SOUTH COAST BASIN

ON LOAN
from
STATE WATER RESOURCES BOARD
500 Public Service Building
Salem, Oregon 97310

STATE WATER RESOURCES BOARD
SALEM, OREGON
January 1963

BOARD MEMBERS

KARL W. ONTHANK, CHAIRMAN - Eugene
GEORGE H. COREY, VICE CHAIRMAN - Pendleton
LaSELLE E. COLES - Prineville JOHN D. DAVIS - Stayton
LOUIS H. FOOTE - Forest Grove RUTH HAGENSTEIN - Portland
ROBERT W. ROOT - Medford

DONEL J. LANE, Executive Secretary

COVER PICTURE

Chetco River at mouth.
Corps of Engineers photo.

Price $2.50

TABLE OF CONTENTS

	PAGE
LIST OF TABLES	v
LIST OF FIGURES	vii
LIST OF PLATES	ix
PURPOSE AND INTRODUCTION	x
FINDINGS AND CONCLUSIONS	xi
PART I THE BASIN	
PHYSICAL FEATURES	
Location and Size	1
Subbasin Divisions	2
Stream System	3
Climate	4
ECONOMIC FACTORS	
History of Settlement	6
Population	7
Transportation	8
Land Use and Ownership	9
Agriculture	12
Forestry	16
Mining	20
Commercial Fishing	23
Manufacturing	24
Recreation	27
PART II WATER SUPPLY, USE, AND CONTROL	
SURFACE WATER	
Annual Yield	31
Seasonal Distribution	34
Extreme Discharges	37
Water Rights	40
Legal Restrictions	45
Maximum Legal Depletion	46
GROUNDWATER	
Geology	49
Occurrence	49
Water Rights and Depletions	52

TABLE OF CONTENTS

	PAGE
WATER USE AND ASSOCIATED PROBLEMS	
Domestic	53
Municipal	55
Irrigation	57
Power	62
Industrial	64
Mining	65
Recreation	66
Wildlife	67
Fish Life	68
Pollution Abatement	75
WATER CONTROL	
Flooding	78
Drainage	83
Erosion	84
WATER RESOURCES DEVELOPMENT POTENTIAL	
General	85
Chetco Subbasin	87
Sixes Subbasin	89
Coquille Subbasin	90
Coos Subbasin	92
APPENDIX	
Authority	97
Statutory References	100
Orders by State Engineer	102
Selected Bibliography	105
Table A, Hydrological Stations Summary	110
Table B, Watershed Reconnaissance Data Summary	111
Table C, Potential Water Development Projects	115
Table D, Recommended Minimum Flows	118
Abbreviations and Symbols	123
Approximate Hydraulic Equivalents	124
Acknowledgment	125

L I S T O F T A B L E S

TABLE		PAGE
1	Areas of Counties within South Coast Basin . . .	1
2	Subbasin Areas and Miles of Streams	2
3	Length and Gradient of Principal Streams	4
4	County Population Distribution by Subbasin . . .	7
5	Land Ownership or Administration	10
6	Land Use	12
7	Agricultural Land Use	13
8	Gross Agricultural Income	15
9	Commercial Forest Areas and Sawtimber Volumes .	17
10	Present and Potential Timber Harvest	19
11	Commercial Fish Landings at South Coast Ports .	23
12	Number of Wood-Using Industrial Establishments .	25
13	Installed Projection Capacity of Certain Wood-Using Industries	26
14	Production and Disposition of Wood Residues from Sawmills, Plywood and Veneer Plants	27
15	Estimated Average Annual Yield by Subbasin . . .	31
16	Minimum, Maximum and Average Annual Yields of Principal Streams	33
17	Average Monthly Discharges of Principal Streams	35
18	Extreme Discharges at Selected Stream Gaging Stations	38
19	Minimum Miscellaneous Discharge Measurements on Principal Ungaged Streams	39
20	Surface Water Rights Summary	42

L I S T O F T A B L E S

TABLE		PAGE
21	Reservoir Rights Summary	44
22	Maximum Legal Annual Depletions Consumptive Rights	46
23	Average Annual Surface Yield vs. Legal and Estimated Depletion	48
24	Legal Annual Groundwater Depletion	53
25	Public Water Systems	56
26	Irrigation Development	59
27	Irrigation Water Sources	60
28	Present and Potential Cropland and Irrigated Land	61
29	Undeveloped Hydroelectric Power Sites	63
30	Surface Areas of Lakes, Ponds, and Reservoirs . .	67
31	Salmon and Steelhead Sports Catch	69
32	Recommended Minimum Flows for Fish Life	74
33	Sewerage Systems	76
34	Coquille Flood Damages	81
35	Drainage Problems	83

LIST OF FIGURES

FIGURE		PAGE
1	Long-term Average Monthly Precipitation at Representative Stations	5
2	Long-term Average Monthly Air Temperature at Port Orford	6
3	County Population Growth	8
4	Land Use	11
5	Value of Farm Products Sold	14
6	Log and Lumber Production	18
7	Value of Mineral Production	20
8	Mineral Deposits	22
9	Value Added by Manufacturing	24
10	Annual Use of State Parks	28
11	Annual Yields of Two Streams in the Coos Subbasin at Stations Shown	32
12	Annual Yields of Three Streams in the Coquille Subbasin at Stations Shown	34
13	Average Monthly Discharges at Selected Stream Gaging Stations	36
14	Discharge Pattern for the Water Year of Minimum Instantaneous Discharge, at Selected Stream Gaging Stations	37
15	Chronological Depletions	40
16	Legal Depletions by Stream Mile for Selected Major Streams	43
17	Average September Discharge and Legal Depletion	47
18	Groundwater Geology	50
19	Typical Geologic Cross Section of Coos Bay Sand Dunes	51

L I S T O F F I G U R E S

FIGURE		PAGE
20	Irrigated Lands	58
21	Irrigated Acreage	60
22	Generalized Plot of Anadromous Fish Activities . .	70
23	Daily Water Temperatures, South Fork Coquille River near Powers, Water Year 1958	72
24	Relationship between Utilizable Spawning Gravel and Flow for the Coquille North Fork at Mile 36.0	73
25	Problem Areas	79
26	Flood Frequencies, Coquille River	82

L I S T O F P L A T E S

PLATE	
1 and 1A	South Coast Drainage Basin
2 and 2A	Hydrological Stations and Average Annual Precipitation
3 and 3A	Water Rights
4 and 4A	Anadromous Fish Distribution
5 and 5A	Potential Damsites

Note: Plates appear at the back of the report.

PURPOSE AND INTRODUCTION

The purpose of this report is to set forth in a condensed form the major items considered by the State Water Resources Board in its formulation of an integrated, coordinated program of use and control of the water resources of the South Coast Basin in Oregon.

The board's investigation activities were completed in June 1962. The study was made in conformity with ORS 536.300 (1) which states:

> "The board shall proceed as rapidly as possible to study: existing water resources of this state; means and methods of conserving and augmenting such water resources; existing and contemplated needs and uses of water for domestic, municipal, irrigation, power development, industrial, mining, recreation, wildlife, and fish life uses and for pollution abatement, all of which are declared to be beneficial uses, and all other related subjects, including drainage and reclamation."

Having completed the study necessary to formulate and implement an integrated, coordinated water resources program, the board proposes to adopt a program for the South Coast Drainage Basin. This program will fulfill the requirements of ORS 536.300 (2) which states:

> "Based upon said studies and after an opportunity to be heard has been given to all other state agencies which may be concerned, the board shall progressively formulate an integrated, coordinated program for the use and control of all the water resources of this state and issue statements thereof."

The program will be based on the standards outlined in ORS 536.310 and the data obtained in the basin investigation. A summary of basic data and factors examined in the study are contained in the report. Detailed information is available for examination in the files of the board in Salem, Oregon.

Data for study and evaluation were secured through (1) physical field activity, (2) review of available reports and data, (3) extensive personal contact, (4) formal hearings on the basin's water needs and problems (Coquille, November 16, 1961), (5) data supplied by the U. S. Department of Agriculture (Soil Conservation Service, Forest Service, and Economic Research Service) through a cooperative program with the State Water Resources Board, and (6) submission of data to the board, at its request, by local, state, and federal agencies and other groups.

F I N D I N G S A N D C O N C L U S I O N S

A. Water Supply

1. The total surface water yield of the basin is more than adequate on an average and critical year basis to meet existing and contemplated future needs for water.

2. The seasonal distribution of annual yields does not provide sufficient water for present needs during low flow months in some watersheds, particularly on small streams.

3. The upstream extension of the salt front in past years has reduced the usefulness of water for various purposes in some tidal areas, particularly on Coos Bay estuaries and the lower Coquille River.

4. Augmentation of the water supply during low flow periods can come through storage of surplus runoff.

5. There are potential storage sites on most watersheds but few detailed studies have been conducted.

6. Project economic studies have been related primarily to flood control for the Coos and Coquille stream systems. Past studies did not establish economic feasibility.

7. Additional benefits being included in the current comprehensive study of the Coquille River system may provide project feasibility.

8. Basic hydrological data are not adequate to accurately determine the streamflows of most stream systems. Establishment of stream gaging stations on the major streams would be necessary in order to completely evaluate the water resources of the basin.

9. Available data indicate that the groundwater resource is inadequate in both quantity and quality in most areas. Fairly large quantities of water are known to exist in some of the sand dune areas and further studies are needed to determine the potential of the remaining sand dune areas.

10. Groundwater represents a limited, but important source of water for domestic purposes.

11. Groundwater represents an important source of industrial water in the sand dune area north of Coos Bay.

B. Water Rights

12. Over 90 percent of the total average annual surface water yield of the basin is unappropriated and therefore subject to the jurisdiction of the State Water Resources Board.

13. The actual consumption of water is estimated to be about one-half of one percent of the total average annual surface water yield of the basin.

14. Claims for water rights with priorities prior to 1909, the year of enactment of the Oregon Surface Water Code, have not been adjudicated.

15. Adjudication of these rights would probably result in only minor additions to the presently registered water rights.

16. The waters of Clear Lake and its tributaries have been withdrawn by statute for municipal supply for the City of Reedsport.

17. ORS 538.120 regarding the withdrawal of Brush(es) Creek and tributaries needs legislative clarification as to whether the intent was to include all of Brush(es) Creek and tributaries or only that portion lying within Township 33 South, Range 14 West, Willamette Meridian.

18. Ferry and Geiger Creeks and tributaries have been withdrawn by the State Engineer for municipal supply for the City of Bandon.

C. Water Use and Control

19. Domestic, livestock, and wildlife uses, while important, represent comparatively small quantities of water in existing and contemplated future needs.

20. Inadequate quantity and quality of domestic water, primarily groundwater, restricts development of certain areas.

21. Although adequate surface water supplies are available in many areas having domestic water shortages, there has not been sufficient interest to develop these surface supplies, such development usually involving a more expensive community system.

FINDINGS AND CONCLUSIONS

22. Municipal use is and will continue to be one of the major consumptive uses of water.

23. The largest expansion of municipal water use is expected to occur in industrial areas of the basin.

24. Irrigation is one of the major consumptive uses of water.

25. Shortages of water to meet existing irrigation needs occur in several areas of the basin, primarily in smaller watersheds and tidal areas of the lower Coquille valley.

26. There is a substantial potential for irrigation expansion, but development is expected to be slow because of marginal economic feasibility.

27. The hydroelectric potential of the basin that is economically feasible of development is small. Limited potential exists on the Chetco, Elk, Coquille, and Coos Rivers.

28. There are plans for the development of the hydroelectric power potential of the Coquille River South Fork.

29. Industrial use is and probably will continue to be the major consumptive use of water.

30. There are raw materials available for expansion of wood-using industries. Water supplies are available for such expansion, but storage may be required in some areas to meet seasonal water shortages.

31. Present mining use of water is small and is associated primarily with placer mining operations during the high flow winter months.

32. The coastal beaches and ocean boating and fishing are a major attraction for out-of-basin tourists.

33. Recreational use of inland waters is of major importance to the basin and is associated primarily with sport fishing and boating.

34. Coastal lakes, particularly the Tenmile Lake system, have high recreational value.

35. Use of the stream systems by anadromous fish life is of major importance both to the basin and to the state.

F I N D I N G S A N D C O N C L U S I O N S

36. Anadromous fish spawning areas within the basin make a significant contribution to the important offshore commercial fishery.

37. The major problems affecting fish life are related to siltation and low seasonal streamflows.

38. There is potential for enhancement of anadromous fish runs.

39. Maintenance of adequate streamflows would benefit fish life, wildlife, and recreation.

40. The lack of stream gages does not permit making standard minimum flow computations except at a few locations.

41. Work by the Game Commission in determining minimum flow recommendations for fish life may provide a basis for establishing minimum flows for an interim period until stream gaging records are available.

42. Pollution of surface water is generally limited to salt water intrusion in tidal areas and high turbidity during flood stages.

43. Streamflows are not sufficient during low flow periods to assimilate major pollution or siltation loads.

44. Contamination of groundwater creates serious health hazards in many populated areas not served by community water and sewer systems.

45. Serious damages, caused by flooding and erosion, are annual occurrences on many streams, particularly the Coquille River.

46. Storage sites on the tributaries of the Coquille River are not capable of providing complete control of floods.

47. Partial control of floods would be beneficial.

48. Serious drainage problems exist on a large portion of the arable lands.

49. Physical and economic factors justify limited-purpose use of certain waters.

50. The highest and best use of the waters of the South Coast Basin appears to be for domestic, livestock, municipal, irrigation, industrial, mining, recreation, wildlife, and fish life purposes.

S O U T H C O A S T B A S I N S T U D Y

PART I THE BASIN

PHYSICAL FEATURES

Location and Size

The South Coast Basin is made up of two parts: the coastal drainage between the Umpqua and Rogue watersheds, designated as the Coos-Coquille Drainage Basin, No. 17 (see Plate 1); and the coastal drainage south of the Rogue watershed, designated as the Chetco Basin, No. 17A (see Plate 1A).

Major portions of Coos and Curry Counties and a small part of Douglas County are included in the South Coast Basin, as listed in Table 1. More than half of the basin is in Coos County, nearly four-tenths in Curry County, and the remaining one-tenth in Douglas County.

TABLE 1

AREAS OF COUNTIES WITHIN SOUTH COAST BASIN

COUNTY	TOTAL AREA	AREA WITHIN SOUTH COAST BASIN			
	Sq. Mi.	Sq. Mi.	Acres	Percent of County	Percent of Basin
Coos	1,627	1,598	1,022,700	98.2	53.6
Curry	1,629	1,126	720,600	69.2	37.7
Douglas	5,089	260	166,400	5.1	8.7
BASIN TOTAL	-	2,984	1,909,700	-	100.0

Note: Areas include coastal bays within main shoreline.

Source: Determined from SWRB Maps No. 17.6 and 17A.4.

The South Coast Basin is composed of many independent watersheds which together drain 2,980 square miles (1,910,000 acres) which is 3.1 percent of the total area of Oregon.

The basin has a coastline of about 145 miles, which extends in a general north-south direction, and measures about 44 miles at its longest east-west extension.

THE BASIN

Subbasin Divisions

To simplify analysis of the many stream systems and their different physical characteristics, as well as differences in needs and uses of water and levels of economic development, the South Coast Basin has been divided into four subbasins. The Chetco portion is treated as a unit referred to as the Chetco Subbasin. The Coos-Coquille portion is divided into three units referred to as the Sixes, Coquille, and Coos Subbasins which are numbered 1, 2 and 3, respectively, as shown on Plate 1.

Areas of these subbasins are listed by county in Table 2 along with miles of streams.

TABLE 2

SUBBASIN AREAS AND MILES OF STREAMS

SUBBASIN	COUNTY AREA					MILES OF STREAMS
	COOS Sq. Mi.	CURRY Sq. Mi.	DOUGLAS Sq. Mi.	TOTAL Sq. Mi.	TOTAL Acres	
Chetco	0	719	0	719	460,200	1,400
Sixes	41	401	0	442	282,900	680
Coquille	975	6	113	1,094	700,100	1,520
Coos	582	0	147	729	466,500	850
BASIN TOTAL	1,598	1,126	260	2,984	1,909,700	4,450

Note: Areas include coastal bays within main shoreline.

Source: Determined from SWRB Maps No. 17.6 and 17A.4.

The Chetco Subbasin includes coastal drainage from the California border to the Rogue watershed and covers 719 square miles lying entirely within Curry County. Most of the Sixes Subbasin is also within Curry County. It comprises the coastal drainage lying between the Rogue and Coquille watersheds and covers 442 square miles. The Coquille Subbasin, which consists primarily of the Coquille River watershed, is 1,094 square miles in area, mostly in Coos County. The Coos Subbasin also lies mainly in Coos County, and is 729 square miles in area. It is made up largely of Coos River drainage and lesser drainages emptying into Coos Bay. It extends north to the Umpqua drainage.

Reference is made to these subbasins throughout the report and

many of the tables and figures present data by subbasin, both for added detail and to facilitate direct comparison.

Stream System

All streams of the South Coast Basin head in the Coast Range and drain into the Pacific Ocean. There are about 750 named streams and over 1,000 unnamed streams. Together, these streams total approximately 4,500 miles in length. See Table 2 for stream miles by subbasin.

Major stream systems in the Chetco Subbasin, from south to north, are the Winchuck, Chetco, and Pistol Rivers and Hunter Creek. Major streams in the Sixes Subbasin are Euchre Creek, Elk River, Sixes River, Floras Creek, and Fourmile Creek.

The Coquille River comprises the largest individual watershed in the South Coast Basin. Its main tributaries are its South, Middle, North, and East Forks.

The principal tributary of Coos Bay is Coos River, whose main branches are the Millicoma River and the Coos South Fork.

Streams of the South Coast Basin are comparatively steep and short which accounts to a great extent for the runoff characteristics, as discussed later in this report.

Only a few streams are more than 50 miles in length. The longest is the Coquille River, extending 99 miles from its mouth to the headwaters of its South Fork. The Coquille South Fork alone measures 63 miles in length, the North Fork 53 miles, the Middle Fork 40 miles, and the East Fork 34 miles.

The Coos River measures 63 miles from its mouth to the headwaters of Lost Creek. Other streams in order of length are: Chetco River - 58 miles, Elk River - 35 miles, Sixes River - 31 miles, Pistol River - 22 miles, Hunter Creek - 20 miles, and Winchuck River - 20 miles.

A map showing the profiles of the principal streams is on file at the State Water Resources Board office in Salem. Their length and average gradient are given in Table 3.

Most of them have their steepest gradients near their headwaters and gradually flatten toward their mouths. This is illustrated by the Elk North Fork, relatively short (5 miles) headwater

tributary which has an average gradient of 400 feet per mile, compared to the Elk main stem which averages only 30 feet per mile for its 30-mile length.

TABLE 3

LENGTH AND GRADIENT
OF PRINCIPAL STREAMS

SUBBASIN AND STREAM	LENGTH Miles	ELEVATION DROP Feet	AVERAGE GRADIENT Ft./Mile
CHETCO			
Winchuck River	12	160	13
East Fork Winchuck River	8	1,840	230
Chetco River	58	4,000	69
Pistol River	22	3,200	147
Hunter Creek	20	3,040	154
SIXES			
Elk River	30	880	30
North Fork Elk River	5	2,080	400
Sixes River	31	880	28
South Fork Sixes River	8	1,840	230
COQUILLE			
Coquille River	36	30	1
South Fork Coquille River	63	2,930	47
Middle Fork Coquille River	40	1,400	35
North Fork Coquille River	53	1,580	30
East Fork Coquille River	34	2,360	70
COOS			
Coos River	6	0	0
South Fork Coos River	31	420	13
Tioga Creek	18	1,740	98
Williams River	21	1,180	56
Millicoma River	9	40	5
East Fork Millicoma River	24	1,640	69
West Fork Millicoma River	35	1,320	38

The coastal plain area is widest in the Coquille and Coos Subbasins as evidenced by the flatter gradients in the lower portion of their main stream systems. Tidewater influence extends farther upstream on these rivers than on the other streams of the basin. The effects of tides are noticed on the Coquille River as far upstream as Myrtle Point (stream mile 36), on the South Fork Coos River to Dellwood (stream mile 9), and on the Millicoma River to Allegany (stream mile 9).

