing kit distribution, and bulk water dispensing stations are moderately affordable and the rebate for showerheads and faucet aerators is the most expensive conservation measure considered.

RECOMMENDED CONSERVATION MEASURES

As a result of the evaluation described above, five conservation measures are recommended for implementation. Table 4-6 presents the results of the evaluation along with the State's WCM category for each measure:

Table 4-6. Water Conservation Program Recommendations

WCM Category	Program Description	Recommendation
12	Additional Bulk Water Dispensing Stations	Recommended
5	Inverted Block Water Rates	Recommended
2, 11	Low Water Use Demonstration Garden	Recommended
4	Distribute Plumbing Kits	Recommended
4	Showerhead and Faucet Aerator Rebates	Not Recommended
12	Water Waste Prohibition	Recommended

IMPLEMENTATION SCHEDULE

Table 4-7 shows an implementation schedule for the recommended conservation programs. The schedule shows that three measures (a new water rate structure, a water waste prohibition, and bulk water dispensing stations) be implemented immediately and that the remaining programs be implemented in following years.

Table 4-7. Recommended Conservation Program Implementation Schedule

Program Description	Implementation Schedule
Additional Bulk Water Dispensing Stations	2001
Inverted Block Water Rates	2001
Low Water Use Demonstration Garden	2002
Distribute Plumbing Kits	2003
Water Waste Prohibition	2001

CHAPTER 5

WATER CURTAILMENT PLAN

OAR 690-086 requires that the Water Management Plan include a description of water supply deficiencies that have occurred within the last 10 years and a discussion of the ability of the water supplier to maintain delivery during long-term drought or short-term shortages. Also required is a water curtailment plan that includes a list of three or more stages of alert for potential shortage or water service difficulties, a description of predetermined levels of severity of shortage or water service difficulties that would trigger curtailment actions under each stage of alert, and a list of specific standby water use curtailment actions for each stage of alert.

The City has an existing water curtailment ordinance, Section 8.04.070, Emergency Water Conservation Procedures. The ordinance authorizes the Mayor to declare a water conservation emergency and gives the City Manager or his designee the authority to implement a water conservation program. The ordinance outlines conditions under which an emergency could be declared and lists measures that could be implemented to reduce water consumption. To comply with OAR 690-086, the existing ordinance will be repealed and a new ordinance will be implemented to conform to the stages of alert and definitions of triggers outlined in the plan. A copy of the new ordinance is included as Appendix E.

FREQUENCY AND MAGNITUDE OF SUPPLY DEFICIENCIES

There have been no supply deficiencies over the last 10 years. The City's source, the Rogue River, provides ample supply even in the driest conditions according to historical flow data. Water production is limited to 18 mgd by the capacity of the water treatment plant, which is much higher than current levels of demand. Peak day use in 2000 was 9.7 mgd, just 54 percent of the plant capacity. Available storage in the existing distribution system is summarized in Table 5-1.

Table 5-1. Available Storage

Type of Storage	Available Storage, mg
Operational	6.5
Emergency	9.9
Fire Flow	2.6
Total	19.0

Since Grants Pass relies solely on the Rogue River for its supply, the City is vulnerable to contamination of the river. It is estimated that it would take three days for a contaminant plume to pass the City's intake or for the treatment process be modified to neutralize the contaminant. Emergency storage will provide three days of storage if demand is reduced to about 70 percent of

the annual average demand, which is achievable with restrictions. The storage would last even longer if use were restricted to essential needs only.

CURTAILMENT TRIGGERS

Although the City has been fortunate not to have experienced a water shortage, the potential exists for a situation where the water supply cannot meet demand for a time. The shortage could be City-wide due to source contamination, treatment difficulties, prolonged drought, pumping, or transmission problems. The shortage could be localized to a pressure zone due to distribution, pumping, or storage problems. Whatever the situation, the City will be well served to have in place a curtailment plan that defines levels of water shortage severity and mechanisms for dealing with the situation.

The City will institute three levels of water supply alert. The alert levels and their operational triggers are summarized in Table 5-2.

Table 5-2. Water Shortage Alert Levels and Triggers

Alert Level	Description	Trigger
One	Potential Water Supply Shortage	A serious drought condition is occurring or is likely to occur in the region or Rogue River flow rates are measured or projected to be below a 1-in-10 year low flow level, or the County or State has declared a drought condition.
Two	Water Supply Shortage	The City's ability to deliver water is not adequate to meet demand due to supply, treatment, or pumping restrictions, or extended treatment plant operation is required and storage cannot be maintained.
Three	Critical Water Supply Shortage	The supply is interrupted.

CURTAILMENT ACTIONS

For each level of alert, actions appropriate to the situation will be implemented to curtail water consumption. The following sections identify curtailment actions for the different alert levels.

Level One Alert – Potential Water Supply Shortage

The City Manager has the authority to activate some or all of the following voluntary curtailment actions listed below until the reasons for a Level One Alert have passed:

1) Restrict watering based on odd/even address numbers for residential and business customers, and governmental agencies. No watering will be allowed on Wednesdays. The schedule will apply to all lawn watering and all nonessential

water uses with exceptions as specified by the Manager. Watering hours will be restricted to before 6 a.m. and after 9 p.m.

