Long-Range Water Supply

A Study of Newport's Water Supply and the Potential for Future Regionalization of Water Supplies

City Of Newport, Oregon

June 1997

by

FULLER & MORRIS
Engineering, Inc.

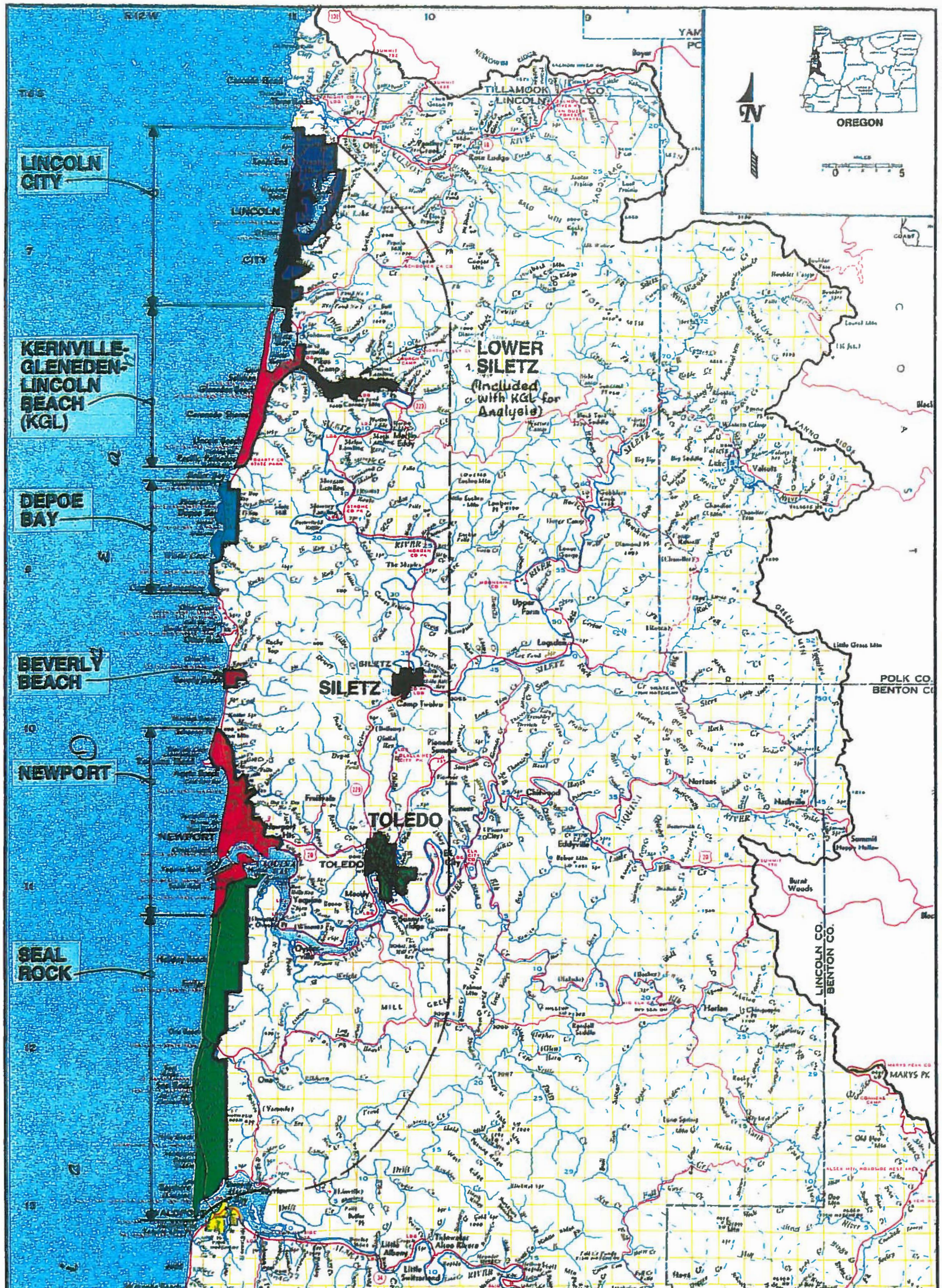
Contents

List of Tables

List of Figures

Abbreviations

A-f	Acre-feet (1 A-f = 0.326 MG)
ADD	Average Daily Demand (mgd) = Annual Demand in MG/365 days
Annual Demand	Total volume of water used in a year (MG)
cfs	cubic feet per second (1 cfs = 0.646 mgd)
gpcd	gallons per capita per day = Annual Demand/population/365 days
MG	million gallons (1 MG = 3.069 A-f)
mgd	million gallons per day (1 mgd = 1.547 cfs)



LEGEND

— — STUDY AREA BOUNDARY

SERVICE AREAS OF THE STATE REGULATED PUBLIC WATER SYSTEMS WITHIN THE STUDY AREA

JUNE 1997

FIGURE 1-1
STUDY AREA
LONG-RANGE WATER SUPPLY STUDY
CITY OF NEWPORT, OREGON

FULLER & MORRIS Engineering, Inc.

Chapter 1
Introduction

Purpose

This study estimates future water needs for Newport and the Study Area shown in Figure 1-1. Concepts for expanding the supply to meet the needs that would not be met from existing water supplies are identified and explained .

The report provides Newport with information to help determine whether or not a regionalized water supply would be in Newport's interest, as well as the basic information necessary to begin intergovernmental discussions on the merits of regionalizing water supplies.

Methods

Projecting more than 5 to 10 years into the future is almost certain to prove inaccurate, but is a necessary exercise for determining the potential magnitude of future requirements for public facilities such as water. Plans developed on the basis of these projections should be reviewed and updated every 10 years or so.

The growth assumptions presented in this report have been compiled from the most up-to-date information available from each community's Master Plans. Water Master Plans necessarily consider the high side of growth potentials for determining demands. It is assumed the demands must be met during drought supply conditions. Planning for this "worst case" is the accepted method to insure against having an inadequate water supply. Consequently, while the population and water demand projections presented in this study may seem high, we believe they constitute a prudent and defensible basis for long-range water supply planning.

Acknowledgements

We appreciate the assistance furnished by the people contacted at the communities and water districts in the Study Area and from state agencies. Their suggestions and contributions were essential to the preparation of this report. Their help is gratefully acknowledged.

Chapter 2

Summary

Data presented in this report indicates the potential magnitude of future water needs by year 2050. Although the actual growth patterns may turn out to be different, growth is occurring and water supplies will become inadequate unless plans are made to expand the supply.

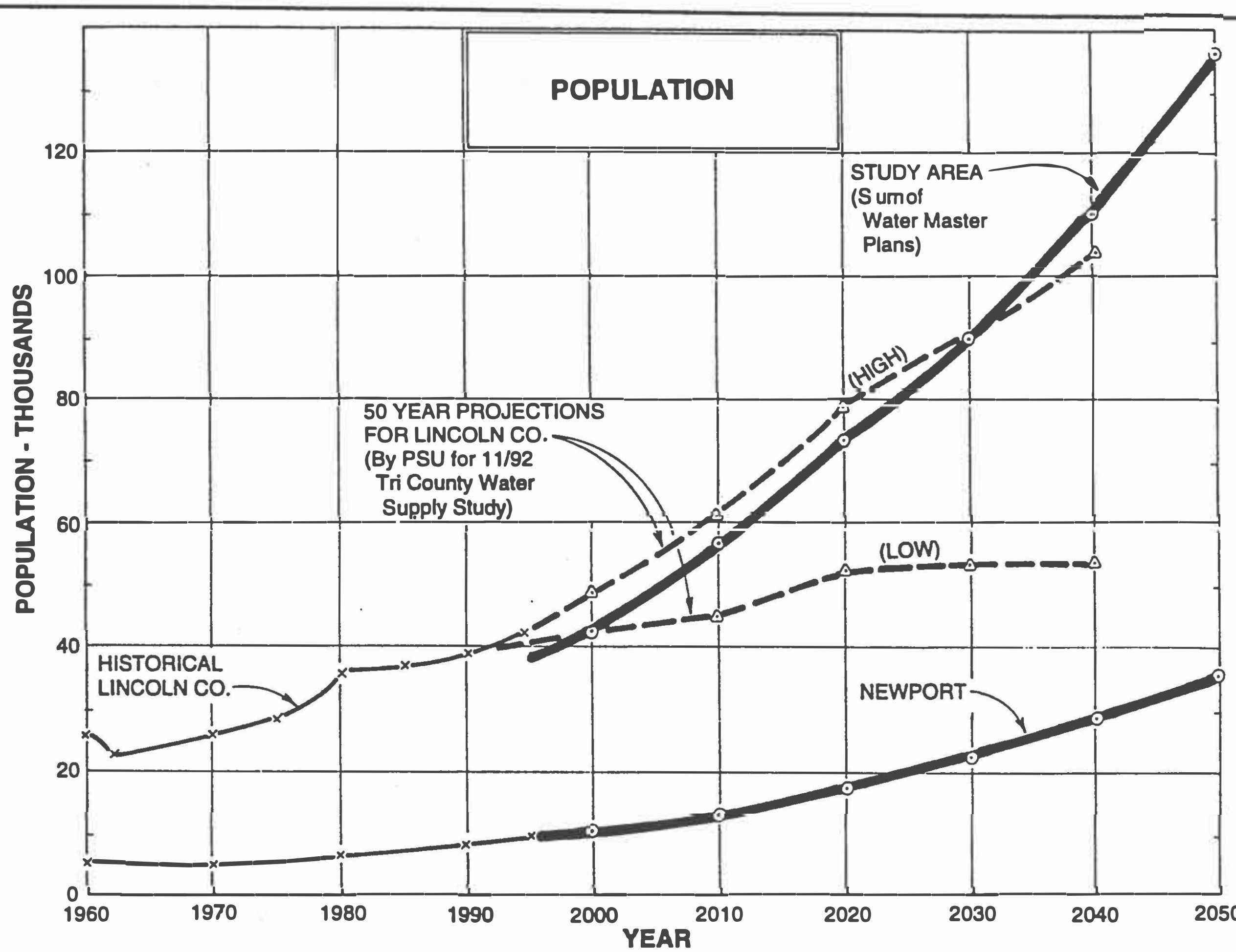
The projected growth would make additional storage for Newport necessary by 2030. If water supplies in the Study Area were managed regionally, the need for additional storage would occur by 2025.

Although three sites have been identified that would meet Newport's needs, and two of those sites would meet the needs of the Study Area, all sites have the potential for environmental issues that could complicate permitting, such as:

- Potential for restoring anadromous fish passage to Rocky Creek (salmon recovery issue).
- Limited or no fish passage potential at a fully developed Big Creek site.
- Impacts of re-regulated stream flow downstream from the Big Rock creek site.

Urgency

As this study developed it became clear that potentially developable sites for additional raw water storage are very limited. The challenges of permitting a dam for construction become greater every year, thus action should be taken as soon as possible to identify the preferred dam site(s) and start the permitting process. The political realities of water resources management in Oregon are that regionalized efforts are considered more favorable. Therefore, it is in the interest of all communities in the Study Area to join forces to secure raw water supplies for the future. If additional action, such as consolidating treatment or service boundaries is desirable, these discussions should take place separately so they do not delay initiating the work to secure a storage site.



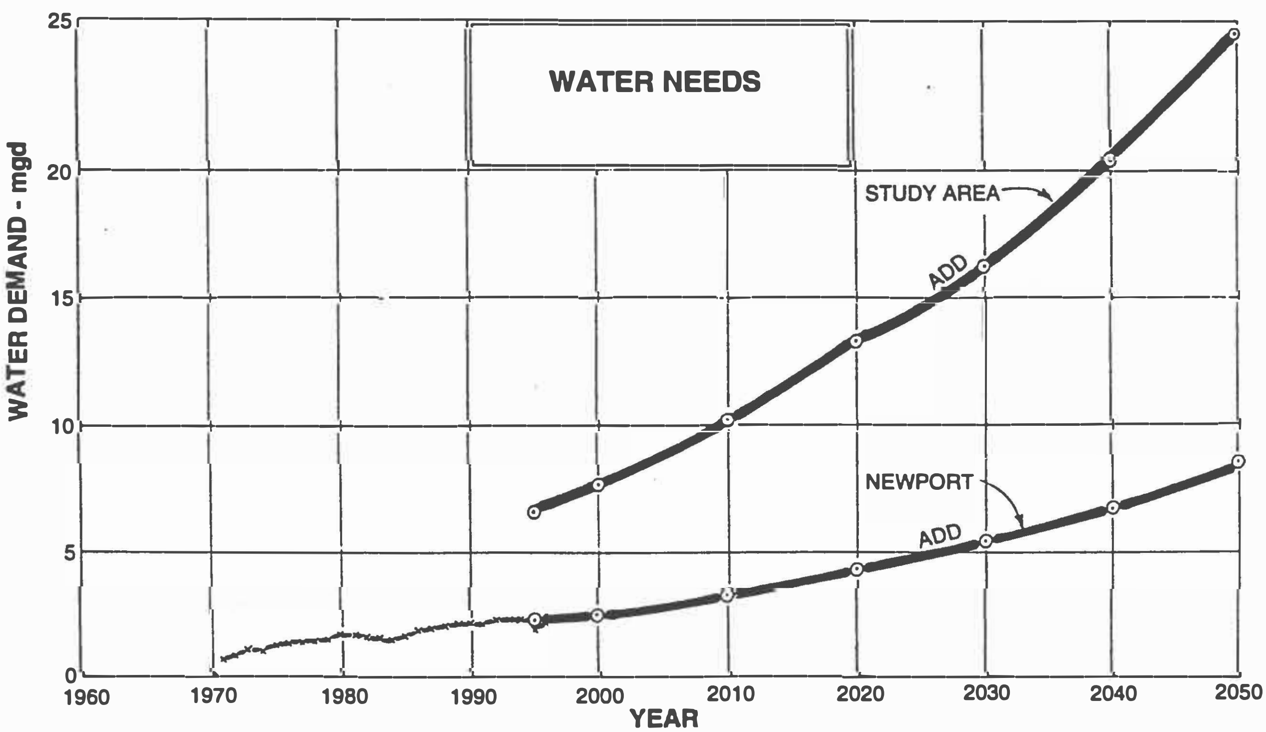


FIGURE 3-1
POPULATION AND WATER NEED PROJECTIONS
LONG-RANGE
WATER SUPPLY STUDY
CITY OF NEWPORT, OREGON

FULLER & MORRIS
Engineering, Inc.