Climate

The South Coast Basin has a humid climate resulting from the

moderating influences of the Pacific Ocean and from intensification of rainfall induced by the Coast Range. Plates 2 and 2A show lines of equal average annual precipitation and the location of hydrological stations in the basin. Table A of the Appendix lists these stations by name, giving location, type of station, and period of record. Most climatological stations are located along the immediate coast. Isohyetals in the interior of the basin were derived from precipitation estimates based on very limited information.

Elevations range from sea level to the 5,098-foot Pearsoll Peak in the Chetco Subbasin. Only a few peaks exceed 4,000 feet in the other subbasins. The highest, an unnamed mountain, rises 4,116 feet in the Coquille Subbasin.

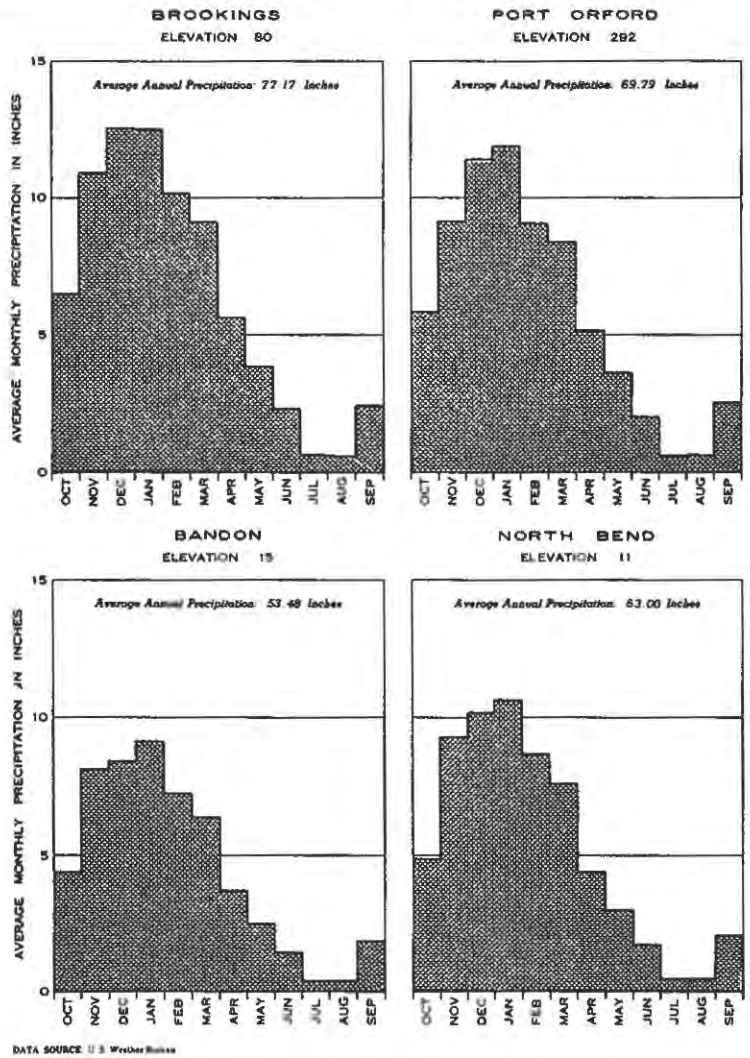


FIGURE 1. Long-term average monthly precipitation at representative stations.

Average annual precipitation is lowest along the coast, ranging from 50 to 70 inches, and increases with elevation to over 120 inches in parts of the Coast Range.

The effect of elevation is also shown by the distribution of snowfall. It averages as little as 1 inch annually along the coast, increases to 3 inches at Powers (elevation 300 feet), 11 inches at Golden Falls (elevation 650 feet), and 57 inches at Fir Glen (elevation 2,300 feet). Snow does not remain on the ground long enough to have an appreciable effect on stream runoff characteristics.

Figure 1 illustrates monthly distribution

of seasonal precipitation for representative stations. Nearly 80 percent of the average annual precipitation occurs during the six months of October through March with about 50 percent occurring during November, December and January. Precipitation during the three lowest months of the year, June, July and August, is only about four percent of the annual average and amounts to less than four inches in most agricultural areas of the basin.

Average annual temperatures range from 50 to 54 degrees Fahrenheit (° F.) at the climatological stations, which are located mainly along the coast and in valley bottoms. Figure 2 shows average monthly temperatures for the Port Orford station, which is representative of the pattern existing along the coast. Average monthly temperatures at this location range from 46° F. in January to 59° F. in August. Mean minimum temperatures range from 40 to 51° F. for the same months and mean maximums from 53 to 67° F. Recorded temperature extremes vary from 0° F. (at Coquille) to 107° F. (at McKinley).

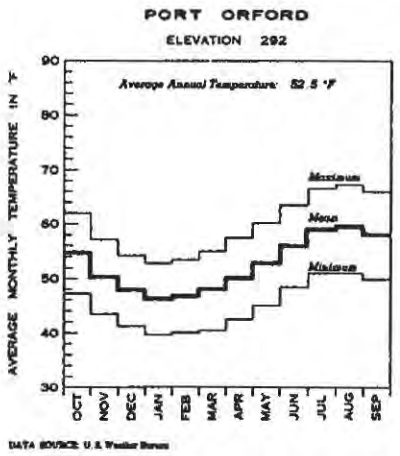


FIGURE 2. Long-term average monthly air temperature at Port Orford.

The growing season averages about 250 days in the Chetco Subbasin and decreases in a northerly direction along the coast to about 200 days in the Coos Subbasin. It also decreases with higher elevations dropping to about 150 days along the eastern boundary of the basin.

ECONOMIC FACTORS

History of Settlement

The coast of southern Oregon was first sighted by Spanish explorers in 1543, but no landings were attempted in the 16th, 17th and 18th centuries. The first white men who crossed this area were trappers of the Hudson Bay Company in 1826. The first settlement in the basin was established in 1851 at Port Orford.

More settlements were founded in the same decade, settlers being attracted by opportunities in agriculture, lumbering, fishing, and mining. Mining and fishing continued to have

some influence on population growth in the early years. Expansion in lumbering and agriculture, however, have been the principal factors in the basin's economic growth since 1900. Tourism's role in the area's economy has been increasing in recent years.

Population

The estimated total population of the South Coast Basin in 1960, based on U. S. Bureau of the Census data, was 68,000, which is about four percent of the total population of Oregon. This gives a population density of 23 persons per square mile for the basin, compared to 18 persons per square mile for the state.

Table 4 shows the population distribution in the basin by county and subbasin. Coos County contributes about 80 percent to the basin population and Curry County most of the remainder.

TABLE 4

COUNTY POPULATION DISTRIBUTION
BY SUBBASIN
1960

SUBBASIN	COUNTY			TOTAL	POPULATION DENSITY Pers./Sq. Mi.
	Coos	Curry	Douglas		
Chetco	-	8,050	-	8,050	11.2
Sixes	750	4,750	-	5,500	12.4
Coquille	19,600	0	200	19,800	18.1
Coos	34,600	-	50	34,650	47.5
BASIN TOTAL	54,950	12,800	250	68,000	22.8

Note: Population figures rounded to nearest 50.

Source: SWRB estimate, based on Bureau of Census figures.

The Coos Subbasin, with a population of 34,650, contributes about 50 percent of the basin population, and has the highest population density of all subbasins, 48 persons per square mile. The Coquille Subbasin ranks second with a population of 19,800. The Chetco Subbasin, with a population of 8,050, has the lowest population density, 11 persons per square mile, and the Sixes Subbasin the lowest population, 5,500.

T H E B A S I N

Trends in population of Coos and Curry Counties are illustrated by Figure 3. Coos County had a population of 445 in 1860 and experienced an uninterrupted rise to 55,000 in 1960, based mainly on expansion of agriculture, lumbering, and shipping. Curry County had a population of 393 in 1860 and showed a considerably slower population growth than Coos County. In the last 10 years, however, the population of Curry County started to climb at an accelerated rate, reaching 14,000 in 1960. This was caused primarily by a rapid increase in the logging and lumbering industries.

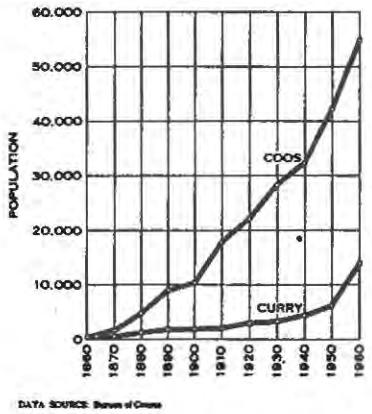


FIGURE 3. County population growth, 1860-1960.

The 11 incorporated cities in the basin and their 1960 populations are: Brookings (2,637) and Gold Beach (1,765) in the Chetco Subbasin; Port Orford (1,171) in the Sixes Subbasin; Coquille (4,730), Myrtle Point (2,886), Bandon (1,653), and Powers (1,366) in the Coquille Subbasin; and North Bend (7,512), Coos Bay (7,084), Empire (3,781), and Eastside (1,380) in the Coos Subbasin. There are many unincorporated communities in the basin, all having populations under 300.

Transportation

The Oregon Coast Highway, U. S. 101, is the principal highway through the South Coast Basin, generally following the coast and connecting the main population centers of the basin. The only surfaced east-west route through the basin is Oregon 42, running from U. S. 101 through Coquille to Roseburg. Secondary roads extend into many of the watersheds.

There is regular bus service on U. S. 101 and Oregon 42. Regular freight truck service is available to all population centers in the basin.

The only railroad serving the basin is a branch line of the Southern Pacific, running from Eugene through Reedsport to Coos Bay and Coquille, and terminating at Powers. There is no railroad in Curry County.

Scheduled airline service is available only to North Bend. Although there are several airports and landing strips in the basin, only those at North Bend, Bandon, Sixes, and Gold Beach are classified by the Oregon State Board of Aeronautics as adequate for public use.

Ocean shipping plays a major part in the transportation system and economy of the South Coast Basin. The principal seaport is the Port of Coos Bay, the only deep water harbor between the Columbia River and San Francisco. Total freight traffic in Coos Bay amounted to 3,200,000 tons in 1960, of which 1,400,000 tons were from ocean traffic and 1,800,000 tons were made up of logs rafted within the bay.

The leading ocean cargo in 1960 was lumber and other wood products, totaling 940,000 tons, followed by logs, totaling 160,000 tons. All logs and about 30 percent of the lumber and wood products shipped from Coos Bay were exported to foreign countries. The principal receipts were gasoline and other oil products, totaling 234,000 tons. All other shipments and receipts, including food, building materials, machinery, and other miscellaneous items, totaled only 63,000 tons. Foreign imports totaled only 1,100 tons.

Port facilities exist also at Bandon, Port Orford, Gold Beach, and Brookings. These ports are too shallow for large ocean-going freighters and shipments are restricted to barges and smaller crafts, primarily lumber and fishing vessels.

Land Use and Ownership

Table 5 shows land ownership by subbasin in terms of federal, state, county and municipal, and private ownership.

Fifty-eight percent of the basin area, (1,730 square miles) is privately owned. About 40 percent of this is held by 16 individuals or corporations, predominantly large timber holdings of 5,000 acres or more. Most of the remaining 60 percent is owned by ranchers and farmers.

Thirty-six percent of the basin area (1,070 square miles) is in federal ownership. Two-thirds of this land is in national forests and includes portions of the Siuslaw National Forest along the coast north of Coos Bay and portions of the Siskiyou National Forest in the Coquille, Sixes, and Chetco Subbasins.

Most of the remaining federal land, including national land

reserve (formerly called public domain), Oregon and California railroad revested land, and Coos Bay wagon road revested land, is administered by the Bureau of Land Management. Most of this is in the eastern Coos and Coquille Subbasins, and is intermingled with private land in a checkerboard pattern.

TABLE 5

LAND OWNERSHIP OR ADMINISTRATION
1961

SUBBASIN	U. S. FOREST SERVICE		OTHER FEDERAL		STATE, COUNTY AND MUNICIPAL 1/		LARGE PRIVATE 2/		SMALL PRIVATE		TOTAL AREA
	Area Sq.Mi.	% of Total	Area Sq.Mi.	% of Total	Area Sq.Mi.	% of Total	Area Sq.Mi.	% of Total	Area Sq.Mi.	% of Total	Sq.Mi.
Chetco	478	66	27	4	9	1	67	9	138	19	719
Sixes	114	26	17	4	11	2	98	22	202	46	442
Coquille	108	10	247	23	21	2	235	21	483	44	1,094
Coos	13	2	68	9	140	19	292	40	216	30	729
BASIN TOTAL	713	24	359	12	181	6	692	23	1,039	35	2,984

1/ Includes coastal bays.
2/ Private ownerships of more than 5,000 acres.

Data Source: U. S. Department of Agriculture

The State of Oregon owns five percent (144 square miles) of the basin area. Sixty percent of this is in the Elliott State Forest in the Coos Subbasin. Fourteen percent of the state-owned land is in state parks and the remainder consists of highway rights-of-way, water areas, and tracts administered by the State Land Board.

Counties and municipalities own about one percent (37 square miles) of the basin area. The largest block, about 60 percent, consists of the Coos County Forest south of Coos Bay.

Figure 4 and Table 6 show land use in the South Coast Basin. The predominant land use is for the growing of timber. Forests cover 89 percent (2,662 square miles) of the basin area. About 95 percent of this is in commercial forest lands, which are lands available for and physically capable of growing merchantable timber.

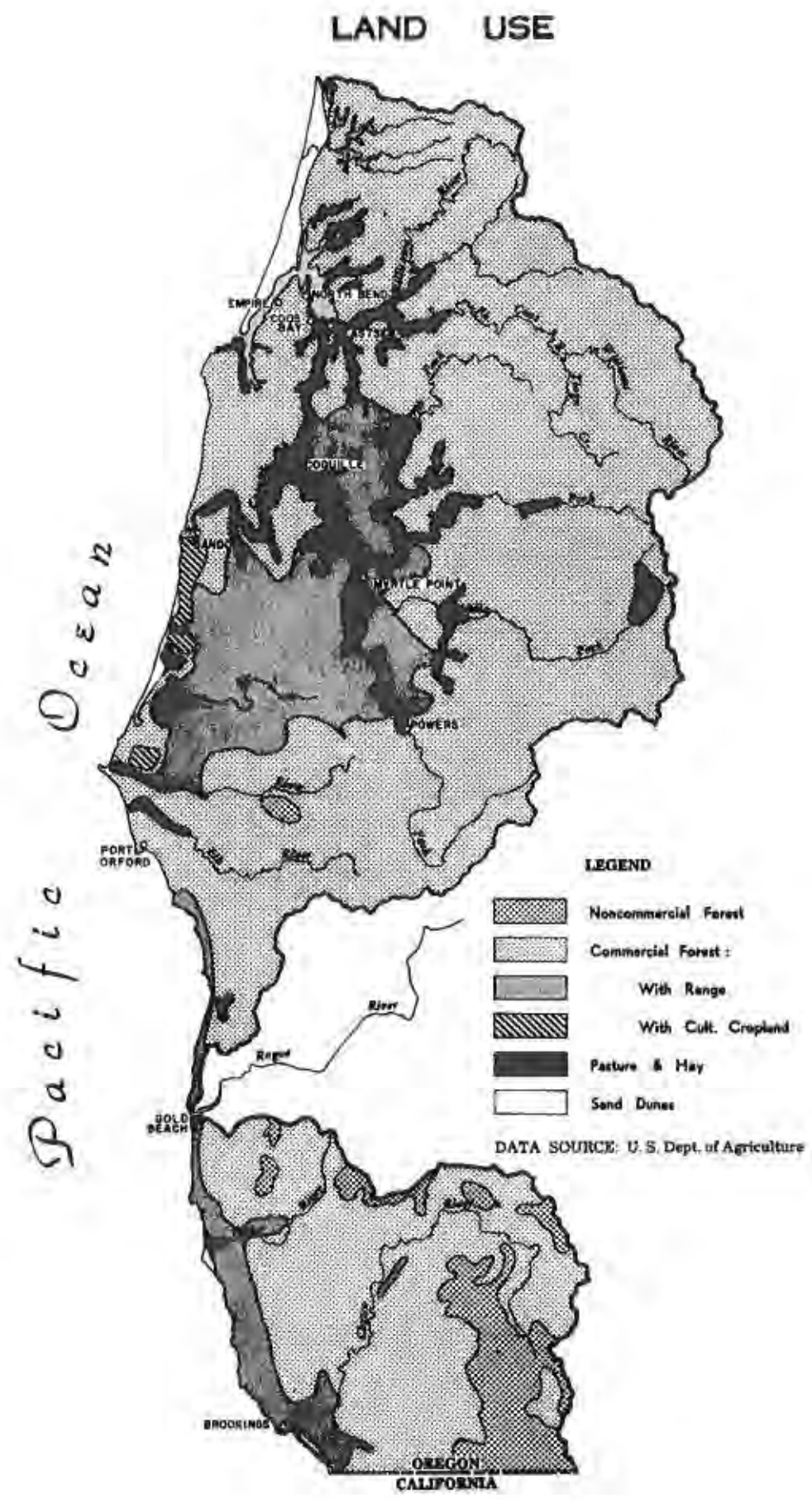


FIGURE 4. Generalized Land Use.

T H E B A S I N

Seven percent of the basin area, (213 square miles) is agricultural land. About 40 percent of this is cropland and 60 percent is rangeland. In addition, 183 square miles of forest land are used for livestock grazing.

TABLE 6

LAND USE
1961

SUBBASIN	COMMERCIAL FOREST		NONCOMMERCIAL AND RESERVED FOREST		CROPLAND		RANGELAND		OTHER LAND		TOTAL AREA
	Area Sq.Mi.	% of Total	Area Sq.Mi.	% of Total	Area Sq.Mi.	% of Total	Area Sq.Mi.	% of Total	Area Sq.Mi.	% of Total	Sq.Mi.
Chetco	521	72	84	12	4	1	22	3	12	2	719
Sixes	371	84	8	2	12	3	34	7	13	3	442
Coquille	934	85	17	2	53	5	67	6	20	2	1,094
Coos	621	85	18	2	16	2	5	1	64	9	729
BASIN TOTAL	2,447	85	127	4	85	3	128	4	109	4	2,984

Data Source: U. S. Department of Agriculture

The remaining four percent of the basin area (109 square miles) is used for other purposes, such as cities, rural residential areas, highways, and water areas.

The pattern of land use does not vary greatly between subbasins. The Chetco Subbasin has the largest percentage of forests, 95 percent of its total area, and the smallest percentage of cropland, only 1 percent. The Coquille Subbasin has the highest percentage of cropland, 5 percent of its area.

A breakdown of agricultural land use by individual watersheds is listed in Table B in the Appendix.

Agriculture

The dominant agricultural activities in the South Coast Basin are the production of milk, beef cattle, sheep, cranberries, and lily bulbs. These activities have developed in accordance with the physical capabilities of the land. Dairying is prominent in the Coos and Coquille valleys and in the tidal areas

where frequent flooding and drainage problems limit the use of the land to the production of hay and pasture. Rangeland and grazed forest lands are utilized by cattle, sheep, and goats. Cranberries are well adapted to the peaty soils and climatic conditions of the coastal area of the lower Coquille and Sixes Subbasins while lilies thrive in the Chetco Subbasin on the well-drained sandy soils south of Brookings.

Use of agricultural land, including forested grazing land, in the basin is listed in Table 7 and agricultural lands are delineated on Figure 4. All lands used for agricultural purposes in 1961 totaled 254,000 acres, or 13 percent of the total basin area.

TABLE 7

AGRICULTURAL LAND USE IN ACRES
1961

AGRICULTURAL LAND USE	SUBBASIN				BASIN TOTAL
	Chetco	Sixes	Coquille	Coos	
GRAZING LAND					
Forested land	11,300	34,800	67,000	4,300	117,400
Rangeland	14,200	21,900	42,500	3,100	81,700
TOTAL GRAZING LAND	25,500	56,700	109,500	7,400	199,100
DRY CROPLAND					
Pasture and hay	1,590	6,580	26,500	9,190	43,860
Other cropland	530	10	860	140	1,540
TOTAL DRY CROPLAND	2,120	6,590	27,360	9,330	45,400
IRRIGATED CROPLAND					
Pasture and hay	190	1,130	6,000	1,160	8,480
Other cropland	250	170	390	50	860
TOTAL IRRIGATED CROPLAND	440	1,300	6,390	1,210	9,340
TOTAL CROPLAND	2,560	7,890	33,750	10,540	54,740
TOTAL AGRICULTURAL LAND	28,060	64,590	143,250	17,940	253,840

Data Source: U. S. Department of Agriculture

Grazed forest lands and rangelands total over 199,000 acres, or 10 percent of the basin area. Grazed forest land (grazed land having at least a 10 percent stock of trees) accounts for 117,000 acres of this and rangeland (isolated areas of prairie-type grass) accounts for the remaining 82,000 acres.