2) Distribute brochures regarding conservation measures.
3) Implement a media outreach program.
4) Notify major water users asking for reductions in use or moving nonessential use to off-peak hours.
5) Cease operation of non-recirculating fountains.
6) Restrict hydrant and water line flushing.

Level Two Alert – Water Supply Shortage

The City Manager has the authority to mandate any or all of the following actions until the reasons for the Level Two Alert have passed:

1) Any Level One Alert actions.
2) No watering or lawn irrigation will occur unless the following specific uses are approved by the City Manager:
   a) New lawn, grass, or turf that has been seeded or sodded after March 1 of the current calendar year
   b) Athletic fields frequently used for organized play
   c) Golf course tees and greens
   d) Park and recreation areas of particular value to the community
3) City water will not be used to clean, fill, or maintain levels in decorative fountains.
4) City water will not be used to clean sidewalks, walkways, streets, driveways, parking lots, or other hard surfaces except where necessary for public health and safety.
5) City water will not be used to wash vehicles including automobiles, trucks, trailers, trailer houses, motorcycles, boats, or other type of mobile equipment.
6) Limitations may be placed on industrial and commercial water consumption.
7) Hydrant and water main flushing will be done in emergencies only.

Level Three Alert – Critical Water Supply Shortage

The City Manager has the authority to mandate any or all of the following actions until the reasons for the Level Three Alert have passed.

1) Any Level One Alert actions.
2) Any Level Two Alert actions.

3) No City water will be used for watering of landscaping or irrigating of lawns, grass, turf, athletic fields, golf course tees and greens, or parks and recreation areas.
4) No City water will be used to fill or maintain levels in scenic or recreational ponds and lakes, or other structures making similar use of water.
5) No City water will be used to fill, refill, or add to any swimming pools.
6) No City water will be used to wash the outside of buildings.
7) No City water will be used on construction projects.
8) No City water will be served to restaurant customers unless requested.
9) Residential use will be limited to health and safety uses only.
10) Limitations will be placed on industrial and commercial users up to and including interruption of supply with the exception of health and safety uses only.

CHAPTER 6

LONG RANGE WATER SUPPLY

FUTURE WATER NEEDS

Land use demand factors for the City of Grants Pass were developed using zoning information from the local comprehensive plan and historical water use data. The land use demand factors are shown in Table 3-6. Although the timing of land use development within the UGB is unknown, information is available regarding the current zoning designation for all properties within the UGB. Table 6-1 summarizes the acreage of properties within the UGB according to land use, differentiating between properties that are currently receiving water service and those that will connect to the water distribution system in the future. Using the unit demand factors developed for these land use classifications, the table also projects average annual water demand at the UGB build-out condition. This analysis assumes the existing mix of residential and commercial properties will stay the same in the future.

Table 6-1. Land Use Based Water Demand Projections for UGB Build-Out

Land Use	Existing Acreage	Future Acreage	Total Acreage	Unit Demand, gallons/acre-day	Estimated Average Day Demand, mgd
Commercial	1,146	598	1,744	1,400	2.4
Single-Family Residential	1,977	2,419	4,396	1,100	4.8
Multi-Family Residential	435	440	875	1,700	1.5
Redwood and North Valley[a]					0.8
Total	3,558	3,457	7,015		9.5

[a]North Valley and the Redwood district, portions of which are adjacent to but not currently within the UGB, are expected to continue using Grants Pass water, adding 0.3 and 0.5 mgd, respectively, to the build-out demand.

Grants Pass experienced an annual growth rate of 2.8 percent from 1990 to 2000. The Grants Pass Distribution System Water Master Plan predicted a build-out population of 45,000. Assuming a current population of 23,170 and a conservative consumption rate of 200 gpcd, a straight line projection allows for the interpolation of water requirements for intermediate years 2010 and 2020. Future maximum day demands can be developed using the peaking factor developed in Table 3-2. Future water requirements are summarized in Table 6-2.

Table 6-2. Estimated Future Water Demand

Year	Average Day Demand, mgd	Maximum Day Demand, mgd
2010	6.1	13
2020	8.1	18
Build-out	9.5	21

AVAILABLE SOURCES OF WATER

As discussed in Chapter 2, the Rogue River provides an ample and reliable water supply for the City of Grants Pass as it expands to the limits of its urban growth boundary. The City holds four water rights totaling 87.5 cfs (56.4 mgd). The listing of salmon as an endangered species and long-term climate change potentially may have an effect on the reliable yield of the river in the future. These issues warrant attention, but are ill defined at this time. It can be concluded that the City's supply can meet near and long-term future water needs. Historically, development surrounding the City has relied on groundwater supplies. Wells in the region either have not been reliable or productive or have had groundwater quality issues associated with them which has led to the extension of service by the City. The North Valley system is an example where alternative sources of water were not able to meet development demands.

CHAPTER 7

PLAN UPDATE SCHEDULE

The City will monitor water production and metered sales and report its findings to the Water Resources Department as a part of the annual water use reporting program under OAR 690-85. This report will include a summary of the results of the water conservation measures implemented in the past year and note any significant changes in growth projections, per-capita water use, or community water needs.

The City will update this Water Management Plan five (5) years after it is approved by the Water Resources Department. The update will include recent water consumption data, system improvements, and an evaluation of the effectiveness of the conservation measures implemented as a result of this plan.

CHAPTER 8

REFERENCES

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