JUNE 1997

Chapter 3

Water Needs

General

Future water needs for Newport and the Study Area have been estimated by applying historical per capita use to population forecasts presented in Comprehensive Plans and Master Plans, or developed by Portland State University Center for Population Research, and the State Office of Economic Analysis. Data from Water Master Plans, when available, took precedence.

The projections for population and water use for this study are shown in Figure 3-1. Information from the individual communities is given on Table 3-1. The following paragraphs explain how the water needs forecast was developed.

Newport

Population

Historical population and water use information for Newport for 1971 through 1996 is shown in Figure 3-2. The population increased by 4,485 in this 25-year period, from 5,300 to 9,785, for an average annual growth rate of 2.48 percent. The Comprehensive Plan annual growth rate of 2.44 percent has been used to project Newport's population through the study period, which results in a 2050 population of 35,800.

Water Use

Figure 3-2 also shows the volume of water used annually over the last 25 years. The annual demand has grown at a greater rate than the population (about 4.2 percent), with intervening years even higher. Total water use is dependent on more factors than just population. These factors include industrial use, weather, tourist populations, changing life styles of permanent residents, and changes in unaccounted-for water. The effect of these other factors can be related to the resident population by calculating the per capita use. The per capita use shows the same general upward trend (Figure 3-2) and has varied between 160 gallons per capita per day (gpcd) and 270 gpcd over the 25 year period. The average for the last 10 years is about 240 gpcd which has been used to forecast the future annual water needs (shown in Figure 3-1).

Table 3-1
Study Area Water Service Data

Study Area Water Services	Service Area (see Figure 1)	Year Incorporated	Service Area Population: 1995	Service Area Population: Master Plan Population
Lincoln City	Lincoln City Urban Growth Boundary including sale to Roads End Water District, plus Pixiland and residence along Schooner Creek.	1965	6,570	1.43% to 5% Annual Growth Rate
Kernville-Gleneden-Lincoln Beach (KGL)	Coastal area from Kernville south to Fogarty Creek, plus sale to Lower Siletz Water District.	--	Est. 5,300	--
Depoe Bay	Coastal area from Boiler Bay south to Cape Foulweather, including sale to Miroco Water District.	1973	1,025	3,302 by 2013
Newport	Newport City Limits except that portion of South Beach still served by Seal Rock.	1882	9,495	2.44% Annual Growth
Seal Rock	Coastal area from Newport south to Alsea Bay.	--	5,192 (1993)	2.8% to 2013 then 1.5% to 2046 for population = 13,993
Siletz	Siletz Urban Growth Boundary including Siletz Indian Tribal lands and Housing Authority developments, plus sale to Camp 12 Water District.	1946	1,454 (1996)	1,961 (2006) 2,475 (2016) 3,870 (2046)
Toledo	Toledo City Limits plus sale to Seal Rock Water District.	1905	3,340	2.51% Annual Growth to 2016 = 5,600±
Other Municipal/ Domestic	There are several small water districts in the unincorporated areas not served by the above entities, including Otter Rock, Carmel Beach, and Beverly Beach.	--	Est. 1,500	None
Major Industrial	G-P mill in Toledo.	Constructed 1958		

NOTES ON WATER SUPPLIES:

*Water rights included in analysis of water supply.

[a]Schooner Cr. is overappropriated. Agreements for 3.88 mgd water right at WTP were to not use upstream intake at Forks. Some of this water may be available on an interim basis until Seid (pronounced "side") Cr. Dam is constructed. Rock Cr. rights are part of discussion for permitting Seid Cr. Dam.

[b]Smaller streams with questionable dry season flow and/or water quality. Not included in analysis of regional supply.

		Water Supplies				
Average Annual Water Use		**Stream Water Rights**		**Raw Water Storage**		
MG	**gpcd**	**Location**	**Priority**	**Q (mgd)**	**Location**	**Volume (MG)**
('90-91) 681.5	235	***Schooner Cr. @ WTP** N&S Fork Schooner Cr. (3)[g] Erickson Cr. Rock Cr. (3)[g] Gordy Cr. (2)[g]	6/8/65 1974 & 73 9/28/34 1947, 49 & 65 1940 & 45	**3.88** 6.78[a] 0.57[b] 1.44[a] 0.64[b]	***Seid Cr.**	**440[c]**
(est. '95) 232.1	120	***Drift Cr.** Drift Cr.	12/10/63 4/3/70	**1.94** 2.58 (Jr)[d]		--
('88) 69.3	90 (plan calls for projecting at 110)	N. Depoe Bay Cr. S. Depoe Bay Cr. Springs ***Rocky Cr.**	8/19/65 10/31/79 6/27/73	0.36[b] 0.32[b] 0.36[b] **2.58[f]**	N. Depoe Bay	<3
('87-96) 720 → 867 (see Figure 3-2)	238	***Siletz R.** ***Big Cr.** ***Blatner Cr.** Nye Cr. Jeffries Cr.	/63 /26 /09 /23 /68	**3.88** **6.46[f]** **0.35[f]** 0.45 0.26	***Big Cr. #1** ***Big Cr. #2**	**65[e]** **316**
('90-'92) 140.6	74	Siletz R. Hill Cr.	2/28/73 10/1/59	1.68 (Jr) 0.26		
('95-'96) 44.9	81 → 91	***Siletz R.** Siletz R. Siletz R. (Siletz Tribes Transfer to City)	8/6/53 12/20/85	**0.16** 0.64 (Jr) 0.17	Tangerman Cr.	<1
('93) 244.5	182	***Siletz R.** ***Siletz R.** Siletz R. ***Mill Cr. (3)[g]**	10/24/29 2/12/37 3/23/79 1911 to 1924	**2.58** **1.13** 2.58 (Jr) **10.18[f]**	Mill Cr.	81
--	--	Not listed[b]				
		Siletz R. (2)[g]	1956 & 63	22.62	Olalla Cr.	1284

[c]Seid Cr. storage right application has been filed with Water Resources. The site has not yet been permitted. It is assumed to be available by year 2010.

[d]Water rights marked '(Jr)' are junior in priority to instream rights and are, therefore, not available for peak season needs during drought conditions and probably not during average dry seasons.

[e]Big Cr. Reservoir #1 is assumed to be phased out of service within 10 to 15 years.

[f]Smaller streams whose flow drops well below the water rights but is still considered important for a regional supply.

[g]Number in parentheses indicates multiple water rights on same stream.

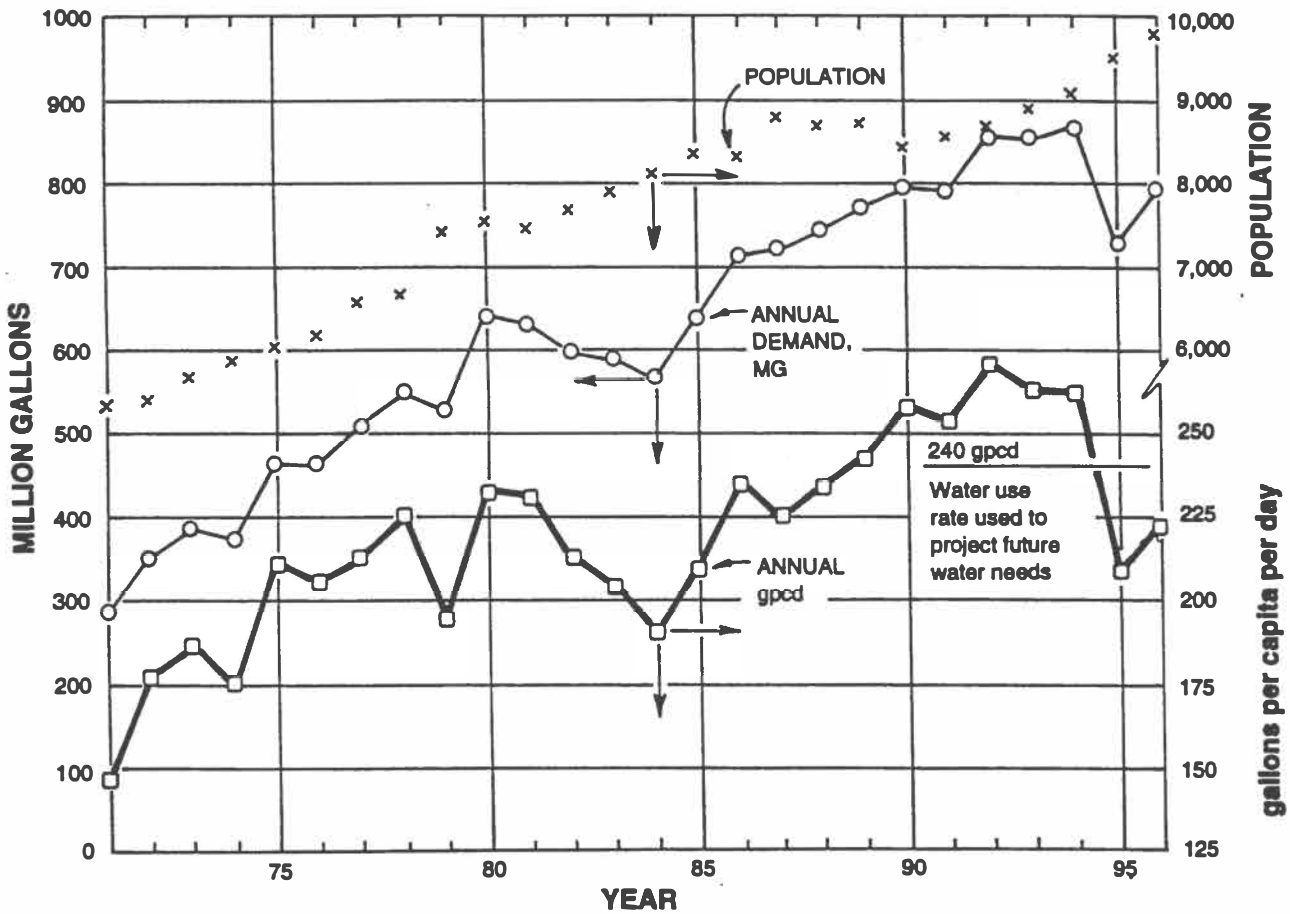


FIGURE 3-2
HISTORICAL
NEWPORT POPULATION AND WATER USE

Study Area

Population

The information to make population projections and forecast water needs for the remainder of the Study Area have been taken from the individual Master Plans and previous studies. In all cases, the projections had to be extended beyond the time period covered by the Master Plans to provide data to year 2050 for this study.

Population growth rates used in the various plans (see Table 3-1) range from a high of 5 percent for Lincoln City (their plan considers the possibility of growth rates from 1.43 percent to 5 percent) to a low of 1.7 percent for Depoe Bay. Table 3-2 shows the growth rate assumptions used for this study. They result in a 2050 Study Area population of 136,000, or about four times the present population.

Table 3-2
Population Forecasts

	Projected Annual Growth Rates	2000	2010	2020	2030	2040	2050
Lincoln City	3% to 2020, then 2.5%	10,677	14,350	19,285	24,686	31,600	40,451
KGL	2.5% to 2020, then 2.0%	5,996	7,676	9,825	11,977	14,600	17,797
Depoe Bay	1.7% to 2020, then 1.5%	2,699	3,194	3,781	4,388	5,092	5,909
Newport	2.44% to 2050	10,737	13,664	17,389	22,129	28,162	35,840
Seal Rock	3.05% to 2020, then 1.5%	6,043	8,161	11,021	12,790	14,843	17,226
Siletz	3.45% to 2020, then 1.5%	1,439	2,020	2,836	3,291	3,819	4,432
Toledo	2.2% to 2020, then 1.5%	3,946	4,905	6,097	7,076	8,212	9,530
Other Unincorporated	3% to 2020, then 1.5%	1,739	2,337	3,141	3,145	4,230	4,909
Total		**43,275**	**56,306**	**73,374**	**89,982**	**110,558**	**136,095**

As a check on the reasonableness of the population forecast, the resulting population density was estimated and compared to the density of existing developments. Assuming all development were to occur within 1 mile of the ocean plus Siletz and Toledo, the density would be about 3,000/square mile (136,100/45). The present population density of municipal developments in the Study Area is in this range; and since the average width of coastal development may very well exceed 1 mile, the projected population does not seem unreasonable. The buildout density of Newport's Urban Growth Boundary as determined for the Waste Water Facility Plan is about 3,350/square mile.

The point of this study is not whether this population will be reached in 50 or 100 years, but that, barring artificial controls, this population will most likely become a reality. It is important to make plans for how to provide water for this eventuality.