T H E B A S I N

Cropland, which is land used for the production of crops or pasture, totals about 55,000 acres of which nearly 52,000 are presently in hay and pasture.

Although relatively small acreages are used for the production of cranberries and lily bulbs, these crops have considerable economic importance. A total of 530 acres are in cranberry bogs, located primarily in the coastal area between the Coquille and Elk Rivers. Lily bulb production is concentrated in the coastal area south of Brookings and presently utilizes 270 acres.

Irrigated cropland totals 9,340 acres, of which 8,400 acres are in pasture and hay. The remainder is principally in cranberries and lily bulbs.

Trends for Coos and Curry Counties in the value of farm products sold are illustrated in Figure 5. The value of total agricultural production, based on five-year census periods, has increased continuously since 1939 although there has been decreases during this time for each major commodity group. Values reflect both prices and production. The dairy industry has maintained nearly constant values since 1944, with higher prices offsetting an 18 percent drop in milk production. During the same period increased cranberry and lily bulb production has more than offset a general drop in prices.

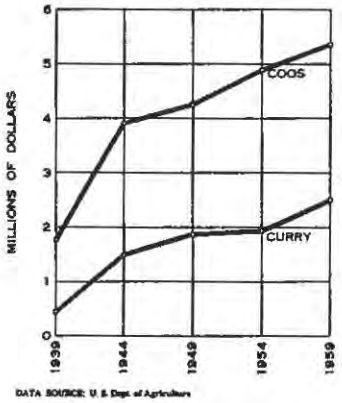


FIGURE 5. Value of farm products sold, by county, 1939-1959.

The 1959 gross agricultural income from the sale of crops and livestock products in the basin was estimated at about 6.8 million dollars. In addition, over 1 million dollars was derived from the sale of forest products by farmers. Table 8 lists the gross agricultural income within the basin by types of commodities sold.

Income for the sale of livestock products accounted for 78 percent (5.3 million dollars) of the total agricultural income, and crops accounted for the remaining 22 percent (1.5 million dollars). Dairy products alone brought in 3.3 million dollars, or nearly half of the total agricultural income. Bulbs and flowers accounted for 0.8 million dollars, and nearly 0.5 million dollars was derived from the sale of cranberries.

THE BASIN

Approximately one-half of the agricultural income of the basin was from products raised in the Coquille Subbasin and the remainder was distributed nearly uniformly over the balance of the basin.

TABLE 8

GROSS AGRICULTURAL INCOME
IN THOUSANDS OF DOLLARS
1959

COMMODITY	SUBBASIN				BASIN TOTAL
	Chetco	Sixes	Coquille	Coos	
Dairy products	81	362	2,148	732	3,323
Cattle and calves	72	212	796	132	1,212
Sheep and lambs	82	169	105	3	359
Other livestock products	65	129	181	65	440
TOTAL LIVESTOCK PRODUCTS	300	872	3,230	932	5,334
Bulbs and flowers	788	16	5	1	810
Fruits, nuts, and cranberries	2	101	303	43	449
Other crops	50	20	113	46	229
TOTAL CROPS	840	137	421	90	1,488
TOTAL CROPS AND LIVESTOCK	1,140	1,009	3,641	1,022	6,822

Data Source: U. S. Department of Agriculture

Marketing of agricultural products in the basin has been a problem because of the distance to major population centers and inadequate transportation facilities. The development of modern highways in recent years has helped to alleviate this situation but the cost of shipping farm supplies and farm products continues to be a significant expense to the producer.

Much of the milk that is produced in the Sixes, Coquille, and Coos Subbasins is sold to manufacturing and processing plants in the basin while most of that produced in the Chetco Subbasin is sold to local consumers. Livestock is marketed primarily in Portland by the producer or through livestock buyers. Cranberries are sold through a local cooperative association and Easter lily bulbs and cut flowers are sold to florists and nurseries throughout the United States.

Local processing of agricultural products is done by six dairies, three cheese factories, three meat packing companies, and one cranberry and fruit processing plant. The total employment in these plants averages only 70 persons.

T H E B A S I N

Forestry

The extensive forests of the basin, and the industry that accompanies the harvesting and processing of this resource, is of primary importance to the basin's economy. The stumpage value of timber harvested in Coos and Curry Counties in 1958 was an estimated 22 million dollars. An estimated 68 million dollars was added to the value through logging and wood products manufacturing (excluding particle board, pulp, and paper).

The forests which provide these values are the most variable in Oregon because of wide differences in soils, climate, and topography and a history of extensive fires. Coniferous forests, with Douglas fir the most abundant species, are the rule, but there is much local variation. In all, about 18 different softwood and 11 different hardwood tree species are found in the basin.

Forest land in the basin occupies 1,700,000 acres, which is 89 percent of the total basin area. Of this, 1,570,000 acres or 92 percent are classed as commercial, which are lands available for and capable of producing commercial timber. These lands support stands in excess of 34 billion board feet of commercial timber.

There are about 100,000 acres of reserved forest land, which is land reserved from timber harvesting by statutory or administrative regulation. About 81,000 acres are classed as noncommercial forest land, which is land physically incapable of producing timber crops, some of which are in reserved areas.

Reserved forest lands include national forest areas in near-natural condition which are managed for recreation and scientific observation and research; state and county parks; and Bureau of Land Management lands withdrawn for recreational development.

Table 9 lists commercial sawtimber areas and volumes by ownership - federal, state, county and municipal, and private. Twenty million board feet covering 940,000 acres, or about 60 percent of both commercial sawtimber volume and forest area are in private ownership. The remainder is primarily within the Siskiyou National Forest or is land administered by the Bureau of Land Management. Forty-two percent of the timber is in the Coquille Subbasin.

Forty-seven percent of the private forest land is owned by 16 private owners. Eleven of these owners have more than 10,000 acres each, the largest being about 160,000 acres. The major

blocks of large private forest ownership are in the Sixes, Coquille South Fork, Coos, and Millicoma drainages. The remaining 53 percent of the private land is held by about 3,300 owners, with holdings averaging about 150 acres.

TABLE 9

COMMERCIAL FOREST AREAS AND SAWTIMBER VOLUMES
1961

SUBBASIN	FEDERAL		STATE		PRIVATE		TOTAL 1/	
	AREA Thousand Acres	VOLUME Million Bd. Ft.	AREA Thousand Acres	VOLUME Million Bd. Ft.	AREA Thousand Acres	VOLUME Million Bd. Ft.	AREA Thousand Acres	VOLUME Million Bd. Ft.
Chetco	221	4,108	1	n.a.	112	1,750	334	5,858
Sixes	78	1,838	1	n.a.	158	2,600	237	4,438
Coquille	213	6,214	0	n.a.	374	8,200	587	14,414
Coos	38	1,330	54	n.a.	297	7,450	389	8,780
BASIN TOTAL	550	13,490	56	460	941	20,000	1,567	34,000

1/ County and Municipal breakdown not available. Total includes 20 thousand acres and 50 million board feet.
n.a. - Subbasin data not available.

Data Source: U. S. Department of Agriculture

Forests of the South Coast Basin, like others in Oregon, are undergoing a period of rapid conversion from a status of limited management to a status of intensive development and use. This process began a little later here than in the more accessible parts of the state but has progressed very rapidly.

Trends in timber harvest and lumber production in Coos and Curry Counties are shown on Figure 6. Log production has been increasing in Coos County since 1931 and reached a peak of 767 million board feet in 1955. Curry County's log production was comparatively small until 1949 but experienced a rapid rise to peak production of 640 million board feet in 1952. Average log production for the five-year period, 1956 through 1960, was 585 million board feet in Coos County and 456 million board feet in Curry County.

Only a small part of this timber harvest was from public land. From 1956 to 1960, log production from federal forests averaged

98 million board feet in Coos County and 63 million board feet in Curry County. There was little demand for public timber until about 1950 because of the abundance of more accessible high quality timber. As the private timber became less plentiful, the demand for public timber steadily increased.

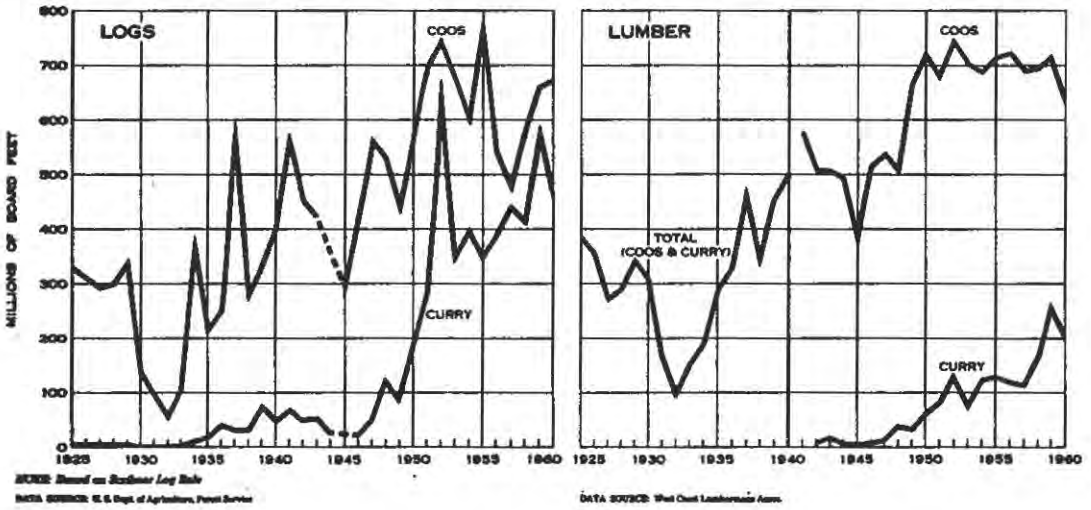


FIGURE 6. Log and lumber production by county, 1925-1960.

Lumber production in Coos County generally shows a similar pattern and magnitude to log production although annual fluctuations are smaller. Export of logs from Coos County to foreign countries has increased in recent years but this is partially offset by logs brought in from surrounding counties. Curry County's lumber production has always been well below its log production as a considerable portion of the logs are hauled to surrounding counties for processing.

The present annual capacity of the lumber and plywood industry in the South Coast Basin is about 1.4 billion board feet. The annual timber harvest has averaged about 1.1 billion board feet in recent years compared to the present timber growth of only about 0.6 billion board feet.

Table 10 compares allowable annual timber cut and ultimate sustained annual yield with the actual 1956 to 1960 average annual timber harvest in the South Coast Basin.

The present allowable annual cut of 191 million board feet

for federal forests was established in January 1961. The ultimate sustained yield of federal forests is estimated at 272 million board feet annually.

TABLE 10

PRESENT AND POTENTIAL
TIMBER HARVEST
IN MILLION BOARD FEET

TIMBER HARVEST	FEDERAL	STATE	COUNTY AND MUNICIPAL	PRIVATE	BASIN TOTAL
Average annual timber harvest, 1956-1960	172	8	n.a.	880	1,060
Allowable annual timber cut, 1961	191	14	n.a.	n.a.	n.a.
Ultimate sustained annual yield	272	29	20	800	1,121

Note: All volumes are log scale, Scribner rule, trees 11 inches d.b.h. and larger.
n.a. - Data not available.

Data Source: U. S. Department of Agriculture

It is difficult to determine an allowable annual cut for private land because of the wide variation in management objectives among various owners. However, it is known that harvesting is in excess of growth and the old growth timber stands on private lands are being depleted. Between 1949 and 1960, an estimated 11 billion board feet were cut from private forest lands, compared to an estimated 4 billion board feet of timber growth during the same period. If these rates of harvest and growth continue, private timber stands will be depleted in about 30 years. However, as forestry becomes a more profitable enterprise, private owners are adopting better forest management practices, and management on some of the more progressive private holdings is probably at least equal to that for public land. Generally, the large private holdings are among the better managed lands.

Privately owned forest land in the basin is generally of high site quality. If all this land were under intensive management it could eventually have a sustained yield of about 800 million board feet of timber annually. The present annual growth rate is less than 400 million board feet because existing forest stands are mostly in slow-growing old growth and much acreage is either poorly stocked or stocked with species having little commercial value at present.

In the past, most of the timber supply from the forest industry has come from private land. It appears that timber harvest from private land may be curtailed when the old growth timber is all harvested, creating a temporary shortage in timber supply. However, as the young growth stands grow to maturity, the timber harvest may be expected to again increase to about the sustained yield potential estimated in Table 10. The effect on the basin's economy of a temporarily smaller timber harvest may be partially offset by further diversification of the forest products industry, resulting in a more complete utilization of the available raw material.

Mining

Mining plays a comparatively small role in the economy of the South Coast Basin. The value of mineral production in 1961 amounted to 530,000 dollars in Coos County and 405,000 dollars in Curry County. Figures are not available for the basin proper. The average annual mineral production for the 10-year period 1952-1961 was 556,000 dollars in Coos County and 207,000 dollars in Curry County.

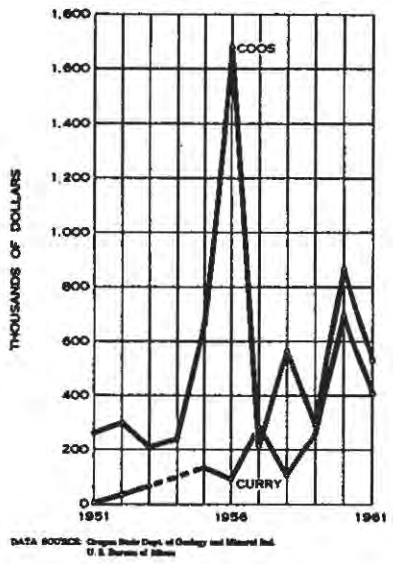


FIGURE 7. Value of mineral production by county, 1951-1961.

Figure 7 illustrates the trend in the value of mineral production in the two counties during the years 1951 to 1961. Stone, sand, and gravel were the principal minerals produced in Coos County during most of that period. The exception was in 1956, when chromite ranked first in value and accounted primarily for the unusually high total that year. Other minerals mined included gold, silver, and coal. In Curry County, chromite, stone, and sand and gravel ranked first at various times during the period with gold and silver being of minor importance. The increase in both counties in recent years was caused principally by the requirement for large quantities of stone, sand, and gravel for highway construction.

The location of known mineral deposits in the basin, including

approximate boundaries of coal fields and the location of holes drilled for oil, are shown on Figure 8. The majority of known mineral deposits, excluding stone and sand and gravel, are considered noncommercial at present because of grade, quantity, or distance to markets.

The Coos Bay coal field, lying between Hauser and Myrtle Point, covers 250 square miles. It is larger than all others in the state combined, and is the only field which has produced coal for commercial use. About three million tons were mined between 1854 and 1955, much of which was shipped via water to San Francisco. Present recoverable reserves are estimated by the State Department of Geology and Mineral Industries at 100 million tons or more of usable coal.

The Eden Ridge coal field, situated in the long bend of the South Fork of the Coquille River in southern Coos County, has proven reserves of approximately 50 million tons. About 60 percent, or 30-35 million tons, are believed to be usable. Pacific Power and Light Company has obtained rights to the coal and is considering its use in conjunction with a proposed steam-electric power plant on the south side of Eden Ridge.

Vast reserves of silica sand occur in the sand dune area north of Coos Bay. The high cost of removing iron particles probably precludes commercial use of the sand.

Gold, platinum, chromium, garnet, zircon, and iron (magnetite and ilmenite) are contained in the black sands found in the coastal benches extending south from Coos Bay to the California border. Profitable mining of these deposits depends on the development of more economical mining and separating methods.

Roadrock is limited in the northern part of the basin, but is more plentiful in the southern part. Sand and gravel are taken from most of the major streams.

There are gold, silver, and chromite mining claims scattered throughout the interior of the basin. Many are worked only to meet the minimum assessment requirements and are operated only intermittently.

Gold placer mining claims are found mainly in the headwaters of the Chetco, Elk, and Sixes Rivers. Recent claims include three filed on the Sixes River in the vicinity of river mile 18, and a series of claims extending at intervals from river mile 37 to 50 on the upper Chetco River. Preliminary estimates

MINERAL DEPOSITS

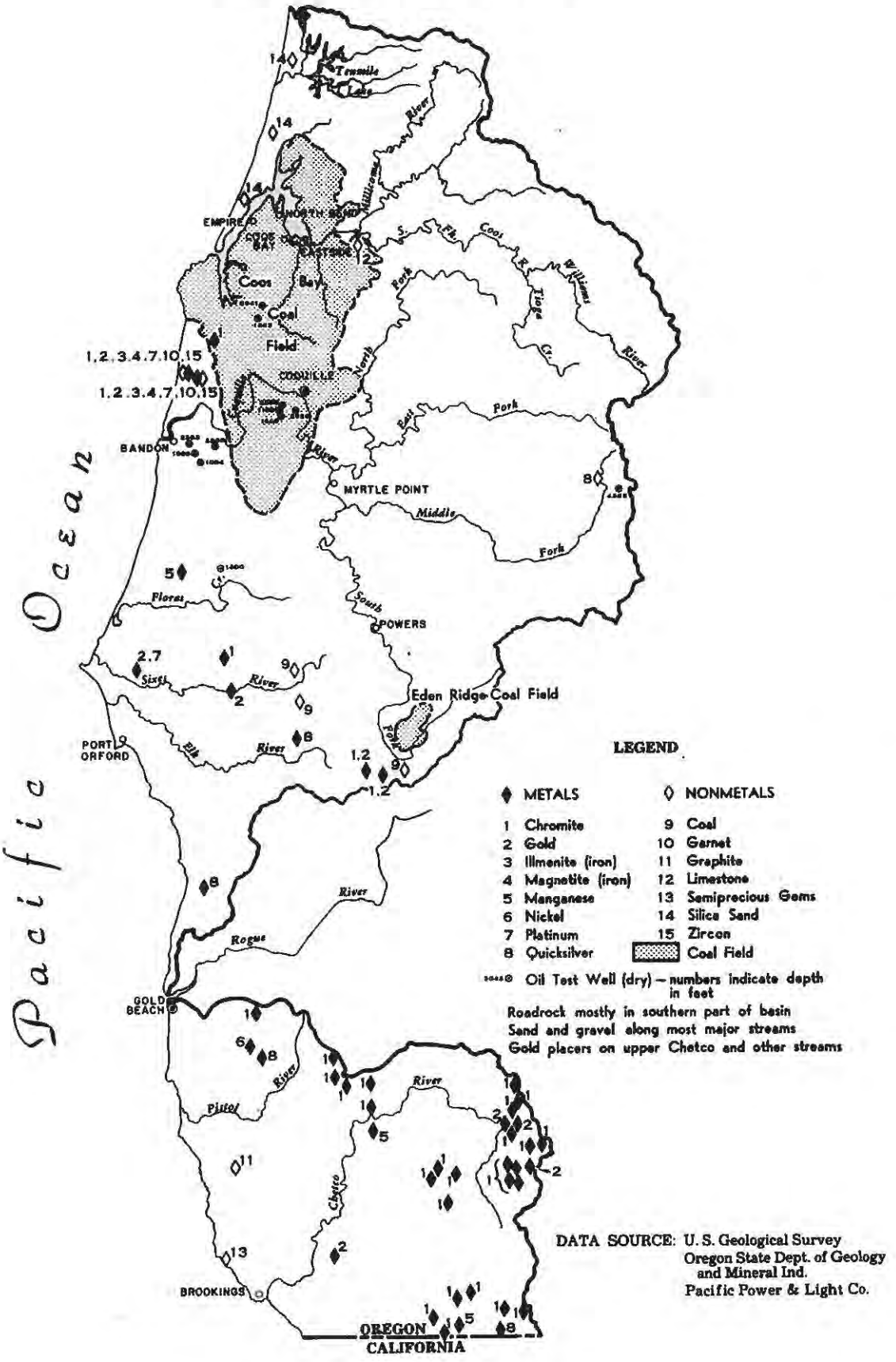


FIGURE 8. Generalized Mineral Deposits.

have placed the gold value at three to five million dollars along the part of the Chetco River involved. This entire operation is within the Kalmiopsis Wild Area.

Oil exploration to date has been limited mostly to Coos County. Twelve unsuccessful oil wells have been drilled, ranging in depth from 1,090 to 6,940 feet. Eleven are located in the Coos Bay-Bandon-Coquille area and one near Camas Valley.

Commercial Fishing

Commercial fishing is important to the economy, particularly to the four port areas located within the basin; Coos Bay, Bandon, Port Orford, and Chetco Harbor. Commercial landings were also started at Gold Beach in 1961 following the development of a boat basin at the mouth of the Rogue River. Almost 12 million pounds of fish were landed at the four South Coast ports in 1960, as shown by Table 11. More than half of these

TABLE 11

COMMERCIAL FISH LANDINGS
AT SOUTH COAST PORTS
IN THOUSANDS OF POUNDS
1960

SPECIES	COOS BAY	BANDON	PORT ORFORD	CHETCO HARBOR	BASIN TOTAL
Albacore tuna	162	0	0	1	163
Chinook salmon	686	41	54	119	900
Clams	11	0	0	0	11
Crabs	2,078	2	1,469	3,139	6,688
Ocean bottom fish	3,246	0	3	30	3,279
Shad	26	7	0	0	33
Shrimp	83	0	0	496	579
Silver salmon	159	8	11	1	179
Striped bass	12	1	0	0	13
Sturgeon	1	0	0	0	1
TOTAL	6,464	59	1,537	3,786	11,846

Data Source: Fish Commission of Oregon

fish were landed at Coos Bay. Landings vary considerably from year to year, depending principally upon the occurrence of fish and prevalent economic conditions.

Varieties of fish landed include chinook and silver salmon,

albacore tuna, striped bass, shad, sturgeon, and various species of bottom fish. Shellfish include clams, shrimp, and crabs.

The greatest poundage of fish landed were crabs, which were caught both offshore and within Coos Bay. Ocean bottom fish ranked second in poundage although their value per pound is comparatively low. Total salmon poundage ranks third but their value per pound is comparatively high.

The only commercial fishery still existing in inland waters is for shad, striped bass, and shellfish. Commercial salmon fishing in inland waters has been closed since 1956.

Information is not available with which to estimate the total value added to the economy of the area by commercial fishing. The first value of fish landed, which is the price paid to fishermen, is estimated at two million dollars. The value added by processing is known to be considerably higher. However, most of the fish landed within the basin are shipped to other areas for processing. It is difficult to predict the future of the commercial fishery because it is dependent upon economic factors within the basin and on a national and international scale, as well as upon the resource.

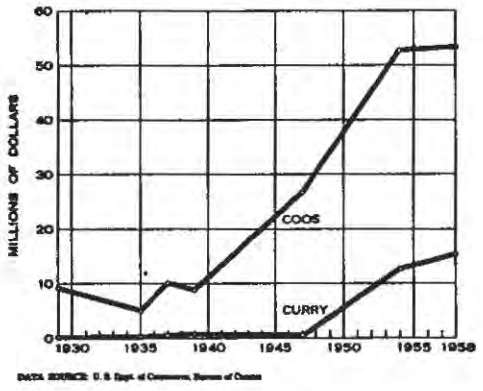


FIGURE 9. Value added by manufacturing, by county, 1929-1958.

Manufacturing

Manufacturing is of major importance to the economy of the South Coast Basin. The value added by manufacturing in 1958 was 56 million dollars in Coos County and 15 million dollars in Curry County. Lumber and wood products industries accounted for 93 percent of manufacturing in Coos County and 99 percent in Curry County. All other manufacturing, including food and fish processing, totaled only 4 million dollars in Coos County and 100,000 dollars in Curry County.

Figure 9 indicates the rapid rise of manufacturing in the basin. Coos County shows an uninterrupted increase in the value added by manufacturing since 1939. Expansion of manufacturing started later in Curry County, with a steady increase evident since 1947.

Employment figures further illustrate the importance of manufacturing, particularly of lumber and wood products. Of the 15,940 employees covered by unemployment compensation in Coos and Curry Counties in 1960, 8,820 or 55 percent were engaged in the lumber and wood products field. Food processing, which includes primarily dairies, cheese factories, and meat and fish processing plants, ranks second with 250 covered employees.

Wood-using industries are shown in Table 12. The majority are in the Coos Bay and Coquille areas. Production includes lumber, piling, plywood, pulp, paper, particle board, and other related products.

TABLE 12

NUMBER OF WOOD-USING INDUSTRIAL ESTABLISHMENTS 1959

PRODUCT	SUBBASIN				BASIN TOTAL
	Chetco	Sixes	Coquille	Coos	
PRIMARY PRODUCTS					
Lumber	24	12	38	27	101
Plywood, veneer	5	2	6	4	17
Shingles	0	0	2	1	3
REMANUFACTURED PRODUCTS	0	0	0	4	4
WOOD RESIDUE PRODUCTS					
Pulp	0	0	0	2	2
Hardboard	0	0	0	1	1
Particle board	0	0	0	1	1
SPECIALTY PRODUCTS					
Myrtlewood novelties	7	6	8	6	27
TOTAL	36	20	54	46	156

Data Source: U. S. Department of Agriculture

Table 13 shows the installed production capacity of certain wood-using industries within the basin. On the basis of 260 eight-hour shifts per year, the present installed sawmill, plywood, and veneer capacity requires a timber supply of more than 1.4 billion board feet. This may be somewhat more than the potential sustained timber growth, and is far more than the estimated present growth of 0.6 billion board feet.

Wood utilization has improved in recent years although there

is still a large amount of unused wood residue from lumber and

TABLE 13

INSTALLED PRODUCTION CAPACITY
OF CERTAIN WOOD-USING INDUSTRIES
1959

PRODUCT	UNIT	SUBBASIN				BASIN TOTAL
		Chetco	Sixes	Coquille	Coos	
Lumber	Thousand board feet per 8 hour shift	560	354	780	1,900	3,585 1/
Plywood and veneer	Million square feet per month 3/	15	10	45	30	100 2/
Hardboard	Million square feet per year 3/	-	-	-	27	27
Particle board	Million square feet per year 3/	-	-	-	12	12
Wood pulp	Tons per 24 hours	-	-	-	215	215
Paper	Tons per 24 hours	-	-	-	125	125

1/ Production capacity available for only 47 of 101 sawmills in the basin. The other 54 are small intermittent operations and their production is estimated at 10 percent of the total.

2/ No estimate available for two veneer plants.

3/ 3/8-inch basis.

Data Source: U. S. Department of Agriculture

plywood manufacture. Table 14 lists sources and types of residue from sawmills, plywood and veneer plants in Coos and Curry Counties. Only a small portion of the residues is presently utilized, and most of it only as fuel. A greater portion of the residue, including some that is presently used for fuel, could be manufactured into secondary wood products.

There is also a large volume of sound wood in logs that are left in the woods because they are presently considered unmarketable due to size, species, or defect. Better wood utilization depends upon such factors as the development of new products; expansion of markets for secondary wood products; the cost of raw materials, labor, and transportation; the disposal of effluent from processing plants; and the availability of industrial water.

An increase in industries making further utilization of presently wasted log production can be expected in the near

future because of the growing demand for secondary wood products and the abundant supply of unused wood available for their manufacture.

TABLE 14

PRODUCTION AND DISPOSITION OF WOOD RESIDUES FROM SAWMILLS, PLYWOOD AND VENEER PLANTS 1953

SOURCE AND TYPE OF RESIDUE	DISPOSITION			
	PRODUCTION Thousand Tons	FUEL Thousand Tons	REMANUFACTURE Thousand Tons	NOT USED Thousand Tons
SAWMILLS				
Solid material	426	162	31	233
Sawdust	272	160	0	112
Shavings	199	47	0	152
Bark	276	0*	0	276*
PLYWOOD AND VENEER PLANTS				
Cores	15	1	10	4
Veneer trim	42	15	0	27
Roundup, log trim, spur trim	24	0	0	24
Dry and residue	41	0	0	41
Bark	39	0*	0	39*
TOTAL	1,334	385	41	908

Note: All figures are dry weight.
*Part of bark used as fuel, but exact quantity is unknown.

Data Source: U. S. Department of Agriculture

Recreation

The South Coast Basin is among the more popular recreation areas of the state. It serves many of the recreational needs of the local population and attracts many people from the interior of the state and from other states.

The principal attraction is the Pacific Ocean, and the 145 miles of shoreline are dotted with state parks, waysides, and tourist facilities. Fishing, boating, and other water-based sports make extensive use of the basin's stream system, the several fresh water lakes along the coast, the bays, and the ocean itself. The large forest areas covering the slopes of the Coast Range provide hunting for many people each year.

T H E B A S I N

Recreation areas in the basin include 16 forest camps; 2 reserved national forest areas; 31 state parks, waysides, and roadside rest areas; 11 county parks; and 19 boat landings. A map showing these areas and a summary of the facilities at each is on file at the State Water Resources Board office in Salem.

Fourteen of the sixteen developed forest camps in the basin, containing 165 family units, are located within the Siuslaw and Siskiyou National Forests. These forests also include four reserved areas, totaling 82,000 acres. They are the 77,600-acre Kalmiopsis Wild Area in the Chetco Subbasin and the 2,700-acre Umpqua Dunes Scenic Area in the Coos Subbasin, both of which are managed primarily for recreation; and the Coquille River Falls and the Port Orford Cedar Natural Areas, totaling 1,750 acres, in the Coquille Subbasin, both of which are used primarily for scientific observation and research. In addition, 3,400 acres of Bureau of Land Management lands are withdrawn for recreational development.

Recreational use of national forests increased from 37,000 visits in 1956 to 59,000 visits in 1960. Camping, picnicking, fishing, and hunting were the most popular activities. National forests in the Coos and Coquille Subbasins received the heaviest use. The U. S. Forest Service has estimated that such recreational use will increase 20 times by the year 2000.

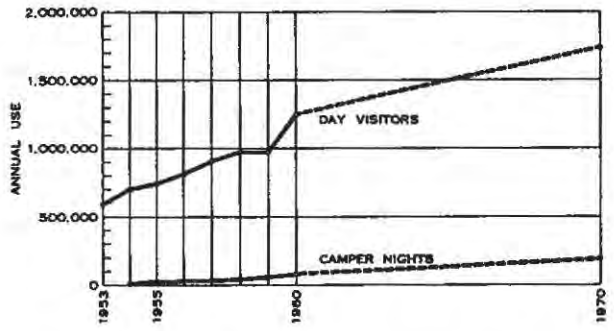


FIGURE 10. Annual use of state parks, 1953-1960, projected to 1970.

The state park system in the basin includes 16 state parks, 12 waysides, 2 myrtle preserves, and 1 roadside rest area, totaling 10,400 acres. The use of the state parks, as shown by Figure 10, illustrates the rapid increase in the popularity of this basin for recreation. The number of day visitors increased from 590,000 in 1953 to 1,250,000 in 1960 - 1,740,000 visitor days are expected in 1970. The number of camper nights increased from 14,000 in 1954 to 74,000 in 1960 - 190,000 are predicted for 1970.

A survey of the origin of cars of overnight campers at state parks, conducted by the State Parks Division in 1958, indicates the popularity of this basin with visitors from other states.

Of 10,400 cars checked at the Harris Beach, Humbug Mountain, and Sunset Bay State Parks, 7,000, or 67 percent, came from out of state. Of these, 49 percent were from California, 22 percent from Washington, 14 percent from Canada, and the remaining 15 percent from other states.

The 11 county parks in the basin are used primarily by the local population. Most of them are located on streams in the interior of the basin, principally in the Coquille Subbasin.

Much of the recreational activity within the basin is centered around fresh water and offshore fishing. Angling data for the three-year period, 1956 to 1958 show that sports fishermen caught an average of 18,500 salmon and 6,820 steelhead during 76,460 angler trips. In addition, thousands of angler trips are made to lakes and streams in the basin to catch other species of game fish. Shad and striped bass are caught in Coos and Coquille tidal areas.

Boating is an important recreational activity and is directly associated with the above-mentioned sport fishery. A survey of licensed boat owners in Coos County showed that $2,385,000 was spent in 1960 on auxiliary boating equipment, fishing equipment, and gas and oil for boats. State Marine Board data list 38 boats per thousand population in Coos County and 53 boats per thousand in Curry County, the latter being the highest ratio in the state. Also, many boats are brought to the basin from the interior of the state, especially from the Roseburg-Medford area.

Hunting is a major recreational pursuit during some periods of the year. Based on three recent seasons, an annual average of 3,560 black-tailed deer are taken by 6,400 hunters and 780 elk by 3,860 hunters. Black bear also provide much recreational hunting. The basin's numerous coastal lakes, marshy areas, bays, and estuaries provide habitat for a number of species of waterfowl, and hunting for them provides an additional recreational attraction.

Recreation on the lower Rogue River, while not being in the basin, is a major factor in the economy of the surrounding area, particularly in the vicinity of Gold Beach.

It is expected that recreation will become increasingly important to the economy of the basin. Highway improvements, particularly that of U. S. 101 along the coast and of Oregon 42 to the interior of the state, will make the recreational features of the basin more accessible. The diversity of

activities offered in the basin will also play an important role in future recreational expansion. As an example, fishing and boating are possible within the basin throughout the entire year due to the variety of ocean and freshwater fish. The alternative of boating on inland waters when weather conditions make offshore trips hazardous is an added inducement. The interior of the basin will probably continue to attract primarily local usage, while coastal attractions will continue to have wide out-of-basin appeal.

PART II

WATER SUPPLY, USE, AND CONTROL

SURFACE WATER

Annual Yield

Stream gaging records are quite fragmentary in the South Coast Basin necessitating the estimation of the runoff of individual stream systems. At present, the only active stream gages are on the Coquille South Fork, Millicoma West Fork, and Tenmile Creek. There has been no stream gaging on any of the streams of the Chetco and Sixes Subbasins. Precipitation stations, which can be used to estimate runoff, are located principally along the coast and at lower elevations and are not adequate to accurately estimate precipitation at higher elevations.

Only three gaging stations in the entire basin have a long period of record and all are in the Coquille River system. These are the Coquille South Fork at Powers, 1917 to 1926 and 1929 to 1961; the Coquille North Fork near Myrtle Point, 1929 to 1946; and Coquille Middle Fork near Myrtle Point, 1931 to 1946. All other stations have records of only two to seven water years.

Records of most stations were extended by correlation to a base period, 1930 to 1961, to facilitate the comparison of different stream systems within the basin. Yields of ungaged streams were estimated from runoff records of other streams and from precipitation records, and therefore may deviate considerably from actual yields.

TABLE 15

ESTIMATED AVERAGE ANNUAL YIELD BY SUBBASIN 1931-1961

SUBBASIN	AVERAGE ANNUAL YIELD	
	Acre-feet	Inches
Chetco	2,500,000	65
Sixes	1,500,000	64
Coquille	2,500,000	43
Coos	2,500,000	64
BASIN TOTAL	9,000,000	57

The term "yield" as used here is primarily a "net yield", or flow past given points or at mouths of streams. Average annual yield therefore reflects a composite change in consumptive use over the years.

All hydrological stations, active and inactive, are shown by location on Plates 2 and 2A. Table A of the Appendix lists these stations by name, giving location, type, and period of record.

Table 15 lists estimated average annual yields of the basin by

subbasin. The total average runoff of the South Coast Basin is estimated at 9,000,000 acre-feet for the period 1931 to 1961. This represents an average unit runoff of about 57 inches, compared to the average annual precipitation of about 80 inches.

Average annual yields of 2,500,000 acre-feet are estimated for the Chetco, Coquille, and Coos Subbasins. The Sixes Subbasin has an average annual yield of approximately 1,500,000 acre-feet. The Coquille system has the lowest unit runoff, about 43 inches, compared to over 60 inches in the other subbasins.

Minimum, maximum, and average annual yields of individual stream systems in the South Coast Basin are listed in Table 16. The maximum annual yields are as much as three times the minimum annual yields at several locations. Average annual yields are approximately twice the minimum annual yields.

Annual yields of all gaged streams in the Coos and Coquille Subbasins are shown on Figures 11 and 12. Although annual yields vary considerably from year to year, a period of predominately low years is evident during the 1930's and a period of high years during the 1950's.

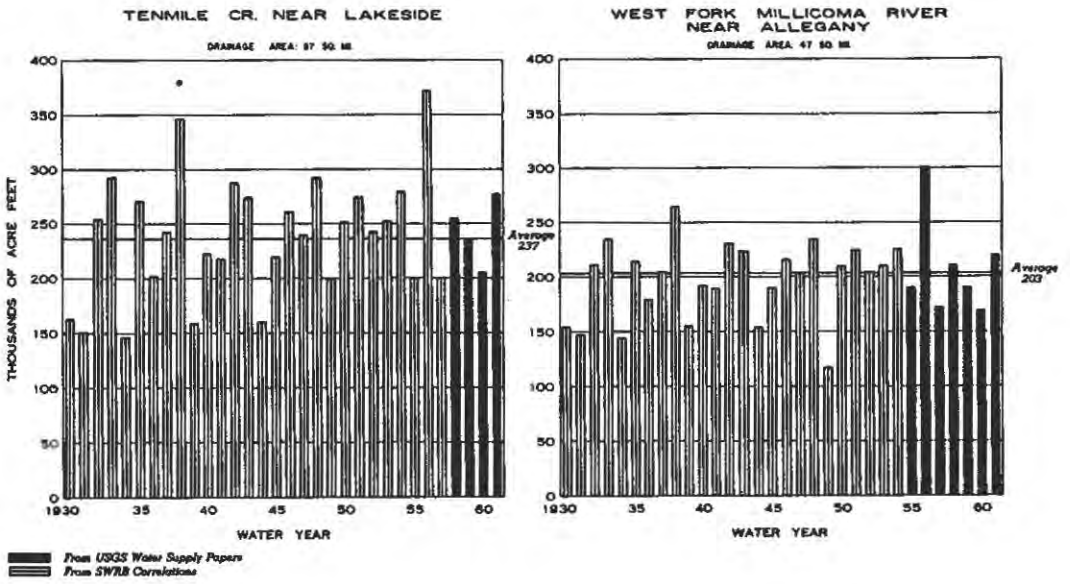


FIGURE 11. Annual yields of two streams in the Coos Subbasin at stations shown.

The lowest runoff occurred at most locations in the water year 1931, while the highest runoff occurred generally in the

TABLE 16

MINIMUM, MAXIMUM AND AVERAGE ANNUAL YIELDS OF PRINCIPAL STREAMS 1930-1961

SUBBASIN AND STREAM	DRAINAGE AREA Sq. Mi.	COMPLETE WATER YEARS OF RECORD	MINIMUM YIELD Acre-feet	MAXIMUM YIELD Acre-feet	AVERAGE YIELD	
					Acre-feet	Inches
CHETCO						
Chetco River at mouth	359	None	740,000	1,570,000	1,230,000	64
Pistol River at mouth	106	None	210,000	510,000	360,000	64
Hunter Creek at mouth	45	None	78,000	200,000	140,000	58
SIXES						
Elk River at mouth	94	None	180,000	470,000	330,000	66
Sixes River at mouth	129	None	240,000	630,000	440,000	64
Floras Creek at mouth	72	None	110,000	310,000	210,000	55
COQUILLE						
South Fork Coquille River above Panther Creek near Illahe	31	1957-61	49,000	170,000	100,000	60
South Fork Coquille River near Illahe	41	1957-61	65,000	240,000	140,000	64
South Fork Coquille River near Powers	93	1957-61	180,000	610,000	370,000	75
South Fork Coquille River at Powers	169	1917-26, 1930-61	287,000*	950,600*	573,500*	64*
Middle Fork Coquille River near Myrtle Point	305	1931-46	257,900*	1,020,000	590,000	36
East Fork Coquille River at mouth	135	None	150,000	450,000	290,000	40
North Fork Coquille River near Myrtle Point	276	1930-46	374,000*	1,120,000	720,000	49
Coquille River at mouth	1,058	None	1,220,000	3,900,000	2,400,000	42
COOS						
South Fork Coos River at mouth	254	None	660,000	1,280,000	930,000	69
East Fork Millicoma River at mouth	79	None	230,000	460,000	330,000	78
West Fork Millicoma River near Allegany	47	1955-61	120,000	301,800*	200,000	80
Millicoma River at mouth	151	None	450,000	880,000	630,000	78
Coos River at mouth	415	None	1,130,000	2,200,000	1,590,000	72
Tenmile Creek near Lakeside	87	1958-61	150,000	370,000	240,000	52

*Actual records. Other yields are estimates or correlations from available records extended to base period 1930-1961.