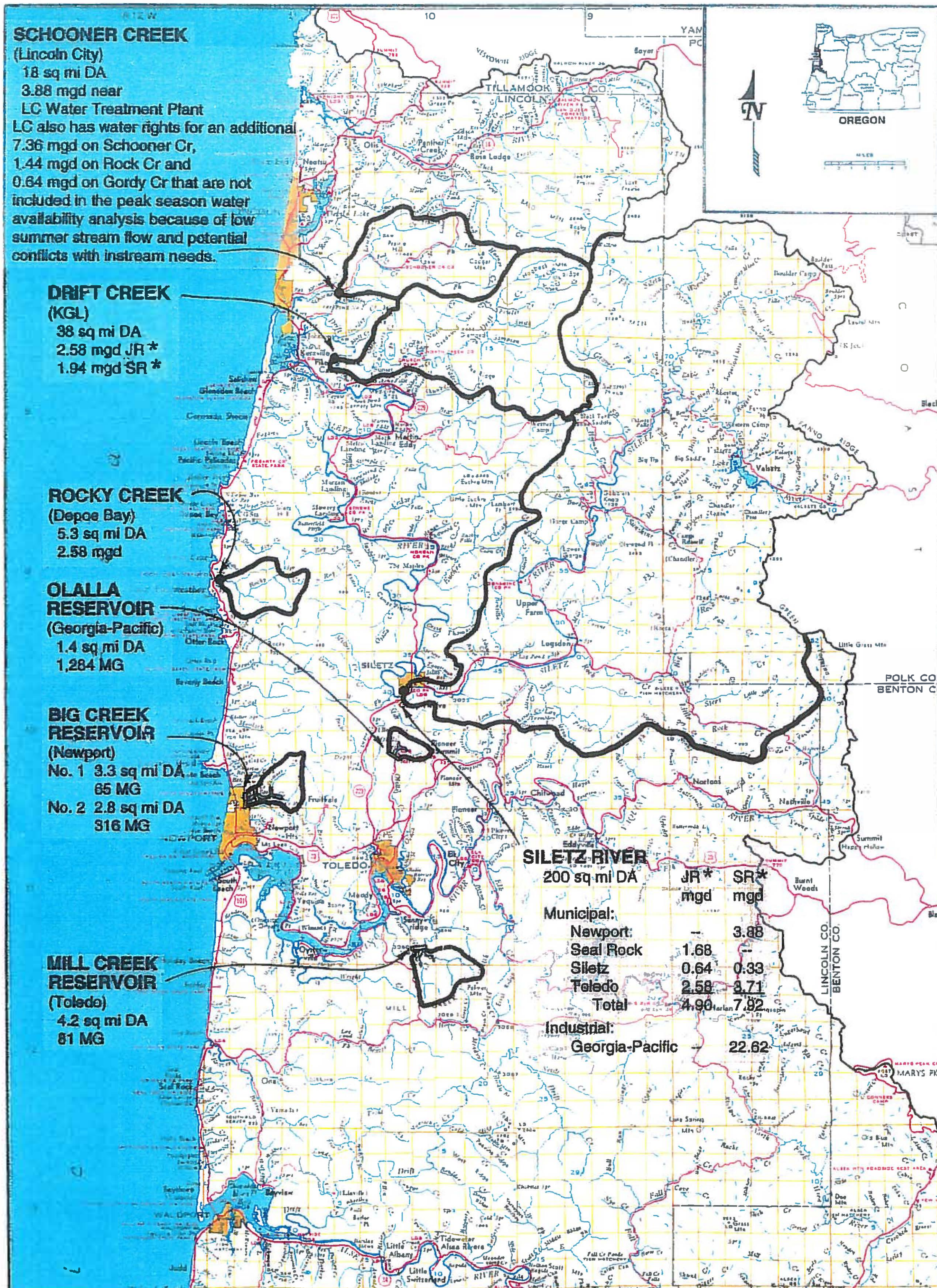
Water Use

The water use patterns vary considerably from community to community, mostly reflecting the degree of development, industrial use, the number of full-time residents and tourist facilities. The historical per capita use ranges from less than 100 gpcd in Seal Rock and Siletz to over 230 gpcd in Newport and Lincoln City. The future water needs are projected using the per capita rates shown on Table 3-3, assuming these rates are constant for the study period.

Table 3-3
Water Need Projection

	Anual Average per Capita Use (gpcd)	Projected Water Needs in mgd					
		2000	**2010**	**2020**	**2030**	**2040**	**2050**
Lincoln City	235	2.51	3.38	4.54	5.81	7.44	9.52
KGL	120	0.72	0.92	1.18	1.44	1.75	2.14
Depoe Bay	110	0.30	0.35	0.42	0.48	0.56	0.65
Newport	240	2.58	3.28	4.17	5.31	6.76	8.60
Seal Rock	100	0.60	0.82	1.10	1.28	1.48	1.72
Siletz	100	0.14	0.20	0.28	0.33	0.38	0.44
Toledo	186	0.73	0.91	1.13	1.32	1.53	1.77
Other Unincorporated	110	0.19	0.26	0.35	0.40	0.47	0.54
Total	**186.5 gpcd** (weighted average)	**7.78**	**10.12**	**13.17**	**16.36**	**20.37**	**25.38**

This may understate the actual growth in water needs because of the historical tendency of the per capita rate to grow. For the purposes of this study, it is assumed that the probable increased per capita use in rural area development will be offset by a corresponding conservation effort in high use areas, especially during the water short years, which are used to determine future needs.



LEGEND

DIVERSION — STREAM/FACILITY (OWNER)
STORAGE — Drainage Area Boundary
Diversion flow in mgd
Storage volume in MG

* PRIORITY OF WATER RIGHTS
JR INSTREAM RIGHTS HAVE PRIORITY
SR WATER RIGHT HAS PRIORITY OVER INSTREAM RIGHTS

JUNE 1997

FIGURE 4-1
SIGNIFICANT MUNICIPAL/INDUSTRIAL WATER RIGHTS
LONG-RANGE WATER SUPPLY STUDY
CITY OF NEWPORT, OREGON

FULLER & MORRIS Engineering, Inc.

Chapter 4

Water Supplies vs. Projected Needs

Raw water supplies for the water purveyors in the Study Area have been classified into two categories (see Figure 4-1 and Table 3-1).

Category 1. Significant and useful as a dry season resource for a regional supply, including:

- Water rights senior to instream water rights, located on streams with significant flow in the dry season.
- Storage rights large enough to contribute to a regional supply. (Arbitrarily set at greater than 100 A-f [30 MG]).

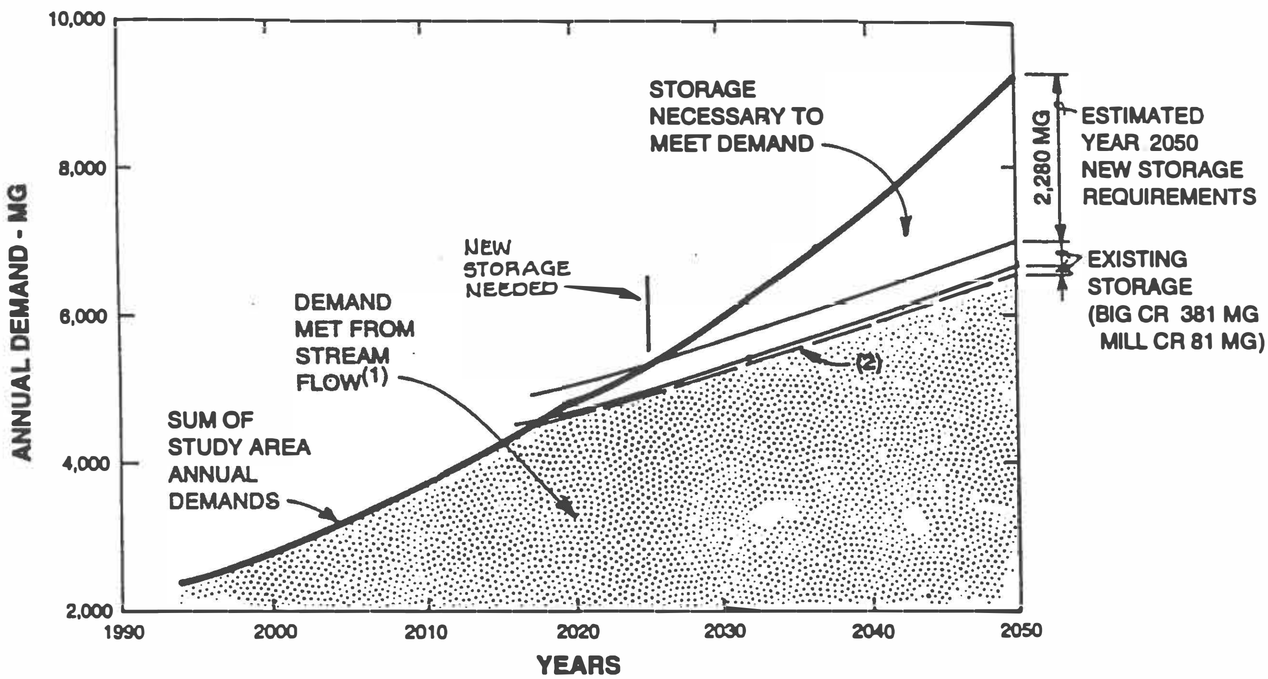
Category 2. Not significant as a dry season resource for a regional supply, including:

- Water rights junior to instream rights; rights on streams that produce minimal flow in the dry season, and/or rights whose use is uncertain due to agreements with resource agencies such as Oregon Department of Fish and Wildlife (ODFW).
- Storage rights less than 100 A-f.

The "significant" existing supply resources (Category 1, above) have been compared to the "demands" of the population projected for each decade through year 2050. This comparison allows defining the point that the existing "supply" falls short of meeting the "need". The magnitude of this shortfall determines the size of the new supply necessary to meet the projected growth of demands.

Existing water supplies for each purveyor are adequate to meet winter demands through the study period, but only Toledo has raw water supplies adequate to meet their projected dry season demands. A comparison of supply and projected annual demand is shown in Figure 4-2. If raw water supplies in Category 1 were managed regionally, new storage would be necessary when the Study Area reaches a population of about 80,000 (year 2025±). Few of the water supply facilities in the Study Area have been developed to make full use of existing water rights. Current system capabilities are shown in Figure 4-3.

The following paragraphs explain how the future water needs for the water districts within the Study Area have been estimated.



NOTES:
1. STREAM FLOW FROM A REGIONALIZED SUPPLY USING CATEGORY 1 WATER RIGHTS AS DEFINED IN CHAPTER 4.
2. MORE DEMANDS CAN BE MET IN THE FUTURE FROM STREAM FLOW BECAUSE OF THE WINTER DEMAND GROWTH THAT CAN BE SUPPLIED FROM STREAM FLOW.

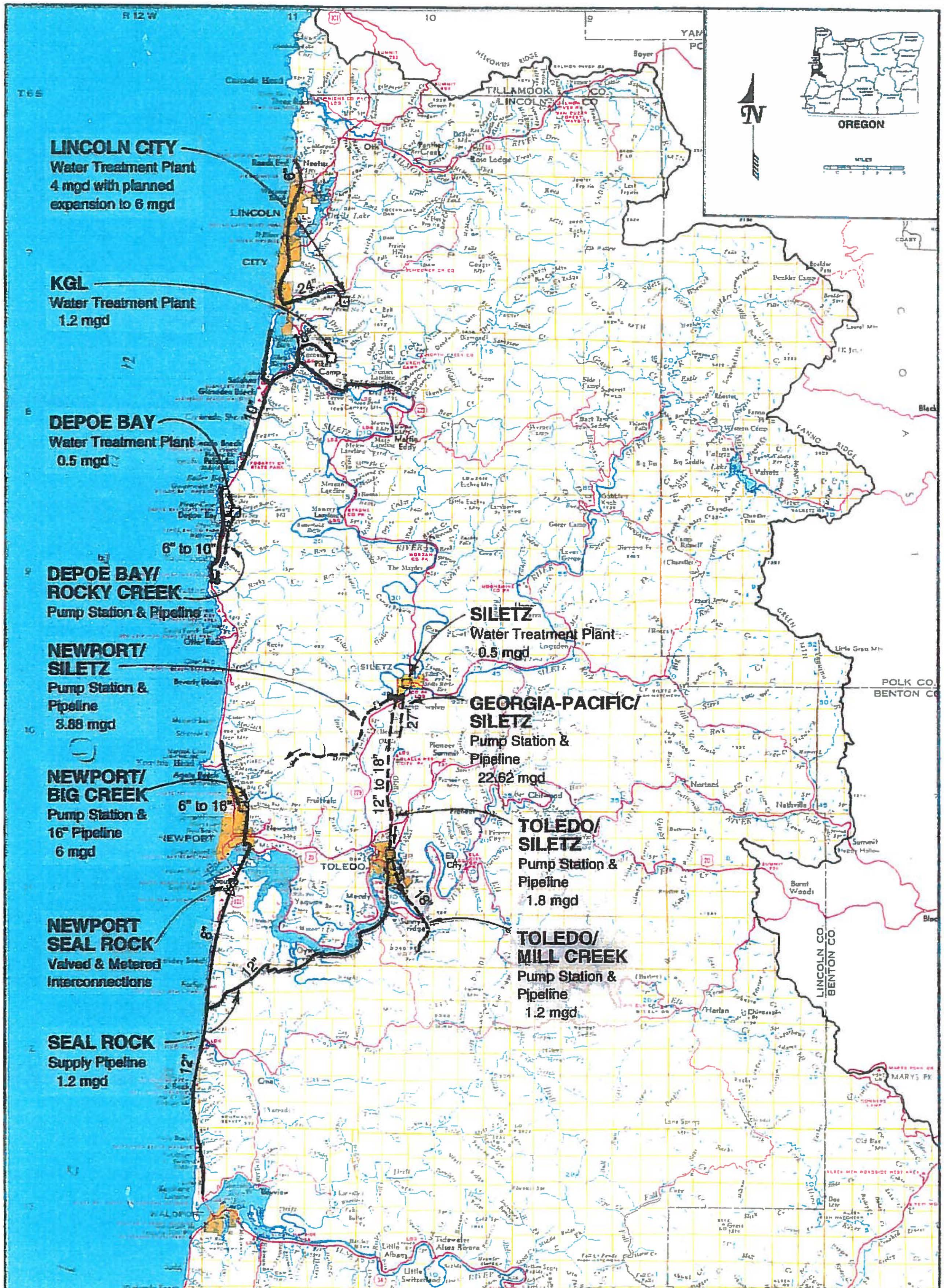
FIGURE 4-2
STUDY AREA
SUPPLY vs ANNUAL DEMAND

Newport

The City of Newport has two raw water sources. First and primary is Big Creek, a coastal stream with a 3.3-square-mile drainage area and two reservoirs that store a total of 381 MG. The average annual basin yield is estimated to be 2,000 MG. The basin yield in a dry year is about 900 MG or about equal to the 1990 demands. The second source is a 3.88-mgd senior water right on the Siletz, representing a potential annual diversion of 1,400 MG that can be pumped into the Big Creek basin to either supplement the storage, or be passed through the reservoirs to the water treatment plant.