Source: U. S. Geological Survey and Oregon State Water Resources Board

water years 1938 and 1956. As an example, the lowest recorded annual yield of the Coquille South Fork at Powers was 287,000 acre-feet, which occurred in 1931, compared to the average annual yield of 574,000 acre-feet, and the highest recorded annual yield of 951,000 acre-feet, which occurred in 1938.

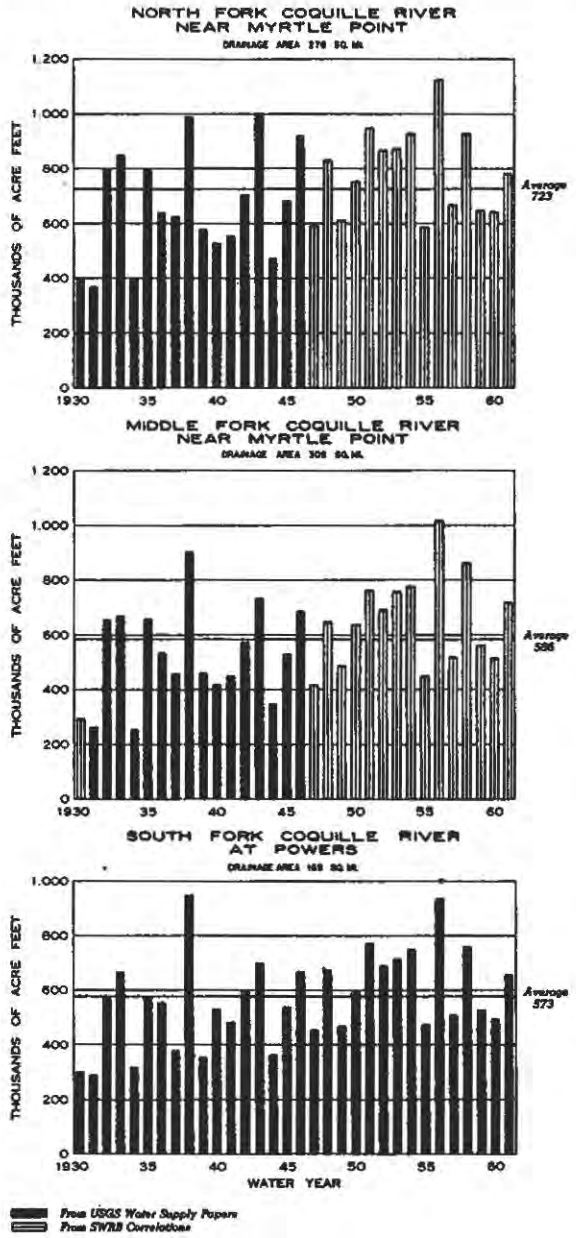


FIGURE 12. Annual yields of three streams in the Coquille Subbasin at stations shown.

Seasonal Distribution

The seasonal pattern of runoff of South Coast streams is typical of most of western Oregon in that it closely follows the pattern of precipitation. This is because the soils and rock formations are tight and provide only a minimum of retention, snowfall is small and does not remain on the ground long enough to significantly influence the pattern of runoff, and most streams are relatively short with steep gradients.

The resulting runoff patterns are illustrated by Figure 13, which shows average monthly discharges at selected stream gaging stations. Table 17 lists average monthly discharges at gaging stations and estimates of discharge for the principal ungaged streams.

The highest runoff months are November through April, which are also the highest precipitation months. With decreasing precipitation in the summer, flows become extremely low in the months of June through October, reaching their minimums in August and September. Generally, about 90 percent of the annual yield occurs in the

TABLE 17

AVERAGE MONTHLY DISCHARGES OF PRINCIPAL STREAMS
1930-1961

SUBBASIN AND STREAM	COMPLETE WATER YEARS OF RECORD	AVERAGE MONTHLY DISCHARGE IN CFS												
		Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Mean
CHETCO														
Chetco River at mouth	None	500	2,000	3,500	3,700	4,000	2,900	1,800	1,100	400	200	140	130	1,700
Pistol River at mouth	None	150	550	1,000	1,200	1,300	900	500	250	100	40	20	20	500
Hunter Creek at mouth	None	50	200	400	450	500	350	200	100	50	20	10	10	190
SIXES														
Elk River at mouth	None	130	500	900	1,000	1,100	800	500	250	150	80	65	60	460
Sixes River at mouth	None	150	650	1,200	1,500	1,550	1,100	600	350	150	50	30	20	610
Floras Creek at mouth	None	70	300	600	700	750	500	300	150	70	20	10	10	290
COQUILLE														
South Fork Coquille River above Panther Creek near Illahe	1957-61	40	200	300	350	300	200	150	100	30	10	5	5	140
South Fork Coquille River near Illahe	1957-61	50	250	400	450	400	350	200	100	50	15	5	5	190
South Fork Coquille River near Powers	1957-61	150	650	1,050	1,200	1,100	900	550	300	100	50	25	20	510
South Fork Coquille River at Powers*	1917-26, 1930-61	234	976	1,630	1,880	1,770	1,390	848	498	187	67	34	32	790
Middle Fork Coquille River near Myrtle Point	1931-46	200	800	1,650	2,050	2,150	1,500	700	400	150	60	30	25	810
East Fork Coquille River at mouth	None	100	400	800	950	1,050	750	400	200	100	40	20	20	400
North Fork Coquille River near Myrtle Point	1930-46	300	1,200	1,950	2,350	2,450	1,800	950	500	300	100	60	55	1,000
Coquille River at mouth	None	850	3,550	6,600	8,050	8,250	6,050	3,150	1,800	750	300	140	130	3,300
COOS														
South Fork Coos River at mouth	None	300	1,400	2,600	3,100	3,300	2,300	1,300	800	300	100	50	50	1,300
East Fork Millicoma River at mouth	None	100	500	950	1,100	1,200	850	400	250	100	40	20	20	460

TABLE 17 (Continued)

AVERAGE MONTHLY DISCHARGES OF PRINCIPAL STREAMS
1930-1961

SUBBASIN AND STREAM	COMPLETE WATER YEARS OF RECORD	AVERAGE MONTHLY DISCHARGE IN CFS												
		Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Mean
West Fork Millicoma River near Allegany	1955-61	70	300	570	670	710	500	270	150	70	20	10	10	280
Millicoma River at mouth	None	220	940	1,800	2,100	2,200	1,600	840	470	210	70	40	30	870
Coos River at mouth	None	550	2,400	4,500	5,300	5,500	4,000	2,100	1,200	530	180	90	90	2,200
Tenmile Creek near Lakeside	1958-61	80	360	670	790	830	590	320	180	80	30	10	10	330

*Actual records. Other discharges are estimates or correlations from available records extended to the base period 1930-1961.

Source: U. S. Geological Survey and Oregon State Water Resources Board

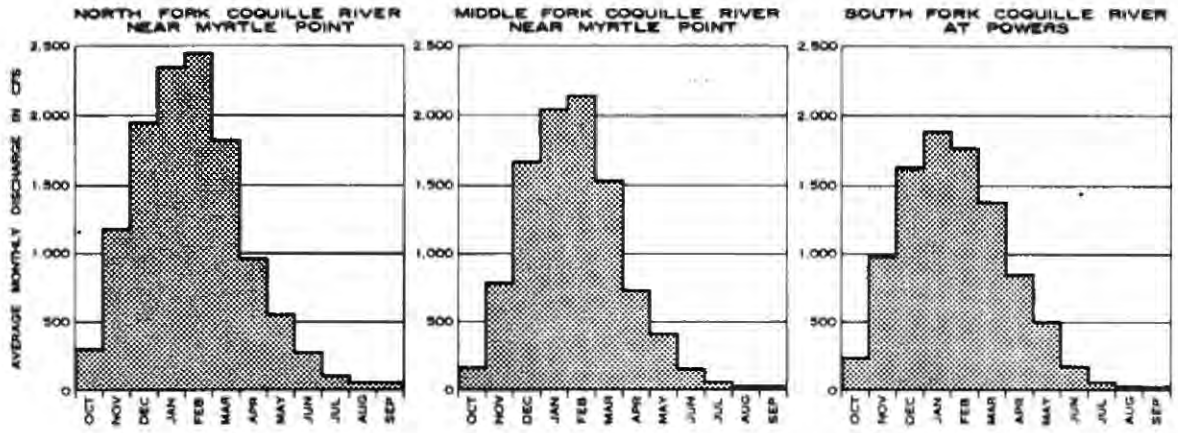


FIGURE 13. Average monthly discharges at selected stream gaging stations.

six-month period November through April, and from one-third to one-half of this occurs in the months of January and February. Less than one percent of the annual yield occurs in the months of August and September. Average monthly discharges for the Coquille South Fork at Powers vary from 32 cubic feet per second (cfs) in September to 1,880 cfs in January.

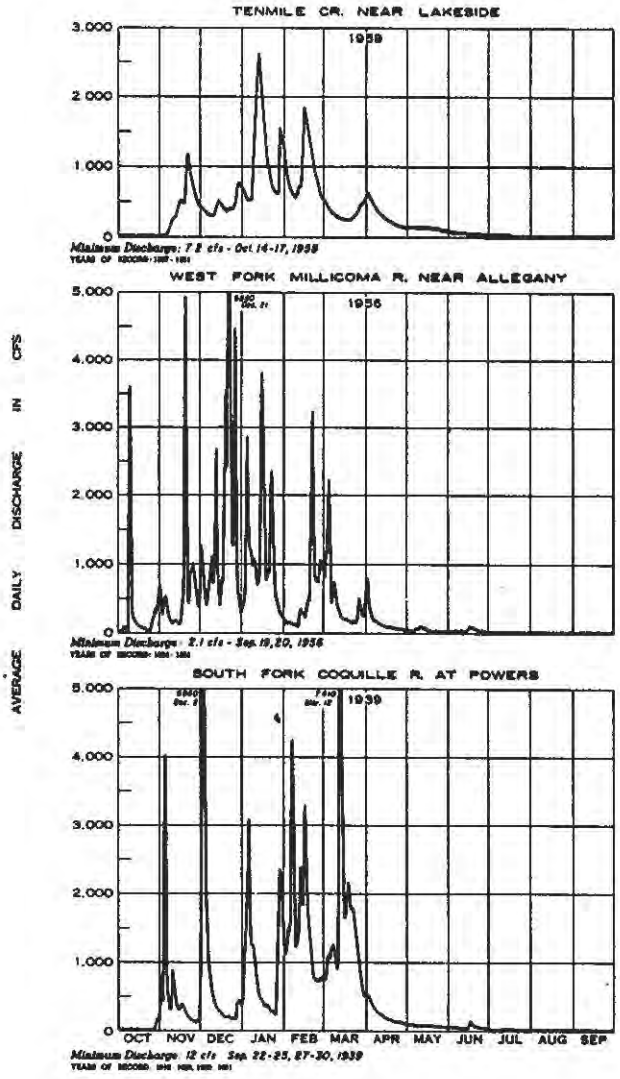


FIGURE 14. Discharge pattern for the water year of minimum instantaneous discharge, at selected stream gaging stations.

Seasonal flows of South Coast Basin streams are principally the result of natural conditions. Water diverted from the streams of the basin or stored in reservoirs is a very small amount compared to the total runoff and, although affecting some small streams, has little effect on the larger ones.

Extreme Discharges

Extreme differences in daily flows are illustrated by Figure 14, which shows daily discharges at selected stream gaging stations for the water year having the lowest recorded discharge. Minimum and maximum instantaneous discharges at these and other gaging stations are listed in Table 18.

Figure 14 shows the direct effect of rainstorms on runoff. Discharges rise rapidly during rainstorms, particularly during the heavy precipitation season of November through March when the soils are already saturated with moisture. Flood peaks are of short duration, indicating the low water retention capacity of the basin's soils and rocks.

TABLE 18

EXTREME DISCHARGES AT
SELECTED STREAM GAGING STATIONS

SUBBASIN AND GAGING STATION	COMPLETE WATER YEARS OF RECORD	MINIMUM RECORDED DISCHARGE		MAXIMUM RECORDED DISCHARGE	
		cfs	Month and Year	cfs	Month and Year
CHETCO					
Ransom Creek near Brookings*	1953-61	-	-	300	Jan. 1953
Harris Creek near Brookings*	1953-61	-	-	439	Dec. 1954
SIXES					
Dry Run Creek near Port Orford*	1954-61	-	-	158	Feb. 1958
COQUILLE					
South Fork Coquille River above Panther Creek near Illahe	1957-61	1.3	Sept. 1961	6,300	Dec. 1955
South Fork Coquille River near Illahe	1957-61	1.7	Sept. 1959	8,600	Dec. 1955
Rock Creek near Illahe	1957-58	1.8	Oct. 1958	2,380	Jan. 1958
South Fork Coquille River near Powers	1957-61	6.5	Oct. 1960	14,300	Nov. 1960
South Fork Coquille River at Powers	1917-26, 1930-61	12.0	Sept. 1939	30,500	Dec. 1945
Rock Creek near Remote	1931-32	2.0	Oct. 1932	560	Nov. 1931
Middle Fork Coquille River near Bridge	1930-31	1.0	Several days during each year	4,430	Apr. 1929
Middle Fork Coquille River near Myrtle Point	1931-46	1.0	July 1931	31,800	Oct. 1924
Gettys Creek near Myrtle Point*	1953-61	-	-	245	Feb. 1961
North Fork Coquille River near Myrtle Point	1930-46	14.0	Sept. 1938	26,900	Dec. 1945
Geiger Creek near Bandon*	1953-61	-	-	206	Feb. 1961
COOS					
Daniels Creek near Eastside	1951-53	1.6	Sept. 1950, 1951 and 1952	1,290	Jan. 1953
West Fork Millicoma River near Allegany	1955-61	2.1	Sept. 1956	8,100	Nov. 1960
Tenmile Creek near Lakeside	1958-61	4.9	Sept. 1961	2,750	Jan. 1959
Eel Creek at Lakeside*	1958-61	-	-	223	Jan. 1959

*Crest-stage station measuring only annual maximum discharge.

Data Source: U. S. Geological Survey

Flood peaks are less pronounced on Tenmile Creek because of the storage effect of the extensive Tenmile Lake system.

As an example of the extreme differences in daily flows, Table 18 shows that the instantaneous minimum for the Coquille South Fork at Powers was 12 cfs, recorded in September 1939, compared to a maximum of 30,500 cfs, recorded in December 1945. Similar differences between extreme discharges exist at the other locations.

TABLE 19

MINIMUM MISCELLANEOUS DISCHARGE MEASUREMENTS ON PRINCIPAL UNGAGED STREAMS

SUBBASIN AND STREAM	WATER YEARS OF ANNUAL MEASUREMENTS	MINIMUM MISCELLANEOUS DISCHARGE	
		cfs	Month and Year
CHETCO			
Winchuck River above mouth of South Fork	1931-32, 1934-36, 1949-52	3.00	Sept. 1934
Chetco River below mouth of North Fork	1926, 1931-32, 1934-36, 1949-52	47.70	Sept. 1931
Pistol River above head of tidewater	1926, 1931-32, 1934-35, 1937-38, 1949-52	0.72	Sept. 1950
Hunter Creek above head of tidewater	1926, 1931, 1934-36	0	Sept. 1934
SIXES			
Elk River above head of tidewater	1926, 1931-32, 1934-38, 1949-52	35.00	Sept. 1931
Sixes River above head of tidewater	1926, 1931-32, 1934-38, 1949-52	7.30	Sept. 1936
Floras Creek below Langlois	1926, 1931-32, 1934-38, 1949-52	2.30	Sept. 1931 Sept. 1936
COQUILLE			
Middle Fork Coquille River at Oregon 42 crossing below Camas Valley	1924, 1931, 1934-37	0.20	Aug. 1924
COOS			
South Fork Coos River above Dellwood	1916, 1932, 1949-52	17.40	Sept. 1951
East Fork Millicoma River above Allegany	1931-32, 1934-37, 1949-52	2.00	Sept. 1937

Data Source: U. S. Geological Survey and Oregon State Engineer

Table 19 lists the lowest miscellaneous discharge measurements

for the principal ungaged streams of the basin. Since in most instances only one measurement was taken during the year listed, the discharges shown are not necessarily the extreme lows for these years. However, since all measurements were taken during the low flow season, they indicate the relative magnitude of the low flows of these streams.

Water Rights

Plates 3 and 3A show the location of each of the approximately 1,200 water rights existing in the South Coast Basin as of January 1, 1962. The application number of each water right permit or certificate is located at its approximate point of diversion. A water rights summary has been prepared which lists each water right by major stream, showing application number, permit or certificate number, priority date, use, quantity of water, and location. A limited number of summaries are available at cost through the State Water Resources Board.

Water rights in the South Coast Basin have not been adjudicated. Therefore, surface water rights with priorities before 1909, the year of enactment of the Oregon Surface Water Code, are not known. Available information indicates that these are few in number and would have little effect on presently registered water rights.

Figure 15 shows the development of water rights since 1909.

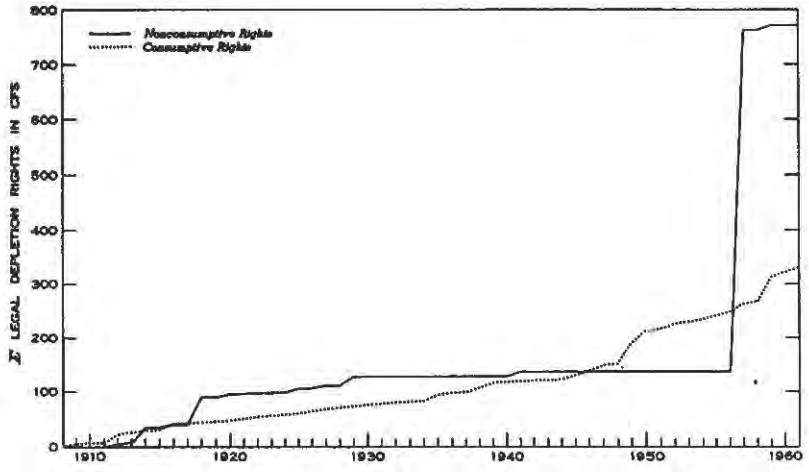


FIGURE 15. Chronological depletions, 1908-1961.

Nonconsumptive rights showed little increase from 1930 until 1956 when a large power right was applied for. Consumptive

rights have shown a fairly consistent rise since 1909, with more rapid increases in the last 20 years.

Table 20 summarizes current surface water rights of the South Coast Basin by subbasin, major watershed, and use. All surface water rights total 1,109 cfs, of which 338 cfs are consumptive and 771 cfs nonconsumptive in nature. Municipal rights, 114 cfs, are the largest consumptive group, followed by 112 cfs for the irrigation of 8,116 acres, 84 cfs for industrial use, 26 cfs for domestic use, and 2 cfs for recreational purposes. Nonconsumptive rights total 625 cfs for power, 108 cfs for mining, and 37 cfs for fish life purposes.

Applications for surface water rights pending as of January 1, 1962, totaled 105 cfs. The largest of these is for 100 cfs for industrial purposes, to be stored on North Slough, a tributary of Coos Bay. Most other pending applications are for domestic or irrigation purposes.

Legal depletion rights by stream mile for the Chetco, Sixes, Coquille, and Coos Rivers are shown on Figure 16. These graphs show the maximum rate of diversion which could legally occur above each point, but not the actual or seasonal pattern of water use. Consumptive rights are shown separately for comparative purposes.

The amount of water covered by rights in the South Coast Basin is relatively small compared to other areas of the state.

The Chetco River has only one water right in its headwaters, 4 cfs for mining purposes. The others, totaling 15 cfs, are in the lower seven miles of the stream and are principally for municipal and industrial purposes.

The depletion diagram of the Sixes River indicates a total of 75 cfs of nonconsumptive water rights on the South Fork of the Sixes River. These are all for mining purposes. The remainder of the water rights, 3 cfs, are in the lower seven miles of the stream and are principally for irrigation and industrial purposes.

The largest group of rights for an individual watershed is on the Coquille River, totaling 783 cfs. Of this total, 624 cfs are for a single power right. This appears at mile 53 of the Coquille River South Fork depletion plot shown on Figure 14. Most of the remainder of the water rights for the Coquille River system are for municipal and irrigation purposes.

TABLE 20

SURFACE WATER RIGHTS SUMMARY
As of January 1, 1962

SUBBASIN AND STREAM	CONSUMPTIVE RIGHTS							NONCONSUMPTIVE RIGHTS				TOTAL RIGHTS cfs
	DOM. cfs	MUN. cfs	IRRIGATION cfs	IRRIGATION Acres	IND. cfs	REC. cfs	TOTAL cfs	POWER cfs	MIN. cfs	FISH cfs	TOTAL cfs	
CHETCO												
Smith River and Trib.*	0	0	0	0	0	0	0	0	10.00	0	10.00	10.00
Winchuck River and Trib.*	0.17	0	1.38	124	0	0	1.55	0	0	0	0	1.55
Chetco River and Trib.	0.82	8.00	0.58	47	5.50	0	14.90	0.05	4.00	0	4.05	18.95
Pistol River and Trib.	0.15	0	0.03	2	0	0	0.18	0	0	0	0	0.18
Hunter Creek and Trib.	0.15	0	0.22	17	0.40	0	0.77	0	0	0	0	0.77
Pacific Ocean Misc.**	2.82	0.78	5.22	380	2.50	0	11.32	0.05	0	0	0.05	11.37
SUBBASIN TOTAL	4.11	8.78	7.43	570	8.40	0	28.72	0.10	14.00	0	14.10	42.82
SIXES												
Euchre Creek and Trib.	0.02	0	0.08	7	0.35	0	0.45	0	0	0	0	0.45
Elk River and Trib.	0.15	0	3.64	291	0.20	0	3.99	0	0	0	0	3.99
Sixes River and Trib.	0.02	0	1.09	76	2.01	0	3.12	0	75.00	0	75.00	78.12
Floras Creek and Lake and Trib.	0.29	1.00	4.01	320	0	0	5.30	0	0	0	0	5.30
Fourmile Creek and Trib.	0.03	0	4.26	127	0.35	0	4.64	0	0	0	0	4.64
Pacific Ocean Misc.**	1.18	1.85	1.37	115	0.55	0.10	5.05	0	0.25	7.81	8.06	13.11
SUBBASIN TOTAL	1.69	2.85	14.45	936	3.46	0.10	22.55	0	75.25	7.81	83.06	105.61
COQUILLE												
Middle Fork Coquille River and Trib.	1.05	0	8.12	693	0	1.00	10.17	0	0	0	0	10.17
South Fork Coquille River and Misc.**	1.73	0.54	11.94	1,114	2.72	0	16.93	624.00	6.00	5.00	635.00	651.93
East Fork Coquille River and Trib.	0.48	0	7.25	618	0.25	0	7.98	0	0	0	0	7.98
North Fork Coquille River and Misc.**	0.81	5.95	10.32	904	0.09	0.10	17.27	0	0	0	0	17.27
Coquille River main stem and Misc.**	5.30	50.55	25.62	1,689	5.96	0	87.43	1.30	0	6.50	7.80	95.23
Pacific Ocean Misc.**	0.14	0	10.85	378	0.10	0	11.09	0.01	11.68	0	11.69	22.78
SUBBASIN TOTAL	9.51	57.04	74.10	5,396	9.12	1.10	150.87	625.31	17.68	11.50	654.49	805.36
COOS												
Coos River and Trib.	1.88	0	2.82	241	0	0	4.70	0	0	15.00	15.00	19.70
Coos Bay and Misc.**	8.11	34.80	11.84	906	47.76	0.50	103.01	0.02	0.99	2.90	3.91	106.92
Tenmile Creek and Lake and Trib.	0.36	11.00	1.20	58	15.00	0	27.56	0	0	0	0	27.56
Pacific Ocean Misc.**	0.30	0	0.11	9	0	0.25	0.66	0	0	0	0	0.66
SUBBASIN TOTAL	10.65	45.80	15.97	1,214	62.76	0.75	135.93	0.02	0.99	17.90	18.91	154.84
BASIN TOTAL	25.96	114.47	111.95	8,116	83.74	1.95	338.07	625.43	107.92	37.21	770.56	1,108.63

*Does not include water rights in California.
**Miscellaneous includes tributaries not listed separately.

Data Source: Oregon State Engineer

W A T E R S U P P L Y, U S E, A N D C O N T R O L

Water rights in the Coos River system are primarily for fish life purposes, most of them on the South Fork. The consumptive water rights are principally for irrigation.

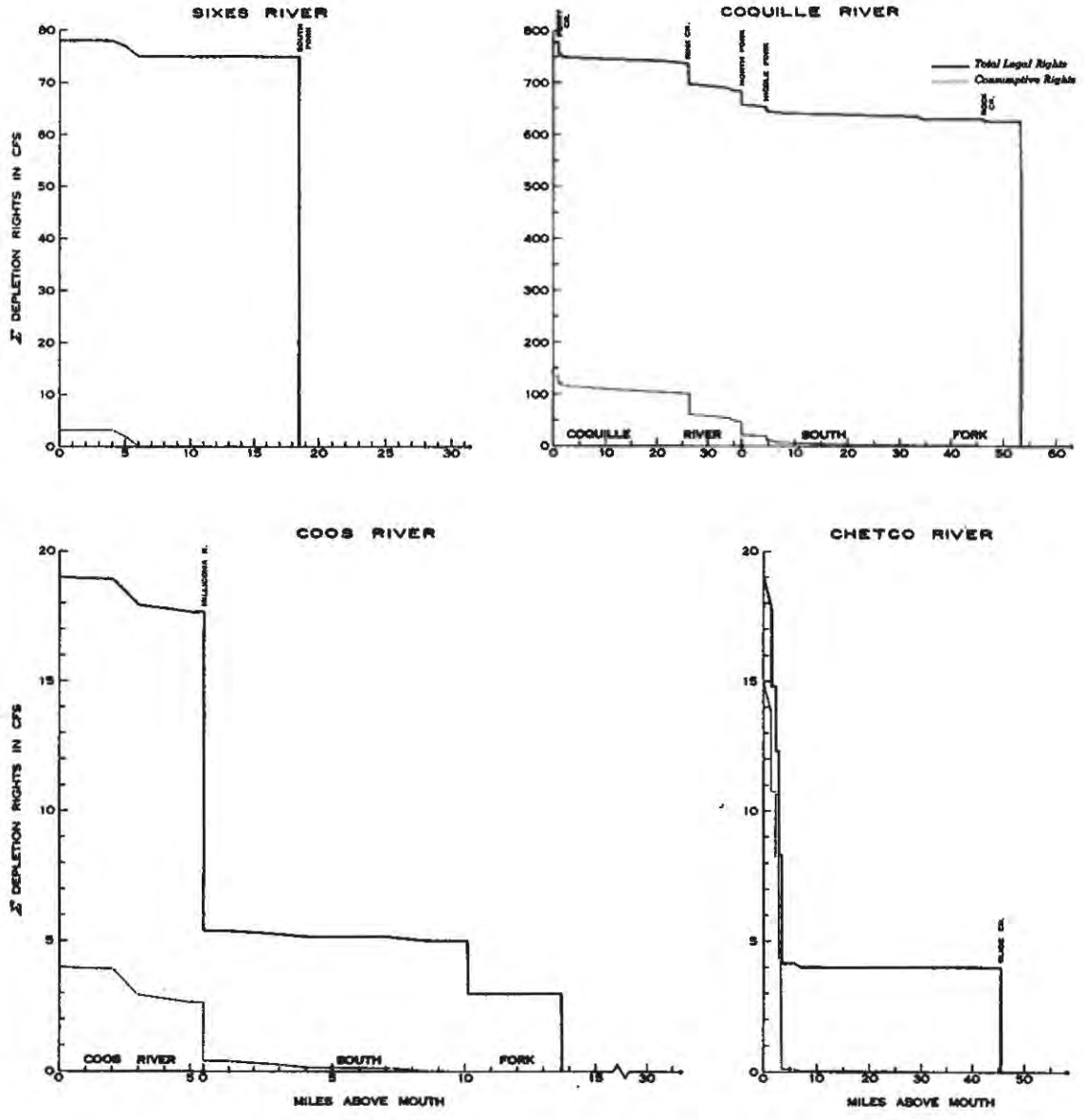


FIGURE 16. Legal depletions by stream mile for selected major streams.

Natural streamflows have been adequate to supply needs for water in most areas of the basin with the result that storage development has been very limited. As shown by Table 21, there were 66 reservoir rights in the basin as of January 1,

TABLE 21

RESERVOIR RIGHTS SUMMARY
As of January 1, 1962

SUBBASIN AND STREAM	NUMBER OF RIGHTS	STORAGE CAPACITY IN ACRE-FEET							SURFACE AREA Acres
		Dom.	Mun.	Irr.	Ind.	Rec.	Fish	Total	
CHETCO									
Winchuck River and Trib.*	1	0	0	1	0	0	0	1	1
Chetco River and Trib.	3	0	0	0	36	0	0	36	5
Pistol River and Trib.	0	0	0	0	0	0	0	0	0
Hunter Creek and Trib.	2	0	0	0	50	0	0	50	9
Pacific Ocean Misc.**	5	0	0	1	269	0	0	270	25
SUBBASIN TOTAL	11	0	0	2	355	0	0	357	40
SIXES									
Euchre Creek and Trib.	1	0	0	0	176	0	0	176	22
Elk River and Trib.	1	0	0	0	32	0	0	32	5
Sixes River and Trib.	2	0	0	0	464	0	0	464	39
Floras Creek and Lake and Trib.	0	0	0	0	0	0	0	0	0
Fourmile Creek and Trib.	1	0	0	0	6	0	0	6	3
Pacific Ocean Misc.**	2	0	0	3	0	0	0	3	2
SUBBASIN TOTAL	7	0	0	3	678	0	0	681	71
COQUILLE									
South Fork Coquille River and Trib.	4	0	0	4	108	0	0	112	24
North Fork Coquille River and Trib.	0	0	0	0	0	0	0	0	0
Coquille River main stem and Misc.**	15	121	253	23	1,232	0	0	1,629	220
Pacific Ocean Misc.**	3	0	0	4	8	0	0	12	4
SUBBASIN TOTAL	22	121	253	31	1,348	0	0	1,753	248
COOS									
Coos River and Trib.	1	0	0	0	0	82	0	82	8
Coos Bay and Misc.**	21	6	4,237	78	234	0	12	4,567	311
Tenmile Creek and Lake and Trib.	2	0	2,800	0	12,000	0	0	14,800	420
Pacific Ocean Misc.**	2	1	0	1	0	0	0	2	1
SUBBASIN TOTAL	26	7	7,037	79	12,234	82	12	19,451	740
BASIN TOTAL	66	128	7,290	115	14,615	82	12	22,242	1,099

*Does not include water rights in California.
**Miscellaneous includes tributaries not listed separately.

Data Source: Oregon State Engineer

1962, with a combined storage capacity of only 22,000 acre-feet and surface area of only 1,100 acres.

Reservoirs having industrial rights account for 14,600 acre-feet, or 66 percent of the total storage. Most of these are log ponds. Municipal storage comprises about 7,300 acre-feet, about 33 percent of the total, and the remaining 300 acre-feet, are for domestic, irrigation, recreation, and fish life purposes.

There were three reservoir permit applications pending as of January 1, 1962 for storage totaling 1,983 acre-feet. The largest of these is for storage of 1,850 acre-feet on North Slough, a tributary of Coos Bay, for industrial purposes. The other two are for storage of 120 acre-feet for municipal purposes and 13 acre-feet for industrial purposes.

Legal Restrictions

In 1927 the Oregon State Legislature passed a law (ORS 449.535) which prohibits the contamination of Clear Lake and the watershed supplying that lake by any means which would corrupt or impair the quality of the water for domestic or municipal purposes. This law also prohibits fishing and camping on or near the lake. In 1940 the State Engineer approved applications of the City of Reedsport for the waters of Clear Lake and Edna Lake for municipal purposes, to the exclusion of all subsequent appropriations.

In 1931 the Oregon State Legislature withdrew the waters of Brush Creek and all its tributaries from appropriation or condemnation with the exception of use in state parks and by existing vested or riparian rights (ORS 538.120 and ORS 538.130). Brush Creek flows through Humbug Mountain State Park south of Port Orford.

In 1940 the State Engineer ordered that no applications shall be accepted for the unappropriated waters of Geiger Creek or its tributaries and from Ferry Creek or its tributaries above the confluence of Ferry Creek and Geiger Creek except for the purpose of municipal use by the City of Bandon. Existing water rights on these creeks are for municipal use by the City of Bandon, for a fish hatchery of the Oregon State Game Commission, and for irrigation, including the flooding of cranberry bogs.

Maximum Legal Depletion

Table 22 indicates the volume of water which could be diverted

TABLE 22

MAXIMUM LEGAL ANNUAL DEPLETIONS
CONSUMPTIVE RIGHTS
As of January 1, 1962

SUBBASIN AND STREAM	CONSUMPTIVE DEPLETIONS BY USE IN ACRE-FEET					TOTAL IN ACRE-FEET
	Dom.	Mun.	Irr.	Ind.	Rec.	
CHETCO						
Smith River and Trib.*	0	0	0	0	0	0
Winchuck River and Trib.*	120	0	450	0	0	570
Chetco River and Trib.	590	5,800	120	3,980	0	10,490
Pistol River and Trib.	110	0	10	0	0	120
Hunter Creek and Trib.	110	0	40	290	0	440
Pacific Ocean Misc.**	2,040	570	950	1,810	0	5,370
SUBBASIN TOTAL	2,970	6,370	1,570	6,080	0	16,990
SIXES						
Euchre Creek and Trib.	10	0	20	250	0	280
Elk River and Trib.	110	0	730	140	0	980
Sixes River and Trib.	10	0	190	1,460	0	1,660
Floras Creek and Lake and Trib.	210	720	800	0	0	1,730
Fourmile Creek and Trib.	20	0	440	250	0	710
Pacific Ocean Misc.**	850	1,340	320	400	70	2,980
SUBBASIN TOTAL	1,210	2,060	2,500	2,500	70	8,340
COQUILLE						
Middle Fork Coquille River and Trib.	760	0	1,730	0	720	3,210
South Fork Coquille River and Misc.**	1,250	390	2,790	1,970	0	6,400
East Fork Coquille River and Trib.	350	0	1,550	180	0	2,080
North Fork Coquille River and Misc.**	590	4,310	2,260	70	70	7,300
Coquille River main stem and Misc.**	3,840	36,620	4,780	4,320	0	49,560
Pacific Ocean Misc.**	100	0	1,380	70	0	1,550
SUBBASIN TOTAL	6,890	41,320	14,490	6,610	790	70,100
COOS						
Coos River and Trib.	1,360	0	600	0	0	1,960
Coos Bay and Misc.**	5,880	25,210	2,380	34,600	360	68,430
Tenmile Creek and Lake and Trib.	260	7,970	150	10,870	0	19,250
Pacific Ocean Misc.**	220	0	20	0	180	420
SUBBASIN TOTAL	7,720	33,180	3,150	45,470	540	90,060
BASIN TOTAL	18,790	82,930	21,710	60,660	1,400	185,490

*Does not include depletions in California.
**Miscellaneous includes tributaries not listed separately.

each year from the individual stream systems of the basin under existing water rights. The maximum legal annual surface water

depletion for the entire basin is 744,000 acre-feet, of which 186,000 acre-feet could be diverted for consumptive purposes and 558,000 acre-feet for nonconsumptive purposes. Water diverted for nonconsumptive purposes becomes available again at downstream locations and also a large portion of the consumptive depletions returns to the groundwater or streams.

For these reasons, and also because many rights are used intermittently and other rights are not used at all, the actual annual diversion and consumption are considerably less than the maximum legal amount. Using a consumptive requirement of 1.7 acre-feet per acre for the 9,340 acres of presently irrigated land and a conservative 10 percent consumption for all other consumptive diversions, the actual annual consumption of surface waters in the basin is probably in the neighborhood of only 32,000 acre-feet.

While the legal annual surface water depletion comprises about 10 percent of the average annual yield (about 9,000,000 acre-feet) the probable consumption is less than one-half of one percent. Therefore, the water supply of the entire basin is far more than adequate, on an average annual basis, to meet existing and contemplated future needs. It appears that the basin runoff in a critical water year would also be more than adequate to supply both existing and contemplated future needs for water.

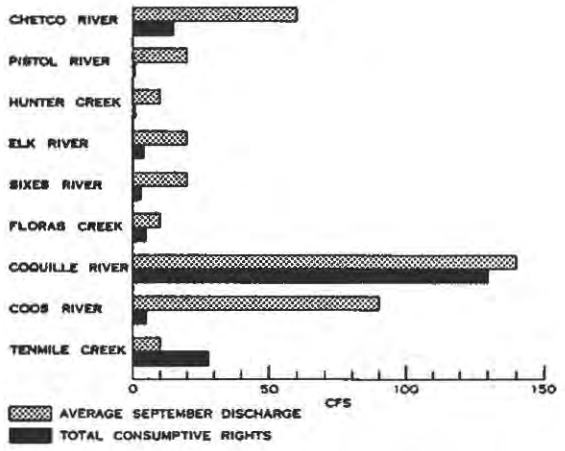


FIGURE 17. Average September discharge and legal depletion.

A comparison of average annual yields with legal annual consumptive depletions and estimated actual annual consumption by major stream systems is shown in Table 23. The legal annual consumptive depletion is less than 10 percent and the estimated actual annual consumption less than 1 percent of the average annual yield for all major watersheds except that of Coos Bay.

Figure 17 compares total consumptive rights of the major watersheds with the 1930-1961 average discharge of September, which is generally the lowest flow month of the year. These discharges are considerably higher than the consumptive rights

in all watersheds except those of the Coquille River and Tenmile Creek. September shortages exist in the tidal areas of

TABLE 23

AVERAGE ANNUAL SURFACE YIELD
VS.
LEGAL AND ESTIMATED DEPLETION

SUBBASIN AND WATERSHED	AVERAGE ANNUAL YIELD Acre-feet	LEGAL ANNUAL DEPLETION Acre-feet	ESTIMATED ACTUAL ANNUAL CONSUMPTION Acre-feet
CHETCO			
Chetco River	1,230,000	10,500	1,200
Pistol River	360,000	100	30
Hunter Creek	140,000	400	70
Other drainages in Chetco Subbasin	770,000	6,000	1,000
SUBBASIN TOTAL	2,500,000	17,000	2,300
SIXES			
Elk River	330,000	1,000	900
Sixes River	440,000	1,700	400
Floras Creek	210,000	1,700	800
Other drainages in Sixes Subbasin	520,000	3,900	700
SUBBASIN TOTAL	1,500,000	8,300	2,800
COQUILLE			
Middle Fork Coquille River	590,000	3,200	800
South Fork Coquille River	720,000	6,400	1,500
East and North Fork Coquille River	730,000	9,400	4,400
Coquille River below Forks	2,400,000	49,600	9,100
Other drainages in Coquille Subbasin	100,000	1,500	600
SUBBASIN TOTAL	2,500,000	70,100	16,400
COOS			
Coos River	1,590,000	2,000	900
Coos Bay	610,000	68,400	7,500
Tenmile Creek	240,000	19,300	2,200
Other drainages in Coos Subbasin	60,000	400	100
SUBBASIN TOTAL	2,500,000	90,100	10,700
BASIN TOTAL	9,000,000	185,500	32,200

Note: Estimated actual annual consumption based on 1.7 acre-feet per acre for presently irrigated lands and 10 percent consumption for all other consumptive rights.

the Coquille River. On Tenmile Creek, 25 cfs of the total of 28 cfs of consumptive rights utilize storage in Clear Lake and Edna Lake rather than diverting directly from the creek.

From this it is evident that average monthly flows also are adequate to satisfy existing water rights, at least in the

major watersheds. However, summer shortages do occur at a number of locations, particularly on small independent streams and on the small tributaries of major streams.