The lower reservoir (Big Creek #1) is small and shallow. It becomes quite warm in the summer, aggravating weed growth and water quality problems. The analysis in this study assumes Big Creek No. 1 will be phased out of service as a water supply reservoir in the next 10 years or so, reducing Newport's storage by 65 MG or 17 percent. This will probably be accomplished by extending the water treatment plant intake pipe to Big Creek No. 2. The lower reservoir would become an emergency or "last resort" supply.

Since Big Creek winter flows, in all but severe drought conditions, are large enough to fill the reservoirs and meet Newport's wet season water needs, diversions from the Siletz River are only necessary in the summer for meeting dry season needs. The Siletz diversions will



LEGEND

□ WATER TREATMENT PLANT (WTP)

● PUMP STATION (PS)

DIA 12" RAW WATER PIPELINE

12" TREATED WATER PIPELINE
(approximate capacities in mgd)

JUNE 1997

FIGURE 4-3
EXISTING
SYSTEM CAPACITIES
LONG-RANGE
WATER SUPPLY STUDY
CITY OF NEWPORT, OREGON

FULLER & MORRIS
Engineering, Inc.

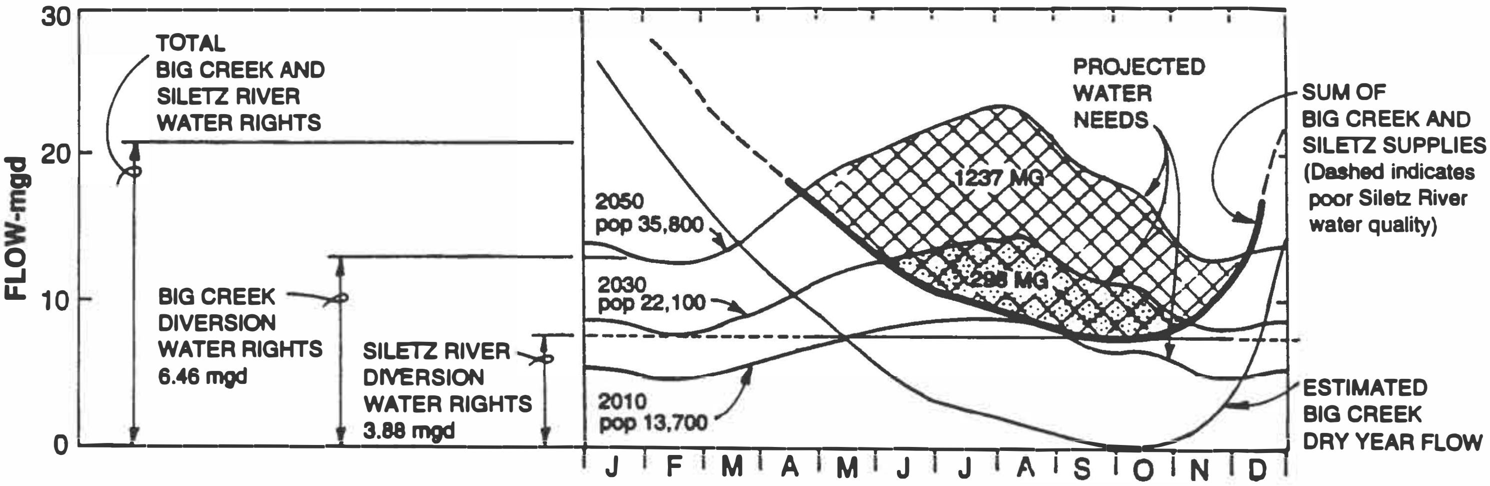


FIGURE 4-4
NEWPORT
SUPPLY vs DEMAND

become increasingly important in the future. By a population of 22,000 (year 2030±) the Siletz diversions will no longer be large enough to meet the demands in a dry year. Before this time, Newport should acquire additional raw water storage to provide for summer demands. Figures 4-4 and 4-5 shows the storage necessary to meet dry season needs to year 2050.

Study Area

Each community's water supplies, previously identified as "significant" for a regional supply, were compared to the demands that will occur in that community for each decade through year 2050. Assuming population growth will occur in each community as forecasted, there is a considerable difference when each community will need additional supplies. Each community's need for additional storage was determined by comparing their Category 1 water rights to their projected demands (as shown for Newport in Figure 4-4). Figure 4-5 shows the projected storage need for each community. When Study Area Category 1 water supplies are combined and compared to the Study Area projected water demands, as shown in Figure 4-6, the need for additional storage in the future becomes evident. The estimated volume of new storage needed is given on Table 4-1.

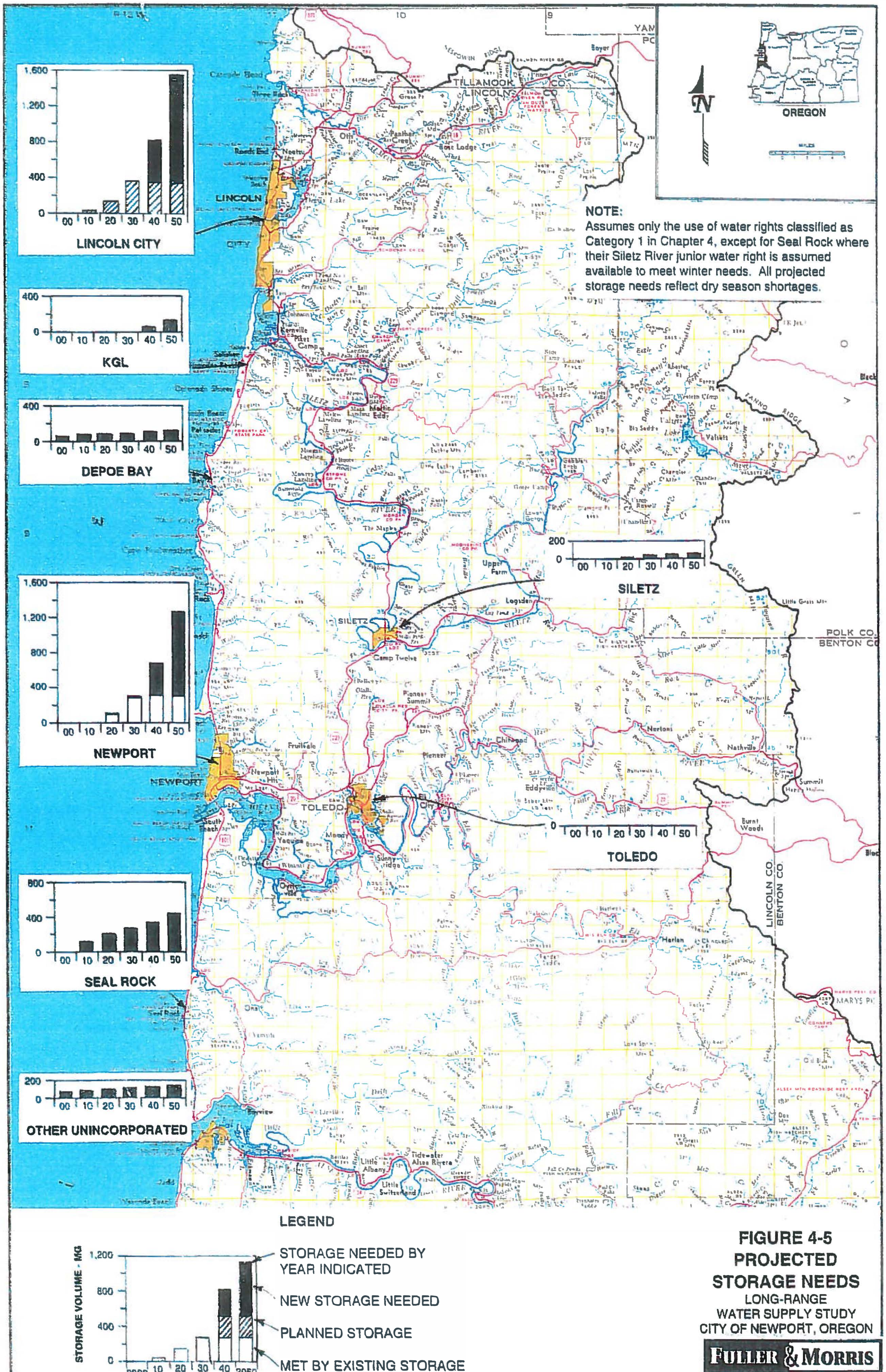


FIGURE 4-5
PROJECTED STORAGE NEEDS
LONG-RANGE WATER SUPPLY STUDY
CITY OF NEWPORT, OREGON

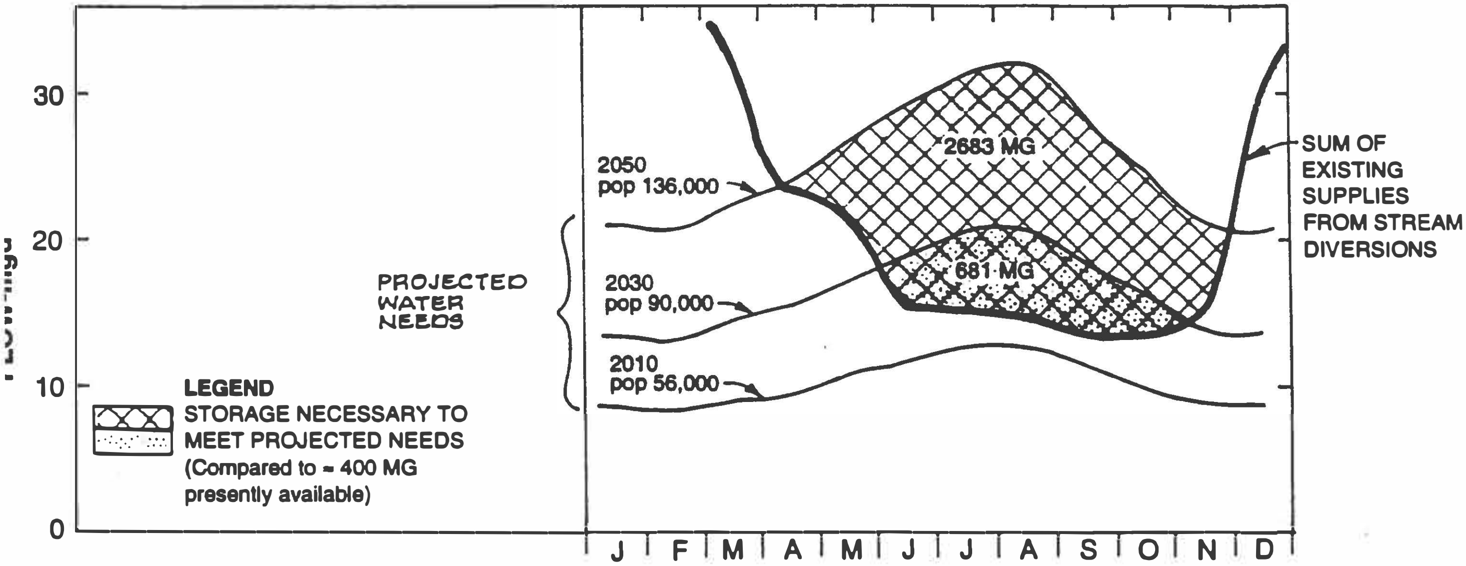


FIGURE 4-6
STUDY AREA
SUPPLY vs DEMAND

Each community has water rights that will normally supply their winter water needs through the study period. However, Seal Rock's junior water right may be inadequate in low-flow years. In every case it is the shortage of stream flow and/or lack of adequate senior water rights that will eventually make the individual water supplies inadequate to meet summer demands. Only Toledo has a water supply adequate for their projected 2050 demand, and only if they were to not serve Seal Rock.

Table 4-1
Study Area Storage Needs

		Storage - MG		
Year	**Population**	**Total**	**Existing[a]**	**New**
2000	43,300	--	440	--
2010	56,300	--	440	--
2020	73,400	151	380	--
2030	90,000	681	380	301
2040	110,600	1,790	380	1,099
2050	136,000	2,683	380	2,303

[a]Mill Creek and Big Creek Reservoirs have an existing capacity of 462 MG which has been reduced by 5% to allow for dead storage. Big Creek No. 1 is assumed to be phased out before 2020.