Conflicts generally do not exist between consumptive and nonconsumptive water rights since most of the nonconsumptive water rights are in the headwater areas where there is little potential for consumptive use. Also, priorities of nonconsumptive rights would not interfere with downstream appropriation of water for consumptive purposes since water used nonconsumptively becomes available downstream for reuse.

GROUNDWATER

Geology

The major geologic features of the South Coast Basin consist of the southern part of the Coast Range and the northwestern corner of the Klamath Mountains. These mountains contain the oldest rocks in the basin. Marine sedimentary rocks predominate throughout most of the basin, with lesser units of igneous and metamorphic rocks occurring principally in the south. The sedimentaries consist mainly of alluvium, siltstone, mudstone, sandstone, shale, and conglomerates; the igneous rocks of basalt, breccia, tuff, diorite, and peridotite; and the metamorphics of gneiss, schist, and serpentine. The rocks of the basin are usually so fine-grained, compact, and impermeable that they yield little groundwater. Because of the preponderance of sedimentary rocks in the north, the soils of Coos County are generally more clayey and therefore less permeable than those of Curry County.

Occurrence

Groundwater supplies are generally inadequate in both quantity and quality throughout most of the basin. There is, however, an undetermined potential in some of the dune areas south of Coos Bay.

Figure 18 is a generalized groundwater geology map delineating the rock units and indicating their estimated yield capabilities. The specific capacities (gallons per minute per foot of drawdown) of representative water wells and their production as determined by pump tests are also shown.

Large quantities of groundwater have been found in the 13,000-acre sand dune area adjacent to the ocean north of Coos Bay.

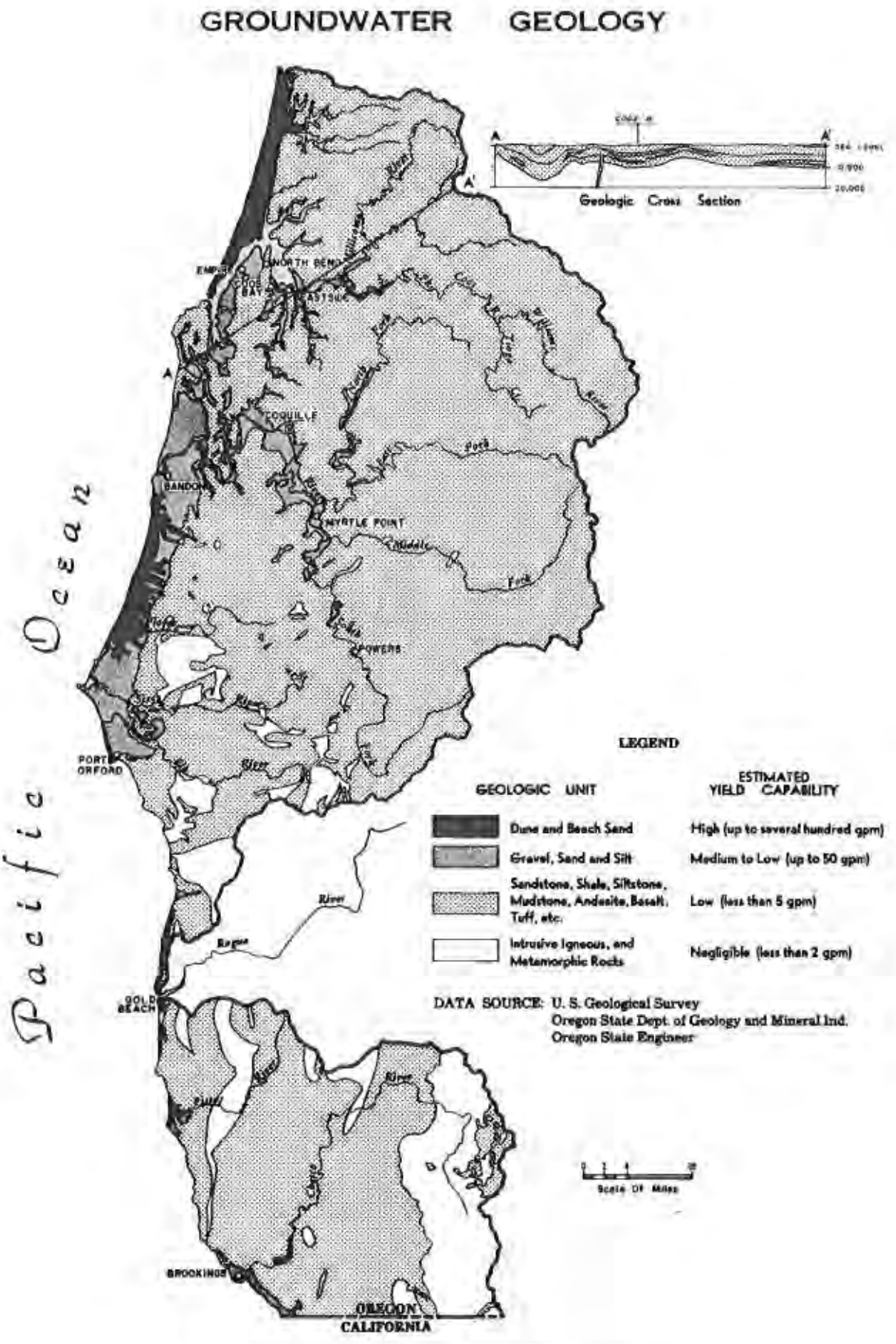


FIGURE 18. Generalized Groundwater Geology.

W A T E R S U P P L Y, U S E, A N D C O N T R O L

Original work by the U. S. Geological Survey and more detailed studies by Pacific Power and Light Company have delineated a large underground reservoir approximately two miles wide by nine and one-half miles long, extending from Jordan Point on the bay northward to Tenmile Creek. Figure 19 is a generalized geologic cross section of a part of this sand dune reservoir.

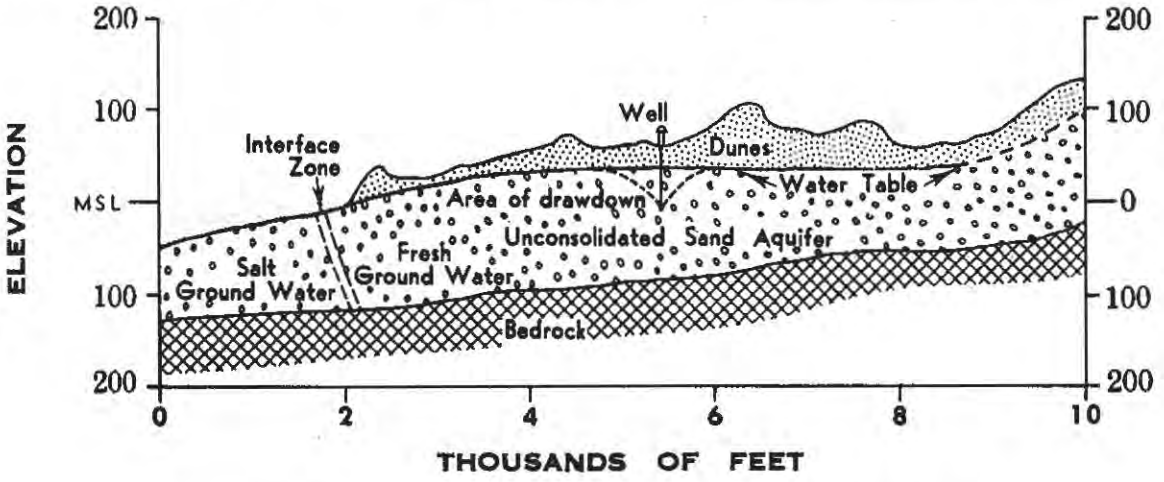


FIGURE 19. Typical geologic cross section of Coos Bay sand dunes.

The reservoir contains nearly two million acre-feet of uniform, unconsolidated, fresh water-bearing sand, from which 30 million gallons of water per day could be withdrawn continuously throughout the year without endangering either the quantity or the quality of the supply. The groundwater reservoir is replenished annually by approximately 65 inches of rainfall. Sea water encroachment is prevented by a hydraulic head averaging 30 feet above sea level.

The dune area is under lease by the Pacific Power and Light Company and is being developed to attract industry, particularly secondary wood processors. Plans call for a total of 64 ten-inch diameter wells to be drilled as need demands. Six wells are presently operating which pump up to 1.5 million gallons per day (mgd).

Other sand dunes that may have good groundwater potential extend intermittently from about halfway between Cape Arago and Bandon to the vicinity of New Lake on the Coos-Curry County boundary. No groundwater studies have been conducted in these deposits.

Additional potential sources of groundwater are the sand and gravel aquifers lying along the main rivers, particularly the Coos and Coquille. The other rivers flow through generally narrow valleys and therefore have deposited relatively little alluvium. Terrace deposits are also potential sources of groundwater.

With the exception of the alluvial deposits, which make up only a small percentage of the basin, the geologic formations are generally so tightly compacted and impermeable that they yield little or negligible quantities of groundwater to wells.

The use of groundwater is restricted in many areas because of quality problems. The principal problems are bacterial contamination, excessive iron content, and, to a lesser degree, high acidity and serpentine-caused oily, odorous water.

Bacterial contamination is a problem in most unsewered areas of the basin, and is caused principally by pumping of surface water and improper construction of wells. Excessive iron is also a problem in many areas. High acidity is limited mainly to the Port Orford area. Serpentine-caused quality problems are confined to areas of the Chetco Subbasin.

The groundwater pumped from the sand dune reservoir adjacent to the ocean north of Coos Bay is satisfactory for industrial uses, but is unsuitable for municipal purposes because of iron content, the removal of which would be too costly.

Water Rights and Depletions

The Ground Water Act of 1955 does not require the registration of wells supplying 15,000 or less gallons per day (gpd) for domestic or stock use, including the irrigation of lawns or noncommercial gardens not exceeding one-half acre in area. Wells supplying 5,000 or less gpd for any single industrial or commercial purpose likewise need not be registered.

There are 29 groundwater rights in the South Coast Basin, which are assigned to 92 existing or proposed wells and total 50.3 cfs. Of this total, 46.3 cfs are for industrial purposes and 3.6 cfs are for the irrigation of 215 acres. The above rights, if fully used, would result in a depletion of approximately 34,000 acre-feet per year. Some of this total is based on quantities claimed by well owners for unadjudicated rights and is subject to modification.

W A T E R S U P P L Y, U S E, A N D C O N T R O L

A summary of the groundwater rights for each of the four subbasins is listed in Table 24.

TABLE 24

LEGAL ANNUAL GROUNDWATER DEPLETION
As of January 1, 1962

SUBBASIN	DOMESTIC		MUNICIPAL		IRRIGATION			INDUSTRIAL		TOTAL
	cfs	Acre-feet	cfs	Acre-feet	cfs	Acres	Acre-feet	cfs	Acre-feet	Acre-feet
Chetco	0.2	123	0.2	159	3.2	176	440	0	0	722
Sixes	0	0	0	0	0.1	8	20	0.3	239	259
Coquille	0	0	0	0	0.3	31	78	0	0	78
Coos	0	0	0	0	0	0	0	46.0	33,304	33,304
BASIN TOTAL	0.2	123	0.2	159	3.6	215	538	46.3	33,543	34,363

Note: Includes registered wells (GR) and wells (G) for which permits have been granted under the Ground Water Act of 1955.

Maximum legal annual irrigation depletion is based on 2.5 acre-feet per acre per year.

The largest groundwater right is 46 cfs for industrial water development from 64 proposed wells in the sand dunes north of Coos Bay. The other rights are comparatively small, the majority of them being for irrigation in the Harbor area in the Chetco Subbasin.

WATER USE AND ASSOCIATED PROBLEMS

Domestic

Approximately one-half of the basin's population rely on either individual or small group type systems for their water supplies. The primary sources of water for these domestic supplies are springs and shallow wells, most of which utilize surface drainage. Surface water is also used, supplied by many of the basin streams.

Domestic water rights total 26 cfs, of which 5 cfs are held by municipalities and water districts. Domestic rights represent a legal annual depletion of approximately 19,000 acre-feet. However, the total use of water for domestic purposes is not known because many rights are not used to their maximum legal limit, and no water rights are required for groundwater use of less than 15,000 gpd.

WATER SUPPLY, USE, AND CONTROL

Domestic water shortages often occur during the summer months. Good producing wells are reported to be uncommon. Many wells have both mineral and bacterial contamination problems but treatment is not provided for most domestic supplies.

The groundwater supply is so limited in the Brookings and Harbor areas that these communities are believed unable to support an appreciable increase in population without developing other water supplies. Among other communities adversely affected by inadequate groundwater supplies are Dora, Hauser, Hunter Creek, and Nesika Beach.

Many wells that yield sufficient water have a high iron content which is undesirable because of the poor taste and the residue deposited in the systems. Fourteen families in the Norway area have to haul drinking water because of the excessive iron content of the groundwater. High acidity is a problem in the area of Port Orford. The mineral serpentine imparts an oily and odorous quality to much of the groundwater in the Chetco Subbasin, particularly in the region from Gold Beach south.

Bacterial contamination of domestic water is quite common. Tests made during 1961 for the Coos County Health Department showed that 52 percent of the 275 wells tested, and 78 percent of the 161 springs tested, failed to meet state standards of purity.

Similar results were reported in Curry County. In many of these cases the contamination was due to improper construction which allowed surface drainage to enter the system.

Contamination problems exist in regions such as Hauser, Millington, Barview, Nesika Beach, Hunter Creek, and Brookings, where septic tank systems are used for sewage disposal. In many areas, increasing suburban and rural populations will require the formation of new water districts and the development of safe and dependable sources of water supply. In most cases such development would require the use of surface water, the major problem being the cost of storage and treatment rather than the availability of water.

There is normally an adequate water supply for livestock use. In most areas natural streams and springs provide this supply without any need for additional development.

WATER SUPPLY, USE, AND CONTROL

Municipal

Municipal water rights total 114 cfs, which represents a legal annual depletion of 83,000 acre-feet. This comprises 45 percent of the total legal consumptive depletion in the basin. All 11 incorporated cities and several suburban areas, containing more than 50 percent of the basin population, are served from municipal supplies. All systems utilize surface water, and in most cases several sources are used to supply the quantity of water needed.

As indicated by Table 25, supplies are adequate except in Bandon, which experiences shortages during September, and in the Bridge Water District, which has short supply in late summer and fall.

Quality problems consist mainly of turbidity during high flow periods and, in the case of Bandon, algae growth in the reservoir during low flow periods. Chlorination is provided in all cases while the larger systems provide more extensive treatment such as sedimentation, filtration, aeration, and taste and odor control.

Expansion in municipal water use is expected throughout the basin. Continued population growth will make it necessary to form additional water districts, some of which can utilize present municipal supplies while others will need to develop new sources. Sufficient water is available for such municipal developments and no major conflicts are foreseen.

Increases are expected in the industrial use of municipal water supplies, especially for those industries that require water of municipal quality. It is often more economical to locate in areas having municipal systems than to develop separate, private systems for industrial uses.

The City of Brookings is presently considering purchasing a privately owned municipal system which serves that area and, in addition, developing new supplies from the Chetco River. Gold Beach has developed an adequate water supply from the Rogue River. The community of Hunter Creek, south of Gold Beach, is in need of a municipal supply and could be served by the Gold Beach system.

In the Sixes Subbasin development will probably be in the form of new water districts to serve small population centers, such as the community of Nesika Beach.

Expansion in municipal use is also expected in the Coquille

TABLE 25

PUBLIC WATER SYSTEMS

SUBBASIN AND WATER SYSTEM	POPULATION SERVED	SOURCE	WATER RIGHTS cfs	WATER RIGHTS mgd	QUANTITY OR QUALITY PROBLEMS
CHETCO					
Brookings		Chetco River	4.00	2.59	Turbidity during winter
		Ransome Creek	0.53	0.34	
Gold Beach		Rogue River	7.42	4.80	
Lieth Water Company (Gold Beach)		Riley Creek	1.40	0.90	
		Well near Riley Creek	0.22	0.14	
SIXES					
Langlois Water District		Floras Creek	1.25	0.81	
Port Orford		Hubbards Creek	1.60	1.03	Organic turbidity
COQUILLE					
Bandon		Ferry Creek	13.00	8.40	Shortages during September
Bridge Water District	100	Springs of Salmon Creek	0.10	0.06	Shortages in late summer and fall
Coquille	5,000	Rink Creek	8.60	5.56	
		North Fork Coquille River	2.00	1.29	
		Coquille River	30.00	19.39	
Myrtle Point	2,900	North Fork Coquille River and Trib.	4.10	2.65	
Powers	1,500	Bingham Creek	1.21	0.78	Turbidity during heavy rains
COOS					
Coos Bay-North Bend Water Board*	25,000	Pony Creek	15.00	9.69	
		Joe Ney Slough	8.00	5.17	
Empire		Empire Lakes	3.70	2.39	
		Winchester Creek	8.00	5.17	
Glasgow Water District		Grange Creek	1.00	0.65	
Lakeside Water District		Eel Lake	1.00	0.65	
North Bay Water District		Tributary of Haynes Inlet	0.30	0.19	
Reedsport		Clear Lake	10.00	6.46	
Shorewood Water District	28	Tributary of Haynes Inlet	0.80	0.52	

*Supplying the Cities of Coos Bay, North Bend, Eastside, and Empire; and the Bay Park-Millington and Englewood Heights Water Districts.

Data Source: Oregon State Board of Health, Oregon State Engineer, Coos and Curry County Health Departments

Subbasin. The Cities of Coquille, Myrtle Point, and Bandon indicate that future supplies could come from the Coquille North Fork, Middle Fork, and main stem. The City of Bandon is also considering the nearby sand dunes as a possible source of water.

The Coos Bay-North Bend Water Board, which serves the major population center of the basin, expects that future demands will exceed the supply from its Pony Creek source and the undeveloped Joe Ney Slough source. Reconnaissance surveys are now being conducted on the Millicoma West Fork to determine the feasibility of utilizing this stream for municipal water. This source may have to be developed in cooperation with large industrial water users because of the cost.

The City of Empire, which is presently served by the Coos Bay-North Bend system, has water rights for additional municipal supplies from the Empire Lakes, which are within the city limits, and from Winchester Creek, a tributary of the South Slough.

Lakeside, in the northern part of the Coos Subbasin, formed a water district recently and is presently developing a municipal supply from Eel Lake. The Bay Park-Millington Water District is presently developing a community water system and is contracting for water with the Coos Bay-North Bend Water Board.

Irrigation

Water from normal precipitation in the basin is not adequate to sustain maximum plant growth throughout the growing season. Irrigation is usually needed to meet plant requirements in the period of June through September.

The location of presently irrigated and potentially irrigable lands in the basin is shown on Figure 20. A total of 8,480 acres, or 91 percent of the irrigated land, was in pasture or hay in 1961. The remaining irrigated lands consisted of 530 acres of cranberries, 290 acres of lilies, and 40 acres of other crops. Irrigation was practiced on 16 percent of the hay and cropland pasture, and on all of the cranberries and lilies.