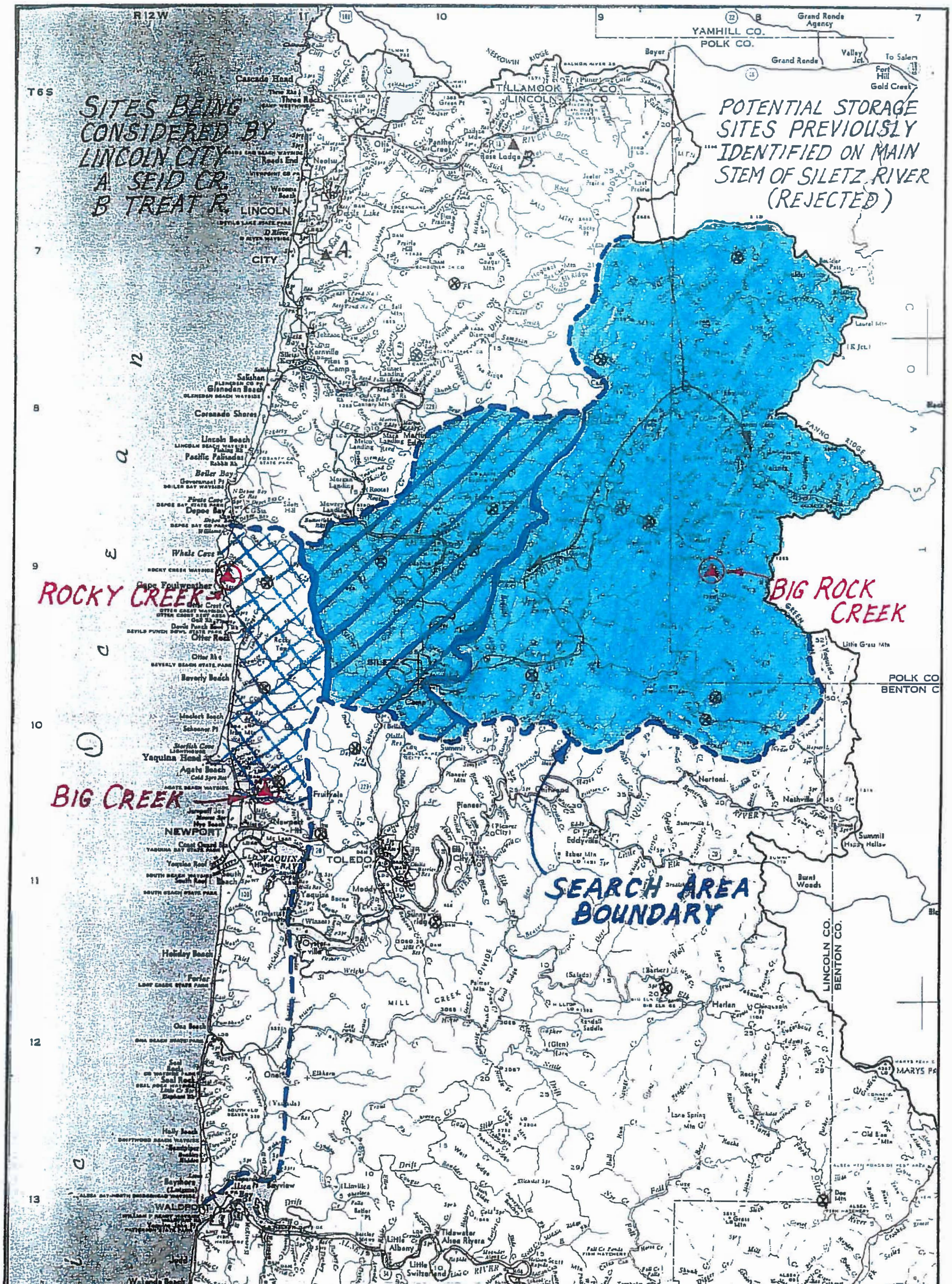
The following paragraphs briefly summarize each community's Water Master Plan for future water supplies:

- Lincoln City; September 1992 Water System Master Plan:
  - Schooner Creek should remain the principle source of water.
  - Develop 1.5 mgd source at abandoned intake site on Rock Creek as interim source while pursuing and acquiring an impoundment site on Erickson Creek, Rock Creek, or Treat River.

    Subsequent work on the plan:
  - Drop plans for interim source on Rock Creek.
  - Identify the Seid (pronounced "side") Creek dam site and submit application for water rights to store 1350 A-f on Seid Creek.
  - Submit application for water rights to store 1250 A-f on Treat River.
- Kernville-Gleneden-Lincoln Beach:
  - No current plan.
- Depoe Bay; February 1988 Long Range Plan:
  - Develop Rocky Creek (done) as new source to replace South Depoe Bay Creek which has water quality problems. Eliminating diversions from South Depoe Bay Creek would also restore the natural flows to benefit fish migration.
  - Maintain North Depoe Bay Creek Reservoir and diversions to reduce costs of pumping Rocky Creek.
  - The report notes that with an impoundment, Rocky Creek could become the sole source of water for Depoe Bay.
- Newport; February 1988 Water System Master Plan Update:
  - Develop the 3.88 mgd (6 cfs) Siletz River water right (done).
- Seal Rock; July 1993 Master Water System Plan:
  - Continue purchase of treated water from Toledo.
  - Water source alternatives for Seal Rock are clearly limited.

- Desalination is not cost effective.
- Cooperate with Toledo to affect the transfer of Toledo's senior 4 cfs Siletz River water right downstream to the present intake location (done).
- Participate in development of regional impoundment in Siletz Basin.

- Siletz; November 1996 Master Water System Plan:
  - Continue utilizing current sources—Siletz River and Tangerman Creek.
  - Gage Logan Creek to assess the viability of this water right.
- Toledo; January 1997 Draft Water Master Plan:
  - This plan addresses system improvements necessary to meet demands by supplying water from Mill Creek in the winter and the Siletz River in the summer. Poor water quality in Mill Creek reservoir in the summer and heavy winter silt loads in the Siletz River are the reason for this operation.
  - Also mentioned is the possibility of negotiating an agreement with G-P to use a part of the capacity of Olalla Reservoir for municipal storage.
- Georgia-Pacific's Industrial supply:
  - G-P's water supply is generally adequate to meet the needs of the mill at its present capacity to produce paper. However, to avoid shutting down in past water short years the mill had to practice water conservation measures that are detrimental to equipment and are economically acceptable only for short periods. A study was made in 1990 to investigate alternatives for increasing their water supply. The study concluded that a 10 foot, 420 MG addition to Olalla Dam would be the preferred alternative to expand their supply.



LEGEND

SILETZ R. BASIN ABOVE TIDEWATER

PORTION DOWNSTREAM FROM EXISTING INTAKES

COASTAL STREAMS LOCATED FAVORABLY TO STORE DIVERSIONS FR SILETZ R.

POTENTIAL STORAGE SITES (REJECTED)

POTENTIAL STORAGE SITES (SELECTED)

JUNE 1997

FIGURE 5-1
POTENTIAL STORAGE SITES

FULLER & MORRIS Engineering, Inc.

Chapter 5

Conceptual Water Supply Plans

Water Supply Alternatives

New water supplies will be necessary to meet growing summer demands. Supply alternatives such as reuse and desalination are viable water supply alternatives in various parts of the world, but only when fresh water supply alternatives are very limited. These technologies are energy intensive, costly to operate and maintain, and produce water that is many times the cost of a storage reservoir system on a fresh water stream.

Conservation can produce some savings that may delay the need for expanding supplies, but unless the public makes a substantial change in lifestyle, conservation cannot change the need to plan for expanded supplies. An example of a lifestyle change that would be required to possibly negate the need to plan for additional storage is to replace flush toilets with composting toilets.

Additional stream diversions to meet future demands are no longer environmentally acceptable. In most cases instream water rights have been established to protect streams from additional withdrawals that could be considered detrimental to aquatic habitat. The remaining option for using stream resources is to store winter runoff that exceeds instream minimums and other water rights.

The purpose of this study was to consider possible storage sites in the Siletz Basin, where many storage sites have been identified. These sites, and the studies made to evaluate them, were reviewed to identify sites with the most promise of being developable and capable of meeting Newport's and/or the Study Area's future needs. As the study progressed, it became evident that sites other than those in the Siletz basin may have merit. Coastal streams between Depoe Bay and Alsea Bay were added to the search area (see Figure 5-1). Our search for potential storage sites was made using USGS, 1 inch = 2,000 ft topographic maps. The selected sites were visited to make a general assessment of the suitability of the site for a dam and reservoir, but no site survey or field work was completed. Stream flow measurements are not available for these sites. Basin yield hydrology has been estimated by relating runoff to annual precipitation and to the runoff per square mile of coastal streams with 14 to 68 years of flow records. The estimated yields are given on Table 5-1. These estimates are only approximate, but should be conservative (low) and are appropriate for the purpose of this study.

Ideally, a storage site would have certain characteristics to make it acceptable to the various permitting and review agencies; it would not conflict with the agenda of local, state, and

Table 5-1
Project Data

Item	Project: Big Creek	Project: Rocky Creek		Project: Big Rock Creek
Purpose	Newport Supply to 2050	Newport and South Study Area Supply to 2050	Regional Raw Water Supply to 2050	Regional Siletz Basin Water Supply to 2050
Storage	1250 MG	1340 MG	2300 MG	2300 MG
Drainage Area	3 sq miles	5.3 sq miles		6.3 sq miles
Preliminary Hydrology				
• Estimated annual precipitation	65 inches	65 inches		112 inches
• Average year runoff (at 60% of precipitation)	2200 MG	3890 MG		7350 MG
• Dry year runoff (at 45% of average year ≈ 5% probability	990 MG	1750 MG		3310 MG
• Diversion to assure full reservoir in dry years	260 MG from Siletz River		550 MG from Siletz River	--
• Diversion rate (for 150 days)	1.75 mgd	--	3.67 mgd	--
Full reservoir water surface elevation	110	148	170	853
Reservoir area	143 Ac	112 Ac	164 Ac	250 Ac
Dam height	100 ft	108 ft	130 ft	100 ft
Type of dam	Earth	Roller Compacted Concrete		Roller Compacted Concrete
Dam embankment volume	430,000 CY	120,000 CY	150,000 CY	130,000 CY
Road inundated	1.5 mi	1.5 mi	1.8 mi	1.4 mi
Displace residences	Yes	No		No
Downstream development	Residential neighborhood, park, and water treatment plant	80 ft Highway 101 Fill		• First farm @ 10 miles± • Siletz @19 miles
Utilities affected	Elect. and phone	No		No
Environmental				
• Anadromous fish	Yes	No		No
• Stream affected by regulation of reservoir	Dam to Ocean - 1.2 miles	Dam to Highway 101 culvert = 0.1 miles		• Dam to anadromous barrier = 3 miles • Dam to Siletz River = 11 miles • Dam to ocean = 60 miles
• Wetland impacts	Wetland margins of existing reservoirs and stream flood plain	Stream bottom and flood plain		Some wetland meadows

Item	Project			
	Big Creek	Rocky Creek		Big Rock Creek
Estimated costs in millions[a]				
• Direct construction cost	$6.7	$6.9	$8.6	$8.0
• Transmission and ancillary facilities	--	11.3	22.5	37.3[b]
• Allowance for permitting and environmental mitigation	1.3	1.7	1.7	2.2
• Engineering, legal, administrative	1.3	3.6	6.2	9.1
• Allowances for property acquisition	.3	.5	.7	.8
TOTAL ESTIMATED COSTS	$9.6	$24.0	$39.7	$57.4
Costs per capita based on the estimated 2020 population served	$/17,400 = $552	$/28,300[c] = $848	$/73,400 = $541	$/73,400 = $782

NOTES:
[a]The estimated costs are for full development of facilities for 2050 demands. Actual developments would most likely be staged.
[b]The regional water treatment plant shown in Figure 5-6 is not included in the estimate, so comparisons are all based on furnishing raw water. All alternatives will have to be accompanied by expansion of water treatment capacity.
[c]This population includes Depoe Bay plus one-half of Seal Rock and one-half of other unincorporated areas.

sometimes national interest groups; and it would meet the needs and financial resources of the owner, as outlined below.

Desirable environmental characteristics include:

- Minimal fishery impacts (passage is a major issue[1]).
- Minimal wetland impacts.
- Minimal impacts to terrestrial habitat.
- Minimal impact to natural flow regime of stream(s).
- No impacts to threatened or endangered species.

Societal questions of interest to review agencies and various interest groups:

- Encourage too much growth of communities served?
- Why not conserve so the additional water is not needed?

[1] The state legislature is working on laws to restore ODFW discretion in resolving passage issues at dams, lost when courts ruled passage is required at all dams. Passage is not practical on water supply dams built to capture most of the basin yield.

- Why not reuse treated effluent to reduce need for "new" water?
- Why not desalinate for new supplies?
- People/jobs displaced by project (timberlands taken out of service, impacts on commercial/recreational fishing, etc.).
- Construction impacts (environmental and societal).
- Recreation effects/potential.

Owner considerations:

- Good water quality.
- Topography that allows the necessary storage and results in acceptable dam construction costs.
- Watershed ownership and use compatible with water supply.
- Geologic conditions suitable for the dam and reservoir.
- Soil conditions that will not degrade reservoir water quality.
- Physically located to allow economical delivery of the water to the intended point of use.

The alternatives identified by this study, in order of least environmental impact and most desirable from the standpoint of Newport or a regional supply are:

Newport	Regional
• Big Creek	• Rocky Creek
• Rocky Creek	• Big Rock Creek
• Big Rock Creek	

Big Creek is a coastal stream that has already been developed; Rocky Creek is a coastal stream that has not had an anadromous fish population since the construction of Highway 101 fill across Rocky Creek in 1952; and Big Rock Creek is located in the upper Siletz River Basin above two anadromous fish barriers.

The biggest difference in these sites is their relationship to the Siletz River. The Siletz River is the largest source of flowing water in the Study Area and naturally comes first to mind when considering new supplies. The coastal streams are small and have limited natural runoff. However, the coastal streams from Big Creek (in Newport) north to Rocky Creek are close enough to the Siletz River (upstream from tidewater) to allow developments larger than dry year natural yields of the basin and still be assured of annually filling the reservoir(s) by pumping winter flow from the Siletz. They are also close to the corridor being served which can reduce ancillary costs, such as pumping and piping.

Table 5-1 presents comparative data on the selected alternative developments. Costs presented for the alternatives are order-of-magnitude based on development concepts that need to be confirmed by a feasibility study and/or preliminary design. These cost estimates are only intended to make initial comparisons of the alternatives.

Newport

The three alternative sites have been evaluated for their potential to serve only Newport or a limited region around Newport.

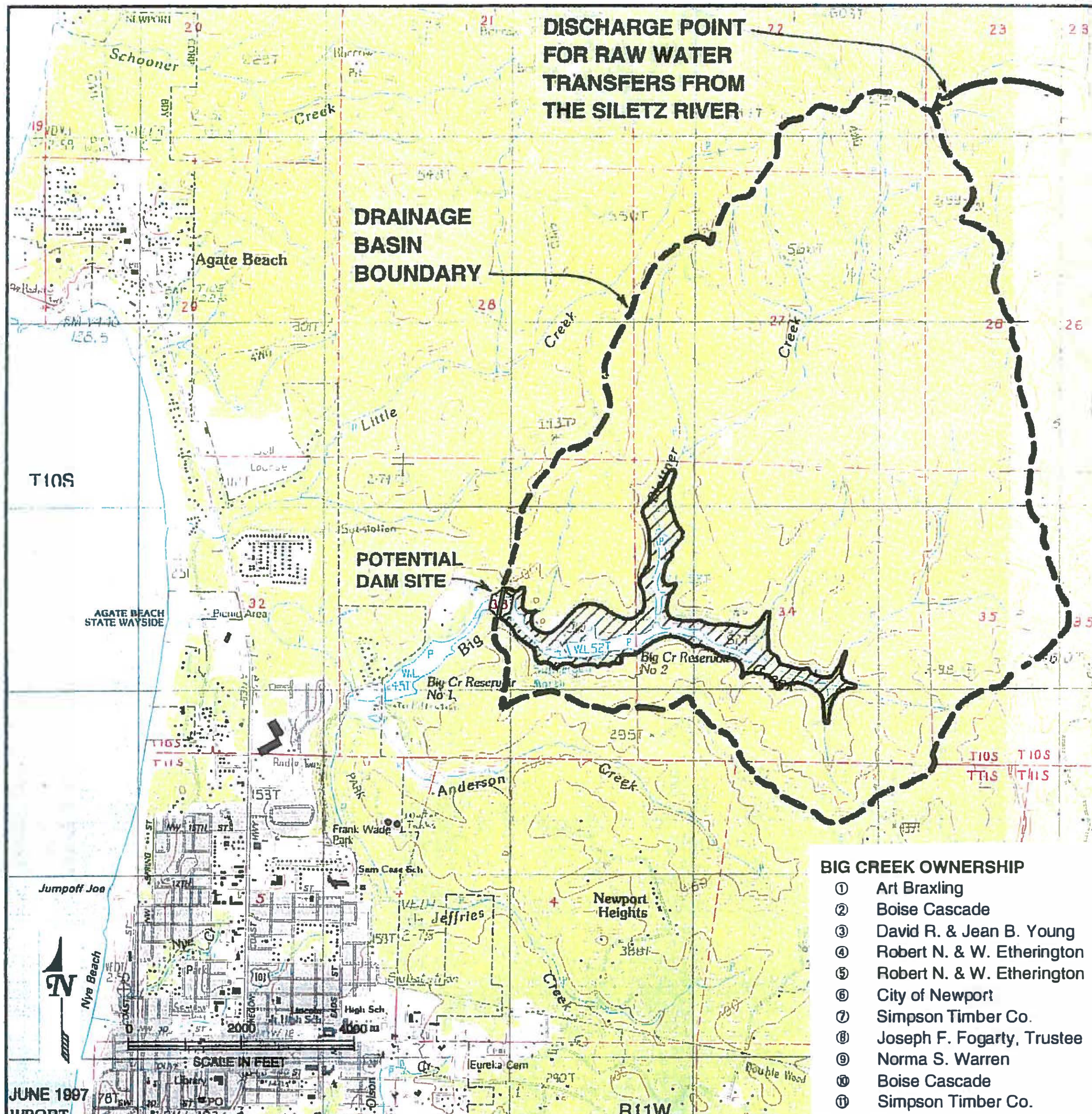
Big Creek Expansion

Expanding Newport's supply can be done most economically with additional storage in Big Creek basin to make maximum use of the basin's natural yield and to store winter diversions from the Siletz River. We believe a new dam located between the existing dams, as shown in Figure 5-2, is the preferred location for a new dam because:

- It makes good use of existing City ownership.
- It avoids most development.
- By purchasing the developed lots that can't be avoided, only timberlands will remain in the watershed. Timberlands are more compatible with a water supply watershed than occupied development.
- The existing dams will serve as "cofferdams" to isolate the dam site, simplyfing construction dewatering.
- The construction can take place without jeopardizing the Big Creek No. 2 and Siletz River water supply.

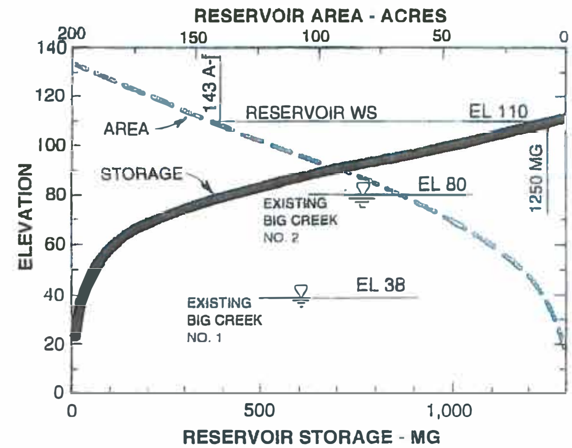
A new, deeper reservoir would flood Big Creek No. 2 and should result in less warming of the reservoir in the summer, improving water quality. Building a large dam at this site will present some engineering challenges with expected weak foundation soils that may be too deep to completely excavate. A site investigation and preliminary engineering study will be necessary to determine that the geologic conditions at the site are suitable for a 100-foot-high dam.

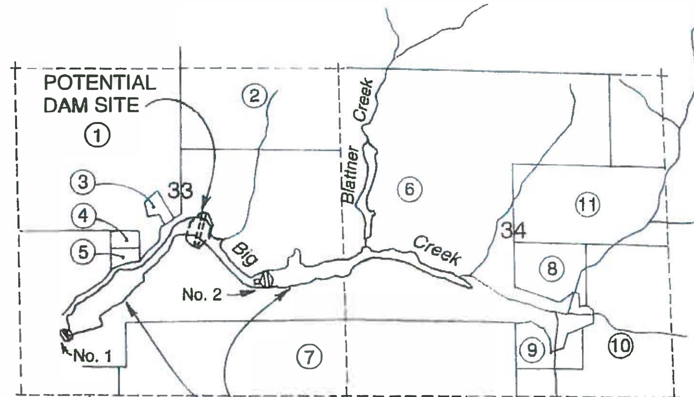
Fishery issues may be a significant factor in permitting a large dam on Big Creek. Big Creek Dams No. 1 and No. 2 are laddered to pass fish. Construction of the proposed dam would control a large portion of the basin yield. As the water demands grow to fully utilize the new storage, the reservoir would be drawn down below the ladder for significant periods of time, and



BIG CREEK OWNERSHIP

① Art Braxling
② Boise Cascade
③ David R. & Jean B. Young
④ Robert N. & W. Etherington
⑤ Robert N. & W. Etherington
⑥ City of Newport
⑦ Simpson Timber Co.
⑧ Joseph F. Fogarty, Trustee
⑨ Norma S. Warren
⑩ Boise Cascade
⑪ Simpson Timber Co.





OWNERSHIP MAP

EXISTING BIG CREEK RESERVOIRS AS SHOWN ON THE 'NEWPORT NORTH' 7 1/2 MINUTE USGS QUADRANGLE MAP

FIGURE 5-2
BIG CREEK
RESERVOIR DEVELOPMENT
LONG-RANGE
WATER SUPPLY STUDY
CITY OF NEWPORT, OREGON

FULLER & MORRIS
Engineering, Inc.

even when near full, water in sufficient quantities may not be available for fish ladder operation. Intercepting such large portions of the basin runoff will also significantly alter the character of Big Creek downstream from the dam.

Development of Big Creek Dam for Newport

1. Permit and construct New Big Creek Dam by 2025± (2050 Reservoir size is 1250 MG).
2. Eventually, pump from Siletz year round.
   A. Pump in winter to insure full Big Creek reservoir in dry year.
   B. Pump in summer to supplement Big Creek storage supply.

Beyond 2050: Construct new reservoir such as Rocky Creek or Big Rock Creek.

Rocky Creek Dam

The Rocky Creek dam site has good potential for a regional supply and is discussed later in this chapter. However, if it cannot be developed to supply the region encompassed by the Study Area, it could be developed to serve just Newport and the adjoining communities. A logical minimum region that a reservoir on Rocky Creek could serve would include the coastal area from Depoe Bay to Newport, plus that portion of Seal Rock's demand that Toledo will be unable to meet in the future.

Development of Rocky Creek for this limited regional system is outlined in the second column of data on Table 5-1.

Development of Rocky Creek for Newport (The service area would probably include Depoe Bay and provide for Seal Rock demands not met by Toledo.)

1. Permit and Construct Rocky Creek Dam by 2025± (2050 reservoir size is 1340 MG).
2. Construct pipelines to deliver Rocky Creek water to Newport.
   A. As raw water, or
   B. As treated water from a water treatment plant sized to serve the Depoe Bay-Newport-Seal Rock area.

Beyond 2050: Raise dam or add second dam. Eventually, transfer winter flow from Siletz River.

Big Rock Creek Dam

Development of Big Rock Creek solely for Newport's needs would require a dam about 85 feet high to store 1,250 MG. Water released from this reservoir would be intercepted by an intake near Siletz and pumped to Newport for treatment and use, supplementing the existing 3.88 mgd

Siletz Transfer facilities that would continue to pump Newport's senior water rights on the Siletz River. By 2050, the capacity of the new transfer facilities would be about 8 mgd.

Alternatively, the water could be treated where it is removed from the Siletz River and delivered by a treated water transmission pipeline. In this case, Newport's service area and water needs would most likely grow to accommodate development occurring along the pipe alignment.

Pipelines from the water treatment plant would also have to be sized to deliver peak day demands, whereas raw water can be delivered to the Big Creek Reservoir at average day flows for withdrawal and treatment to meet peak demands.

A 1,250-MG Big Rock Creek Reservoir and raw water delivery system is estimated to cost about the same as the Rocky Creek Alternative.

Study Area

The alternatives for regionalizing future additions to the water supply are similar to those for Newport, except storage must be larger than is practical for the Big Creek site. Also, the distribution systems are more involved. All degrees of regionalization are possible; two possibilities listed below represent the range of approaches to regionalization.

- Cooperation in developing additional raw water storage for delivery to existing system headworks for treatment and distribution by the individual water districts.
- Complete reorganization into one water district.

The development concepts presented in this report assume a cooperative approach toward developing a new raw water supply.

Rocky Creek Dam

Rocky Creek is a 5.3-square-mile drainage basin discharging directly into the ocean (see Figure 5-3). This site is located about midway between the two largest water demands in the Study Area (Newport and Lincoln City). In 1952, when the coast highway was constructed on a high fill across Rocky Creek, the culvert was constructed in a way that eliminated anadromous fish passage (see photo on the following page).

About 1/4 mile east of Highway 101, Rocky Creek flows from one geologic unit to another (The Astoria Formation—marine sandstone and siltstone to The Cape Foulweather Basalt). The basalt is more resistant to erosion and the valley narrows to form the potential dam site. The exposed rock appears to be variable in quality but is assumed to be suitable for a roller compacted concrete (RCC) dam.. An RCC dam requires fewer cubic yards of material to construct than an earth dam of the same height, but the unit cost for materials is higher. The main advantages of an RCC dam over an earth dam are that a smaller borrow area is needed, the

Photograph of 30- to 40-foot plunge where Rocky Creek discharges to the ocean. The concrete flume is an extension of the Highway 101 culvert.

footprint of the dam is smaller, it can be constructed more quickly, construction activities are less weather dependent, and the outlet and spillway are much easier and less expensive to incorporate into the dam.

Rocky Creek, in its present state, appears to have the most promise for permitting a dam site. However, ODOT has already had preliminary discussions regarding restoration of fish passage to this basin. The results of this survey of all culverts on Highway 101 will probably be used to prioritize improvements. Communities with an interest in Rocky Creek as a potential water supply should become active in ODOT's and ODFW's planning for this basin.

Following is a list of advantages and disadvantages for a development of Rocky Creek as a regional raw water supply, as shown in Figures 5-3 and 5-4.

Advantages:

- Close to service area.
- Adequate hydrology.
- Basin yield can be augmented by transfers from the Siletz River.
- Dam site appears suitable for RCC dam.
- No anadromous fishery.
- Only 0.2 miles of stream would be dewatered by the project.
- No downstream development (other than Highway 101).
- Only two landowners.

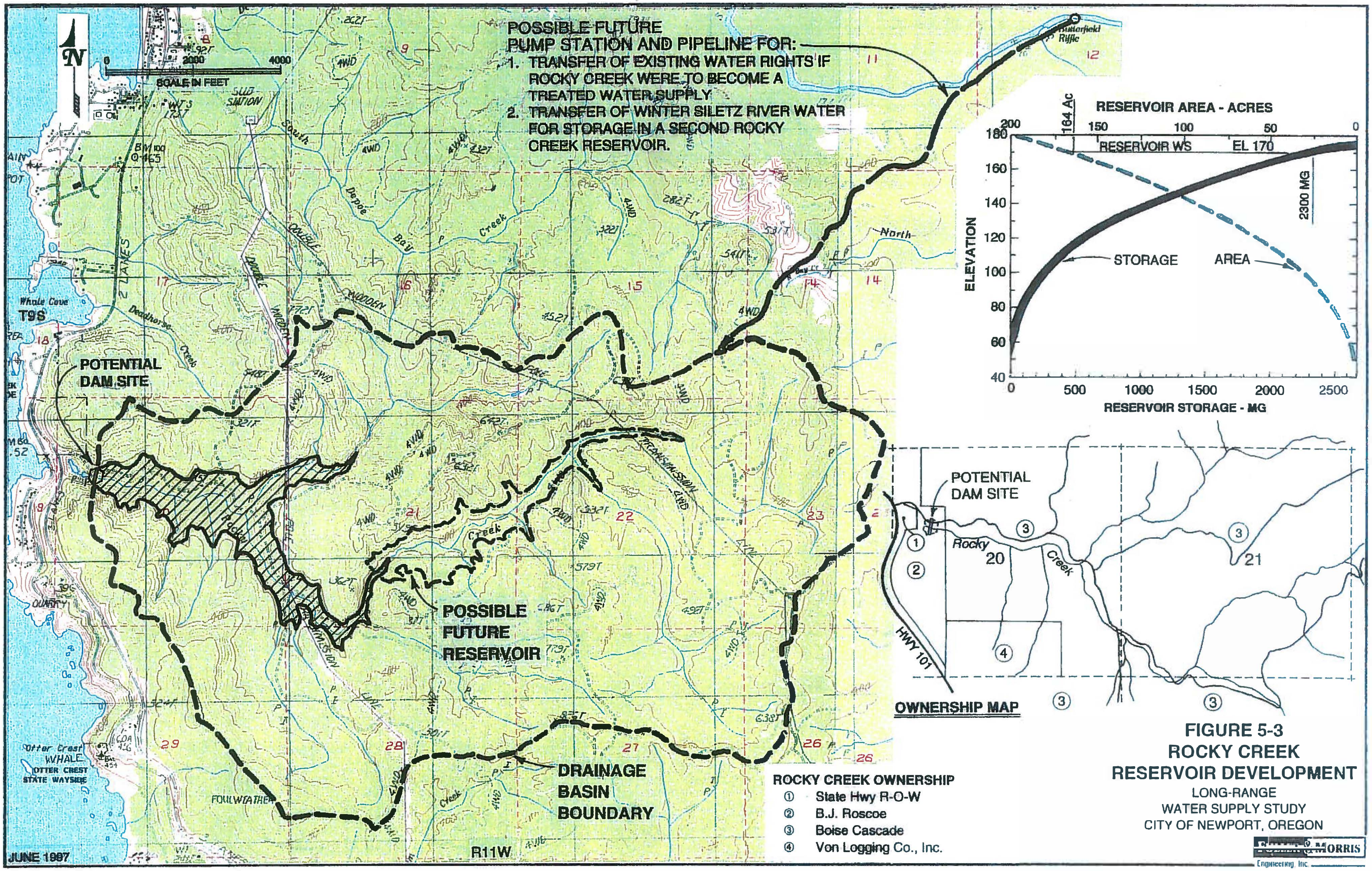
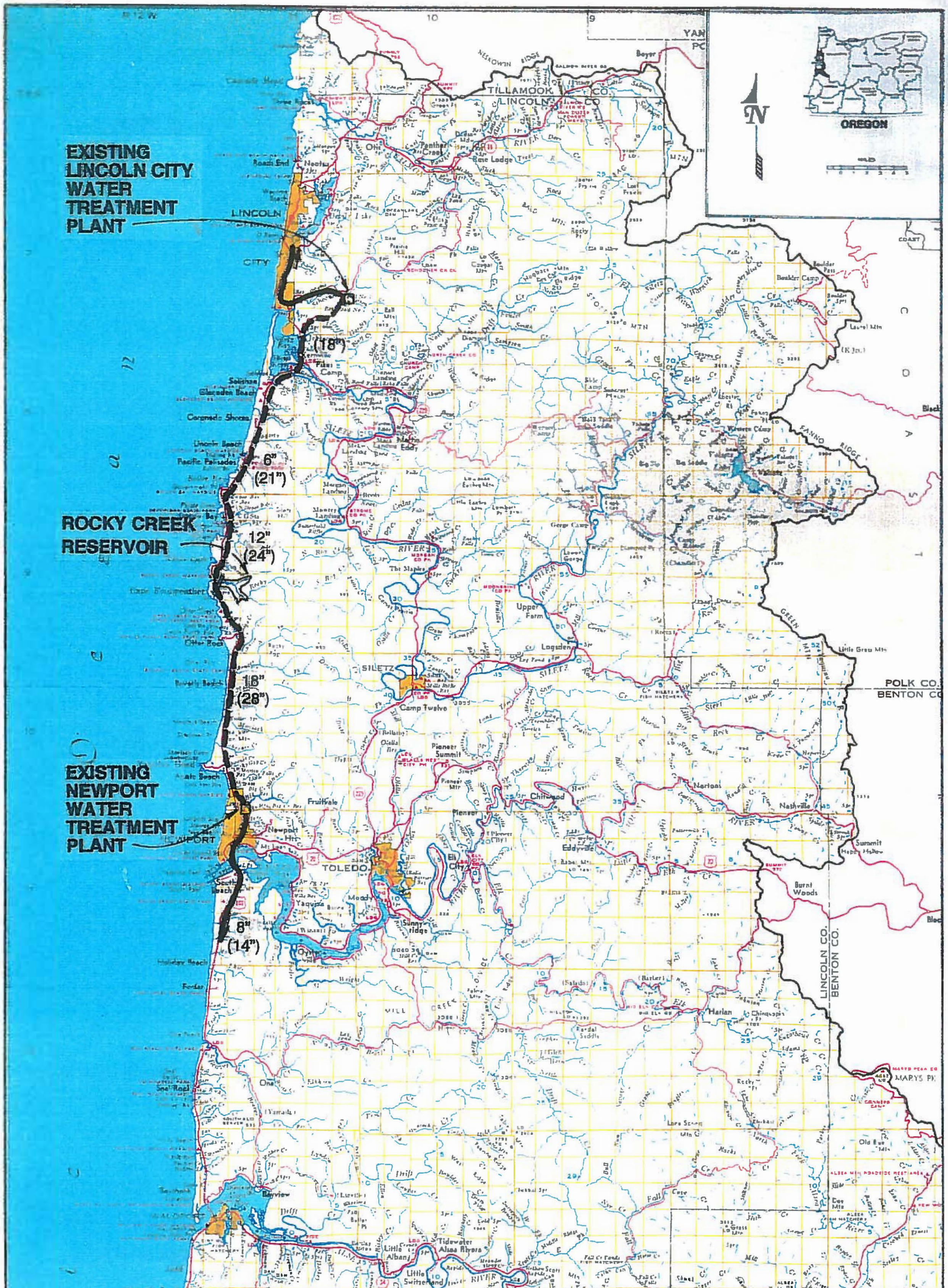


FIGURE 5-3
ROCKY CREEK RESERVOIR DEVELOPMENT
LONG-RANGE WATER SUPPLY STUDY
CITY OF NEWPORT, OREGON



LEGEND

RAW WATER PIPELINE

TREATED WATER PIPELINE

2030
12" (24")
(2050)

PIPE SIZE TO TRANSFER PEAK DAY DEMANDS YEAR 2030 (2050)

NOTE:
TOLEDO AND SILETZ BENEFIT FROM THIS ALTERNATIVE THROUGH REDUCED SUMMER TRANSFER TO SEAL ROCK WHICH IS NECESSARY SO TOLEDO AND SILETZ CAN MEET THEIR COMBINED PEAK SEASON DEMANDS.

FIGURE 5-4
ROCKY CREEK
REGIONALIZED RAW WATER SUPPLY
LONG-RANGE
WATER SUPPLY STUDY
CITY OF NEWPORT, OREGON

FULLER & MORRIS
Engineering, Inc.

JUNE 1997

- Additional storage possible.
- Relatively easy to add water treatment to the regional supply when or if desired.
- Simple operation.

Disadvantages:

- Transmission pipelines would be along Highway 101 (construction interferes with traffic).
- Pipeline route to Newport crosses major slide areas.
- Site may be attractive to salmon enhancement program to restore anadromous passage.
- Proposals have been made in the past to develop a rock quarry at or near the dam site.

Development of the Rocky Creek Regionalized Raw Water Supply

1. Continue present water supply operations to delay storage needs shown in Figure 4-5 for Depoe Bay, Seal Rock, and other unincorporated areas. Phase out use of Category 2 water rights as new supply facilities are completed.
2. Construct raw water pipeline between the Newport and Lincoln City Water Treatment Plants to allow delivery of Siletz River water (Toledo and Newport water rights) to Lincoln City. Complete by 2010±.
3. Permit and construct RockyCreek Dam by 2020± (2050 Reservoir size is 2300 MG).
4. Upgrade the raw water pipelines and/or interconnect treated pipeline systems as necessary to provide additional capacity as needs grow.
5. If Lincoln City's water needs grow as much as their high estimates indicate is possible, additional storage (such as Seid Creek or a second Rocky Creek) will be necessary. (Note that the pipe sizes from Rocky Creek to Lincoln City in Figure 5-4 assume that Seid Creek will be completed within the study period.)

Beyond 2050: Construct second Rocky Creek Dam. Transfer winter flows from the Siletz River to insure filling the reservoir in dry years.

Big Rock Creek Dam

The Big Rock Creek site was studied by the Bureau of Reclamation between 1979 and 1992 to evaluate water resource development potentials in the Siletz River basin (see Appendix).

The reservoir site is underlain by thinly bedded sandstone and sandy siltstone of the Tyee formation. A vertical gabbro (a granitic rock) dike has intruded the Tyee formation at the dam site. This dike has been worked as a quarry for a number of years. The rock dike is relatively narrow, but appears to be a suitable site to construct an RCC dam. The quarry operations are removing material at the dam site and continue to inrease the volume of embankment necessary to build a dam.

Following is a list of advantages and disadvantages for a development of Big Rock Creek as a regional water supply, as shown in Figures 5-5 and 5-6.

Advantages:

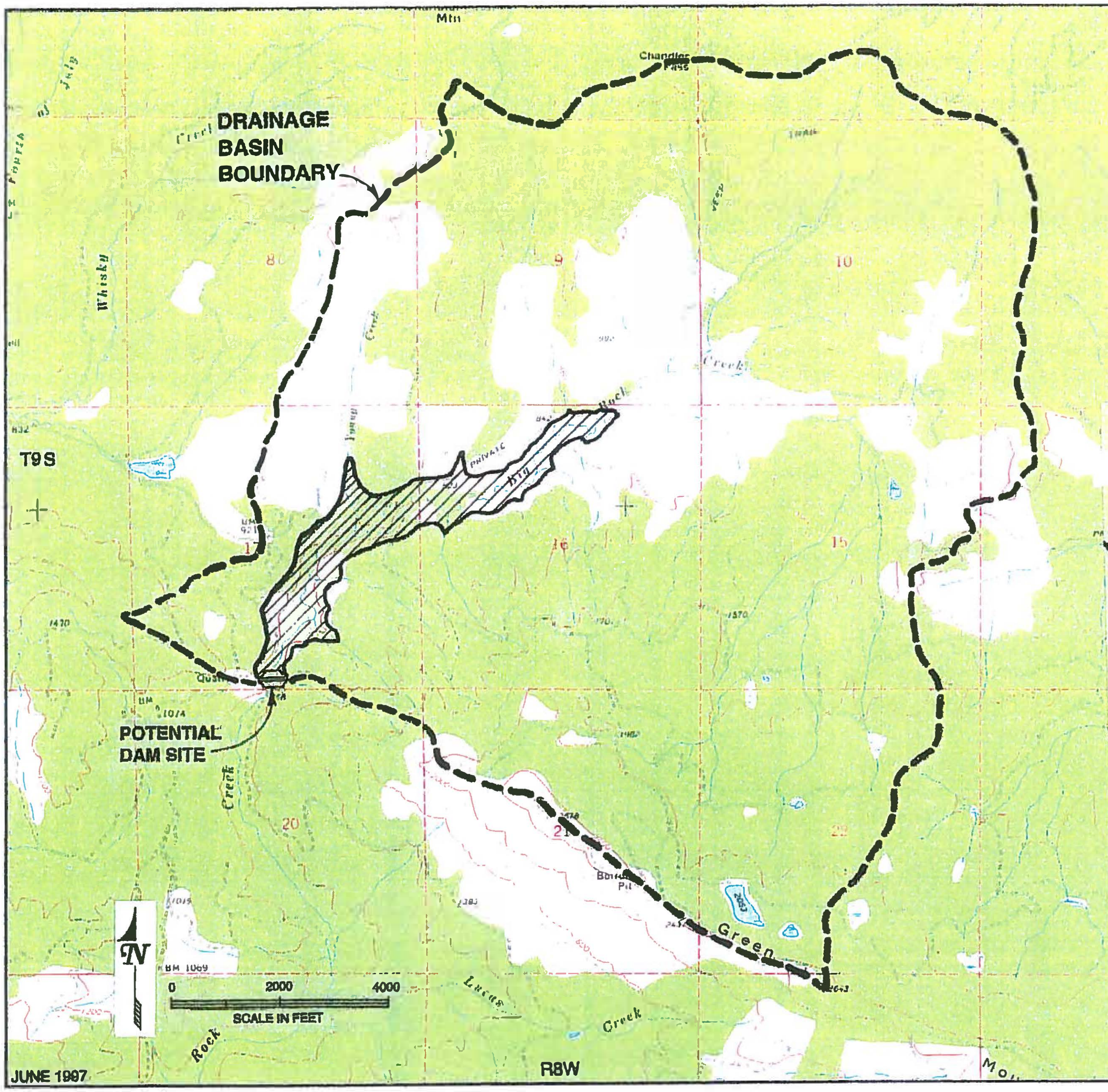
- Very favorable hydrology.
- Located above barriers to anadromous fish.
- Dam site suitable for RCC dam.
- Additional storage possible.

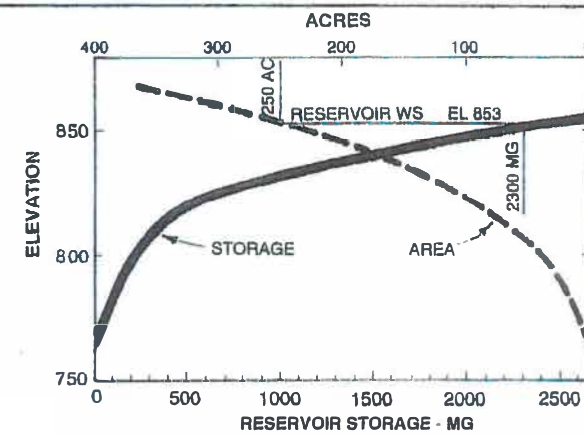
Disadvantages:

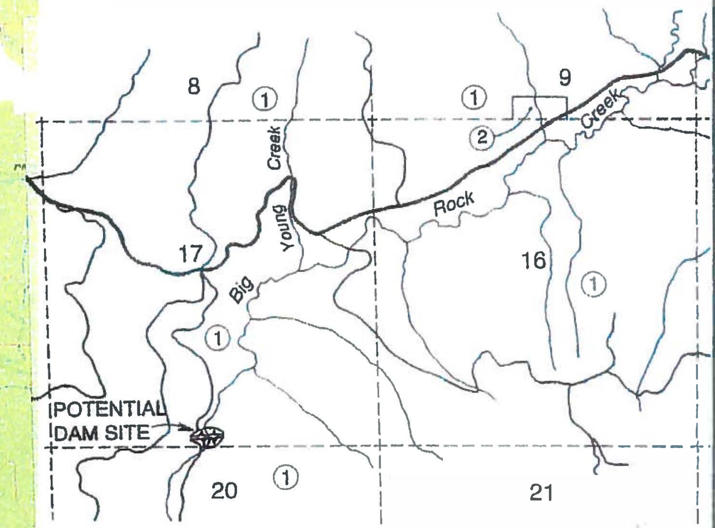
- Reregulates flow to 60 miles of Siletz River.
- Remote from user (complicates operation and maintenance)
- Some wetland meadow impacted.
- Regulation of releases to meet the needs of more than one diversion point (19 and 40 miles downstream) complicates the operation.
- Probable strict operation criteria to minimize temperature and flow changes in the Siletz River.
- Possibility that a reservoir could reactivate old landslides that the Bureau of Reclamation's studies identified in the reservoir area.
- Instream water rights on Big Rock Creek and the Siletz River will limit when water can be stored and will tend to complicate operation of the outlet to not impact stream water rights.

Development of the Siletz River Regionalized Supply System

1. Continue present water supply operations to delay storage needs shown in Figure 4-5 for Depoe Bay, Seal Rock, and other unincorporated areas. Phase out use of Category 2 water rights as new supply facilities are completed.
2. Construct raw water pump station and pipeline from Tidewater on the Siletz to the Lincoln City Water Treatment Plant. Complete by 2010±. Temporarily transfer portions of Toledo/Newport water rights to this pump station (until Big Rock Creek Reservoir is in service).





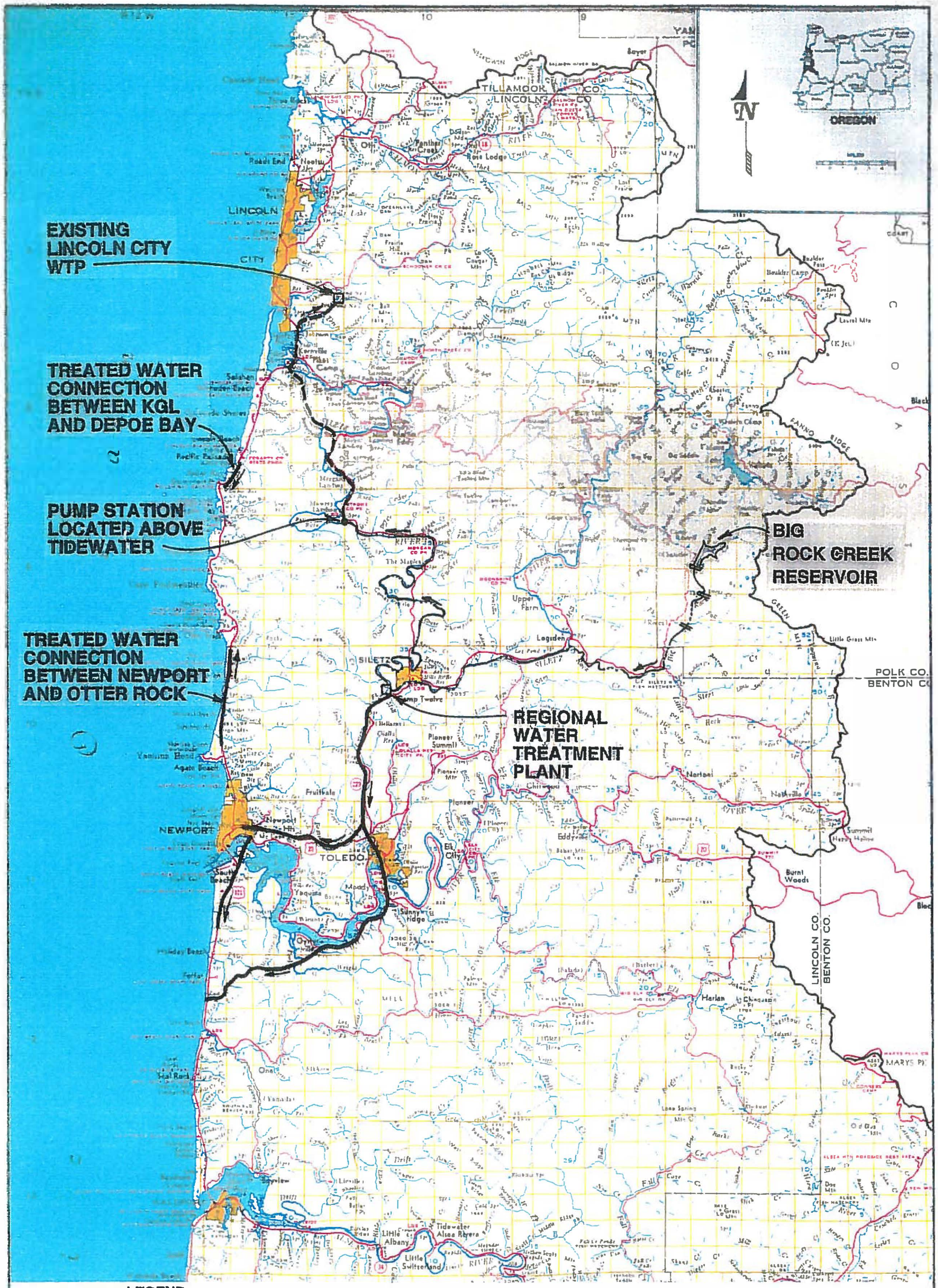


OWNERSHIP MAP

BIG ROCK CREEK OWNERSHIP
① Boise Cascade
② David Bancroft

FIGURE 5-5
BIG ROCK CREEK
RESERVOIR DEVELOPMENT
LONG-RANGE
WATER SUPPLY STUDY
CITY OF NEWPORT, OREGON

FULLER & MORRIS Engineering, Inc.



LEGEND

OVERLAND FLOW OF STORAGE RELEASES

BLOCKAGE TO ANADRAMOUS PASSAGE

TREATED WATER PIPELINE

RAW WATER PIPELINE

JUNE

FIGURE 5-6
SILETZ BASIN
REGIONALIZED WATER SUPPLY
LONG-RANGE
WATER SUPPLY STUDY
CITY OF NEWPORT, OREGON

FULLER & MORRIS
Engineering, Inc.

3. Permit and construct Big Rock Creek Dam by 2020±. (2050 Reservoir size is 2300 MG.)

4. Construct an intake and pipeline at Siletz to deliver water released from Big Rock Creek Reservoir to Siletz, Toledo, Seal Rock, and Newport.

   A. As raw water, or

   B. As treated water from a regional water treatment plant constructed in or near Siletz.

Beyond 2050: Raise Big Rock Creek Dam for additional storage.

References

Barrett & Associates. An Engineering Report on Water Supply and Treatment Facilities for the City of Toledo, Oregon. March 1973.

Buckman, Bob, Randy Reeve, and John Spangler. Siletz River Basin Fish Management Plan. Oregon Department of Fish and Wildlife. April 16, 1997 (Draft).

Bureau of Reclamation. Willamette River Basin Water Optimization, Oregon Lincoln, Polk, and Yamhill Counties Working Paper. In cooperation with Yamhill, Polk, and Lincoln Counties, Oregon and Oregon Water Resources Department. November 1992.

Bureau of Reclamation. Willamette River Basin Water Optimization Study, Oregon Siletz River Basin Information Update. October 1991.

CH2M HILL. Toledo-Seal Rock Water Supply. (Letter report). July 19, 1992.

CH2M HILL. A Preliminary Engineering Report for the Phase I Water System Improvements for the City of Newport, Oregon. April 1991.

CH2M HILL. Alternatives for Additional Storage in the Olalla Basin. (Letter report). November 27, 1990.

CH2M HILL. Water System Master Plan Update 1988 for the City of Newport, Oregon. February 1988.

CH2M HILL. Water Treatment Alternatives for the Kernville-Gleneden Beach-Lincoln Beach Water District. September 1987.

CH2M HILL. Water System Plan for the City of Newport Oregon. February 1981.

Corcoran, R.E., State Geologist. Environmental Geology of Lincoln County, Oregon. Bulletin 81. State of Oregon. Department of Geology and Mineral Industries. 1973.

Cornell, Howland, Hayes & Merryfield. Interim Report on an Engineering Study of Possible Industrial Water Supplies Near Toledo, Oregon. January 10, 1955.

Cornell, Howland, Hayes & Merryfield. An Engineering Study of Additional Water Supply Storage Facilities. June 1967.

Cornell, Howland, Hayes & Merryfield. Additional Water Supply Storage Facilities. (Letter Report). June 8, 1967.

Cornell, Howland, Hayes & Merryfield. A Report to the Newport City Council on an Engineering Study of the Water System. March 1962.

Cornell, Howland, Hayes & Merryfield. An Engineering Study of the Toledo, Oregon, Water System. July 1959.

Cornell, Howland, Hayes & Merryfield. Toledo, Oregon Report on an Engineering Investigation of Water Supply and Storage. December 1955.

Cornell, Howland, Hayes & Merryfield. Yaquina Watershed 1955 Stream Flow Investigation. December 1955.

Cornell, Howland, Hayes & Merryfield. City of Newport Oregon Engineering Report on a Water Supply Investigation. February 1951.

Dyer, Gary L. Master Water System Plan Seal Rock Water District, Lincoln County, Oregon. July 1993.

Dyer Partnership. Master Water System Plan City of Siletz, Lincoln County, Oregon. November 1996.

Frank, F.J. and Antonius Laenen. Water Resources of Lincoln County Coastal Area, Oregon. U.S. Geological Survey Water-Resources Investigations 76-90 Open-File Report. Prepared in Cooperation with the Oregon Water Resources Department. 1977.

Gilbert, J.D. Reconnaissance Geologic Report of Big Rock Creek and Warnicke Creek Damsites Siletz River Basin Project, Oregon. U.S. Department of the Interior, Bureau of Reclamation. 1979.

H.G.E., Inc. Comprehensive Water Source Distribution and Treatment Analysis. (Prepared for City of Lincoln City.) September 1992.

H.G.E., Inc. Oregon Community Development Grant Technical Assistance Study, Water System Evaluation and Long Range Plan, City of Depoe Bay, Lincoln Co., Oregon. February 1989.

H.G.E., Inc. A Comprehensive Water, Sewerage, and Solid Waste Management Plan for Lincoln County Oregon. January 1974.

KPFF Consulting Engineers. City of Toledo, Oregon Water Master Plan. (Draft Copy) January 20, 1997.

Newport, City of. Water and Sewer Data Base. 1987.

Robison, E. George. Water Availability for Oregon's Rivers and Streams: Volume 2; Technical Guide and Appendixes. Water Resources Department, Oregon. May 1991.

Snavely, Parke D., Jr., Norman S. MacLeod, Holly C. Wagner, and Weldon W. Rau. Geologic Map of the Cape Foulweather and Euchre Mountain Quadrangles, Lincoln County, Oregon. Department of the Interior, U.S. Geological Survey. 1976.

Snavely, Parke D., Jr., Norman S. MacLeod, Holly C. Wagner, and Weldon W. Rau. Geologic Map of the Waldport and Tidewater Quadrangles, Lincoln, Lane, and Benton Counties, Oregon. Department of the Interior, U.S. Geological Survey. 1976.

Snavely, Parke D., Jr., Norman S. MacLeod, Holly C. Wagner, and Weldon W. Rau. Geologic Map of the Yaquina and Toledo Quadrangles, Lincoln County, Oregon. Department of the Interior, U.S. Geological Survey. 1976.

State Water Resources Board. Freshwater Resources of the Oregon Coastal Zone. For the Oregon Coastal Conservation & Development Commission. 1975.

State Water Resources Board. Mid-Coast Basin. 1975.

Walker, George W. and Robert A. Duncan. Geologic Map of the Salem 1° by 2° Quadrangle, Western Oregon. Department of the Interior, U.S. Geological Survey. 1989.

Water and Power Resources Service. Siletz River Basin, Oregon Appraisal Report. May 1981.

Water and Power Resources Service. Damsite Review Team Report Siletz River Basin Study, Oregon. January 1980.

Water Resources Commission. A Guide to Water Management Agencies in Oregon. In Cooperation with The Strategic Water Management Group. November 1990.

Wells, Francis G. and Dallas L. Peck. Geologic Map of Oregon West of the 121st Meridian. In cooperation with the State of Oregon, Department of Geology and Mineral Industries. Department of the Interior, U.S. Geological Survey. 1961.

APPENDIX
pg 1 of 2

United States Department of the Interior

BUREAU OF RECLAMATION
Pacific Northwest Region
1150 North Curtis Road
Boise, Idaho 83706-1234

IN REPLY
REFER TO:

PN-6312
ADM-13.00

AUG 26 1996

Mr. Sam I. Sasaki
City Manager
810 S.W. Alder Street
Newport, Oregon 97365

Dear Mr. Sasaki:

This letter responds to your request dated August 12, 1996, for information on the Sunshine Creek and Big Rock Creek damsites.

In May 1981, the Bureau of Reclamation completed an appraisal report on water resource development potentials in the Siletz River basin. Included in this study was an evaluation of damsites on Big Rock Creek and Sunshine Creek. At that time, there was insufficient interest to continue into a feasibility study and detailed studies were not carried out to confirm preliminary findings.

As part of our Willamette River Basin Water Optimization Study, Reclamation reviewed water needs and the cost of new storage in the Siletz and Luckiamute River basins. A preliminary report on the Siletz River basin was completed in October 1991, and a report on Lincoln, Polk, and Yamhill Counties was completed in November 1992. Lincoln County dropped out of the study when it was determined that a Federal role could not be justified for storage development in the Siletz River basin.

In all of these studies, Reclamation relied primarily on quadrangle maps to size reservoirs and to develop costs for new storage. Although a damsite review team visited the area and a surface geology report was completed for the 1981 study, there was little on-the-ground activity. None of the studies included core drilling, on-the-ground reservoir mapping, water quality testing, or other detailed physical investigation.

We are enclosing a copy of the 1981, 1991, and 1992 reports, the damsite review team report, and the geology report for your use. If you have any questions or we can be of further help, please call (208) 378-5089 or write to me at the letterhead address.

Sincerely,

Jane L. Ludwig
Program Manager
Liaison and Coordination

Enclosures