Surface water rights for irrigation total 112 cfs for the irrigation of 8,116 acres. Groundwater rights for irrigation total 4 cfs for the irrigation of 215 acres. All irrigation rights allow a legal annual diversion of 22,000 acre-feet. Water

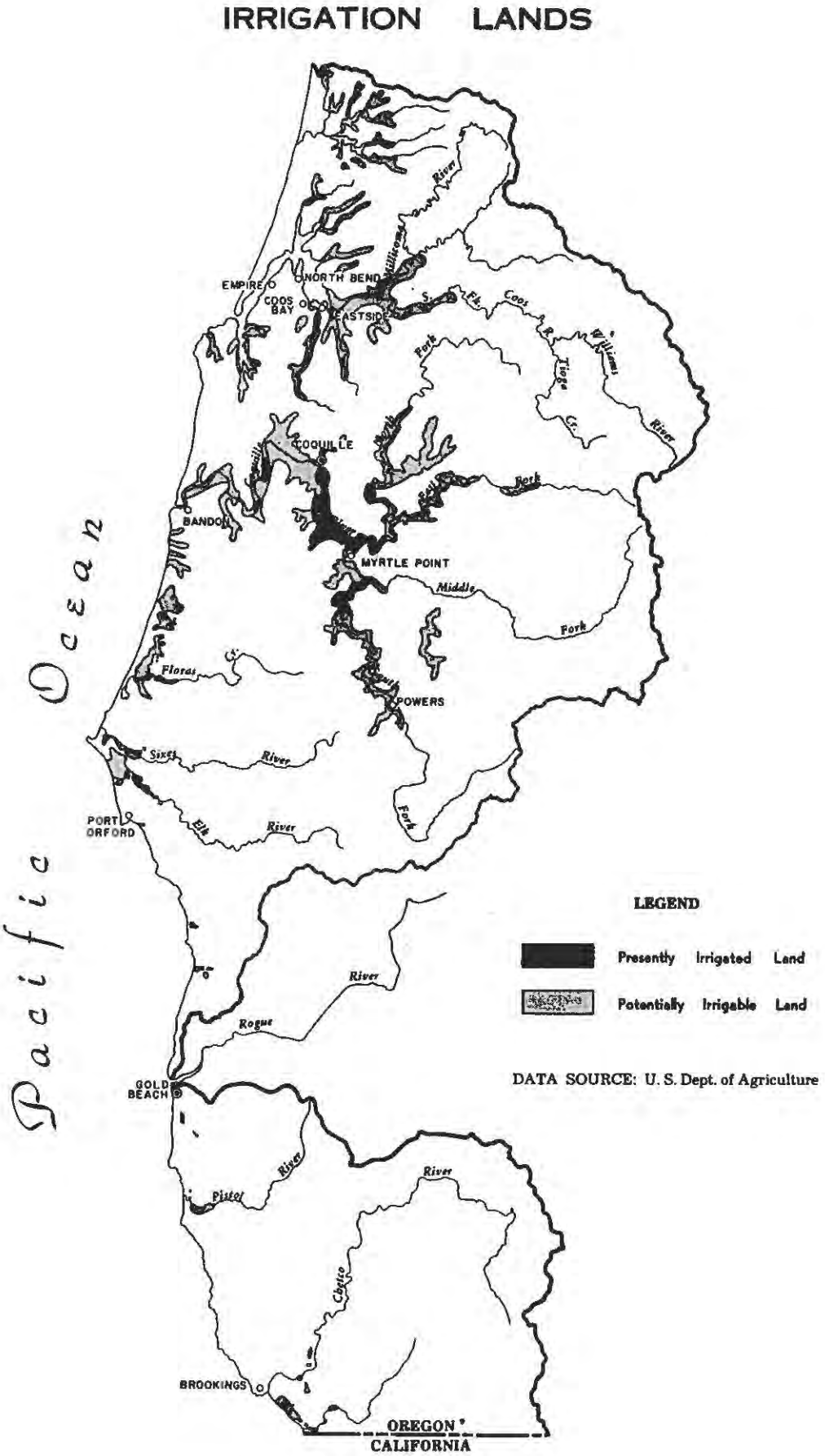


FIGURE 20. Irrigated Lands.

rights generally allow a duty of water of 2.5 acre-feet per acre per irrigation season for most crops. Six acre-feet per acre is the usual allowance for cranberry production.

It is estimated that about 9,340 acres were irrigated in the basin in 1961. Comparing this with the 8,330 acres holding irrigation rights, it is evident that some irrigation takes place without benefit of rights. This information is listed by subbasin in Table 26.

TABLE 26

IRRIGATION DEVELOPMENT
1961

SUBBASIN	LAND WITH IRRIGATION WATER RIGHTS			LAND UNDER IRRIGATION Acres
	SURFACE WATER Acres	GROUND-WATER Acres	TOTAL RIGHTS Acres	
Chetco	570	176	746	440
Sixes	936	8	944	1,300
Coquille	5,396	31	5,427	6,390
Coos	1,214	0	1,214	1,210
BASIN TOTAL	8,116	215	8,331	9,340

Data Source: Oregon State Engineer and U. S. Department of Agriculture

Detailed data on presently irrigated and potentially irrigable lands appears in Table B of the Appendix. This table summarizes the watershed data compiled by the U. S. Department of Agriculture as part of the cooperative investigation. This points out that water shortages occur on approximately 1,600 acres of presently irrigated land. In addition, storage will be necessary to provide irrigation water for 34,900 acres of the basin's 51,600 potentially irrigable acres.

Streamflows supply most of the water used for irrigation in the basin, as shown by Table 27. Other sources include wells, drainage water, and water from sumps and holding ponds. Irrigation from wells is confined to the Harbor area where surface water is limited. Sumps and holding ponds are used predominantly in conjunction with cranberry bogs.

Pumps are the primary means of diverting water from its source to the land. Sprinkler systems are used on about 98 percent of the irrigated land and the remainder is irrigated by flooding. This predominance of sprinkler irrigation results in part from the need for good distribution and control of water in areas where drainage is a problem. Also, most of the irrigated land is adjacent to streams having flat gradients, which makes pumping more practical than gravity diversion. Some of the land that is irrigated is subject to overflow during flood

periods, making structures associated with flood-type irrigation systems difficult to maintain. This makes sprinkler irrigation more practical for these lands, also.

TABLE 27

IRRIGATION WATER SOURCES
1961

SOURCE OF WATER	SUBBASIN				BASIN TOTAL Acres
	CHETCO Acres	SIXES Acres	COQUILLE Acres	COOS Acres	
Direct stream diversion	0	40	150	20	210
Pumped from streams	200	1,140	6,040	1,190	8,570
Pumped from wells	160	0	0	0	160
Other	80	120	200	0	400
TOTAL	440	1,300	6,390	1,210	9,340

Data Source: U. S. Department of Agriculture

Almost all irrigation development in the basin has been accomplished on an individual basis. Of the 409 farms in Coos and Curry Counties reporting irrigation in the 1959 U. S. Census of Agriculture, only 5 farms with a total of 148 acres reported irrigation from mutual facilities.

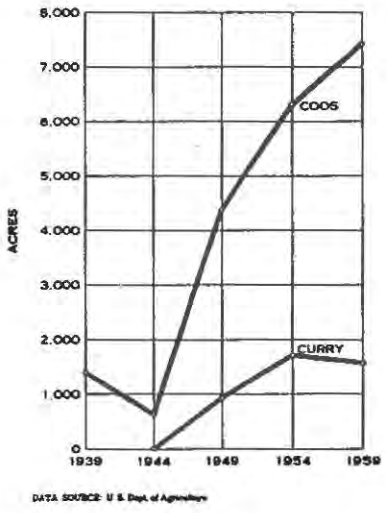


FIGURE 21. Irrigated acreage by county, 1939-1959.

Figure 21 shows trends in irrigated acreage in Coos and Curry Counties since 1939. Although irrigation has been practiced in the basin for many years its application to hay and pasture crops has developed mainly since 1944. This is evidenced by the growth in irrigated acreage between 1944 and 1954. In recent years, however, the rate of increase has tapered off slightly in Coos County and Curry County had a decrease in acreage between 1954 and 1959.

Table 28 compares areas of present and potential cropland and irrigated land. About two-thirds of the total cropland is presently utilized, but less than one-fifth the irrigable land is being irrigated.

WATER SUPPLY, USE, AND CONTROL

It is estimated that approximately 50,000 acres of land, in addition to that presently irrigated, is so located that it could be irrigated in the future. This includes some presently nonirrigated cropland.

TABLE 28

PRESENT AND POTENTIAL
CROPLAND AND IRRIGATED LAND

LAND USE	SUBBASIN				BASIN TOTAL Acres
	CHETCO Acres	SIXES Acres	COQUILLE Acres	COOS Acres	
Arable land	47,900	29,500	97,750	111,250	286,400
Present cropland	2,560	7,890	33,750	10,540	54,740
Potential cropland	50	5,800	15,900	2,950	24,700
Presently irrigated land	440	1,300	6,390	1,210	9,340
Potentially irrigable land	1,700	9,300	30,600	10,000	51,600

Data Source: U. S. Department of Agriculture

Development of the basin's irrigation potential is largely dependent upon the availability of an adequate water supply. The U. S. Department of Agriculture has estimated the consumptive crop requirement for the present 9,340 irrigated acres at 16,000 acre-feet of water. The water yield for the total basin averages 900,000 acre-feet during the irrigation season alone so there is an abundant total water supply to meet irrigation needs, both present and potential. However, there is a critical water supply problem in some areas due to the distribution of yield, both by season and by watershed. Of the 35 tributary watersheds studied, 7 have a seasonal water shortage at the present time, affecting approximately 1,600 acres. Most of the shortages occur in the smaller watersheds and in the tidal areas where salt water from the ocean makes river flow unusable.

An estimated 100,000 acre-feet of water would be needed to provide an adequate supply for all presently irrigated and potentially irrigable land. Natural flow is sufficient to irrigate only about 32 percent of the additional irrigable acreage. Therefore, the natural runoff of many streams needs to be supplemented with water stored in reservoirs during the winter season for release during the low flow season.

Other physical problems that complicate irrigation development

are annual floods which affect 29,000 acres and drainage problems on about 35,000 acres of arable land. In many cases, these problems are present on potential cropland and potentially irrigable land, as well as on land already developed. Increasing encroachment of salt water in the upper portions of the tidal estuaries is also restricting irrigation development. The salt front may make further advances in the future as upstream consumptive use increases thus further depleting the streamflow which, in turn, changes the balance between fresh and salt water in the tidal areas.

The degree and rate of irrigation development are also dependent upon various economic factors but these appear quite stable at present. It is anticipated that forage production, which sustains dairy and livestock production, will continue to be the most important cropland use in the basin, although there may be some increase in the acreage of certain specialty crops that are presently grown. Dairying and livestock operations are well established and, in the case of dairying, a major investment in specialized equipment is required which must be depreciated over a long period of time. Changing from dairying to other types of farms would entail considerable losses of present investments.

Another economic factor which discourages a major change in land use is the marketing situation. Markets for existing crops and livestock are fairly well established. Changes in cropping pattern would require new marketing outlets. Because of the distance to markets, the basin is in a less competitive position than areas closer to processing plants and marketing centers. Thus, development of additional cropland and irrigation land will depend primarily on expansion of markets for products currently raised in the basin.

Power

No major hydroelectric developments exist in the basin at the present time. Hydroelectric energy is supplied to the area by four public utilities served directly by the Bonneville Power Administration, and by one private utility, a member of the Northwest Power Pool.

Water rights for power total 625 cfs, with a single right for 624 cfs held by the private company for the proposed Eden Ridge project. This project, as proposed, would store water of the Coquille South Fork in the Ash Swamp area and divert it by tunnel through Eden Ridge to a powerhouse about 12 miles

downstream, near McCurdy Creek. The project would utilize a net head of 1,600 feet, and have an installed generator capacity of 77,000 kilowatts (kw) and an average annual generation of 200 million kilowatt hours (kwh). A steam plant, supplied by nearby coal fields, may be operated in conjunction with this project, if found feasible.

The upstream limit of anadromous fish migration is a natural falls below the proposed storage and diversion structures, but above the proposed power plant. Therefore, effects on the anadromous fishery would include the regulation of flows below the diversion structures and the fluctuations in streamflow below the powerhouse resulting from the variable discharges through the turbines. The possibility of fish life enhancement through controlled releases has been recognized and is being studied.

Preliminary surveys of basin streams indicated several potential power sites. These are listed in Table 29, giving potential installed capacities and average annual generations.

TABLE 29

UNDEVELOPED HYDROELECTRIC POWER SITES

REF. NO.	STREAM	SITE	INSTALLED CAPACITY kw	AVERAGE ANNUAL GENERATION kwh	APPROXIMATE HEAD Feet
27	Chetco River	Lower	30,000	118,200,000	-
28	Chetco River	Intermediate	43,000	72,400,000	230
29	Chetco River	Upper	42,000	75,700,000	325
	TOTAL		115,000	266,300,000	
51	Elk River	Lower	-	30,600,000	155
52	Elk River	Intermediate	7,500	25,400,000	-
53	Elk River	Upper	7,500	23,600,000	-
	TOTAL		-	79,600,000	
	Coquille River				
22	Middle Fork	Camas Valley	4,600	40,300,000	720
31	South Fork	Coal Creek	2,700	20,200,000	210
47	South Fork	Eden Ridge	77,000	197,000,000	1,610
56	North Fork	Fairview	4,500	39,400,000	200
119	East Fork	Brewster Valley	7,400	64,600,000	400
	TOTAL		96,200	361,500,000	
-	Coos River	Lower Coos River*	30,000	130,000,000	400
130	Coos River	Tioga Fork	20,000	100,000,000	300
	TOTAL		50,000	230,000,000	

Note: Reference numbers refer to Table C in Appendix and Plates 5 and 5A.
*Block of undeveloped power in stretch of stream.

Data Source: Federal Power Commission, Coos-Curry Electric Cooperative, Inc., Pacific Power and Light Company

WATER SUPPLY, USE, AND CONTROL

A survey by the U. S. Geological Survey resulted in the preliminary conclusions that the power potential on the Coos South Fork justifies further study, while the power potential of the Coquille system is of little more than local interest except for the aforementioned Eden Ridge project. A feasibility study on the Chetco and Elk Rivers, conducted by a private consultant for a public utility in the area, recommended power sites outside the basin because of the high cost of development associated with streams within the basin.

Development of hydroelectric power projects would in most instances be complicated by conflicts with the anadromous fishery resource of the basin.

Industrial

Rights held for industrial purposes account for the largest amount of water appropriated for consumptive use within the basin. They total 130 cfs, of which 84 cfs are for surface water and 46 cfs for groundwater. They allow an annual depletion of 94,000 acre-feet.

Most industrial rights are from surface sources, including streams, lakes, bays, and estuaries. They are principally on Coos Bay (48 cfs); Tenmile Lake (15 cfs); and on the Coquille (9 cfs), Chetco (6 cfs), and Sixes Rivers (2 cfs). The largest right for groundwater, 46 cfs, is in the sand dune area north of Coos Bay.

The largest industrial use occurs in the Coos Subbasin where rights account for 109 cfs. Industrial rights in the Coquille Subbasin total 9 cfs, in the Chetco Subbasin 8 cfs, and in the Sixes Subbasin 4 cfs.

Industrial uses of water are primarily for lumber and wood products manufacturing. Smaller quantities are used for food processing, coal washing, and the flooding of cranberry fields.

The wood products manufacturing industry is quite diversified and the water requirements vary both as to quantity and quality. The manufacture of pulp requires relatively high quality water, while hydraulic log barkers, condenser coolers, and log pond uses have a much lower quality requirement. In some cases these latter needs are met through the use of tidal water.

Quantity requirements vary both as to the size and type of the manufacturing industry. The largest single right is for a

lumber mill and plywood plant, which utilizes water from Coos Bay for a log barker and for condenser cooling.

Many industries receive all or part of their industrial supply from municipal systems. The three largest individual users of municipal water in the Coos Bay-North Bend area are wood products manufacturers.

Industries are generally located where sufficient water supplies are available and, therefore, shortages are uncommon. Expansion and further diversification is expected in the wood products industry and the needs for industrial water are expected to increase.

Sufficient water is available for expansion of industry in the Coos Bay and Coquille areas. Expansion in other areas of the basin would require development of new sources of supply, storage of winter runoff, or purchase from municipal supplies.

The major expansion is anticipated in the Coos Bay area. The present use of water from sand dunes amounts to only five percent of estimated dune capacity, 1.5 mgd compared to a potential of 30 mgd. Therefore, large increases in demand could be supplied from this source. An application for 100 cfs (65 mgd) has been received by the State Engineer for storage of water for industrial purposes on the North Slough. The Coos Bay-North Bend Water Board has water rights for 8 cfs (5 mgd) on Joe Ney Slough, which have not yet been used, and is studying the feasibility of utilizing the Millicoma West Fork for municipal and industrial purposes. The combination of these sources could provide sufficient water for a large increase in industrial use.

Mining

There are only six water rights for mining purposes in the basin, totaling 108 cfs. They are all for surface water and allow an annual legal diversion of 78,000 acre-feet. The rights are principally on the Sixes River (75 cfs), Cut Creek (12 cfs), Smith North Fork (10 cfs), Coquille South Fork (6 cfs), and Chetco River (4 cfs).

Little if any water is now being used for mining, but recently filed placer mining claims along the Sixes and Chetco Rivers could result in a considerable increase in both water use and stream siltation. The claims filed along a 13-mile stretch of the upper Chetco River may entail the eventual mining of approximately five or six million cubic yards of alluvial material.

Unless adequate settling basins are built, siltation from the operation could cause considerable damage to aquatic life. Water for the placering will be supplied by pumping from the streams. Placer operations are generally limited to periods of high streamflow during the winter and spring months. The value of recoverable minerals in relation to possible watershed and stream channel damage has not been determined.

Recreation

Water plays an important role in the recreation picture of the South Coast Basin. Principal activities include fishing and boating on the rivers, bays, and lakes, and in the Pacific Ocean.

The area has only a limited number of lakes, but some of these, including the Tenmile Lakes and Floras Lake, are well known both within and outside the basin for their recreation attractions. Table 30 lists the lakes and reservoirs of the basin and indicates their surface areas. They total about 5,700 acres in surface area, of which lakes cover about 5,000 acres and most of the remaining 700 acres are log ponds.

Water rights for recreational use do not reflect the dependence of recreation on the water resources of the basin. There are only six water rights, totaling two cfs. They are for surface water and allow a legal annual diversion of only 1,400 acre-feet.

Very few problems exist in regard to recreational water use in the basin. Most of the water utilized for recreational purposes also serves other water uses, but conflicts with these uses are relatively few.

Turbidity is a problem on many streams during the high flow winter months. Siltation occurs from natural causes and is aggravated in some areas by improper road construction practices, and by placer mining operations.

A serious problem on some streams has been log jams, which interfere with boating and, when large enough, block anadromous fish runs. A local program conducted in cooperation with a number of state and federal agencies has resulted in the clearing of jams in the Coquille stream system.

Pollution of the waters of Coos Bay has reportedly lessened the recreational attractiveness of portions of that area.

Conflicts with recreational water use in the future will probably be increased by the further use of these waters for other

TABLE 30

SURFACE AREAS
OF LAKES, PONDS, AND RESERVOIRS

SUBBASIN AND NAME	SURFACE AREA Acres	SUBBASIN AND NAME	SURFACE AREA Acres
CHETCO		COOS	
Brookings Log Pond	18	Tenmile Lake	1,350
Unnamed lake	17	North Tenmile Lake	980
Misc. lakes and reservoirs	60	Clear Lake	420
		Eel Lake	410
SUBBASIN TOTAL	95	Horsfall Lake	130
		Upper Pony Creek Reservoir	120
SIXES		Unnamed lake	65
Floras Lake	320	Sandpoint Lake	64
Garrison Lake	150	Saunders Lake	63
New Lake	120	Beale Lake	60
Laurel Lake	78	Unnamed lake	59
Croft Lake	77	Pony Creek Reservoir	52
Port Orford Log Pond	39	Empire Lakes	50
Unnamed lake	32	Lake Edna	38
Evans Products Log Pond	22	Unnamed lake	38
Unnamed lake	20	Unnamed lake	24
Unnamed lake	14	Unnamed lake	23
Misc. lakes and reservoirs	40	Lyons Reservoir	22
		Unnamed lake	22
SUBBASIN TOTAL	912	Unnamed lake	19
		Unnamed lake	17
COQUILLE		Tarheel Creek Reservoir	16
Johnson Log Pond	82	Unnamed lake	16
Coquille Plywood Log Pond	80	Archer Gulch Reservoir	15
Bradley Lake	31	Fourth Creek Reservoir	15
Fahys Lake	31	Unnamed lake	14
Powers Log Pond	22	Unnamed lake	14
Myrtle Point Veneer Log Pond	20	Unnamed lake	13
Coquille Reservoir	12	Unnamed lake	11
Round Lake	10	Butterfield Lake	10
Misc. lakes and reservoirs	90	Misc. lakes and reservoirs	180
SUBBASIN TOTAL	378	SUBBASIN TOTAL	4,330
BASIN TOTAL			5,715

Note: Lakes and reservoirs with less than 10 acres surface area included in Misc.

Data Source: USGS quad sheets, SWRB maps No. 17.6 and 17A.6, and Oregon State Engineer

purposes. Since much of the recreational use of water is centered around fishing, conflicts would probably be mostly associated with the anadromous fishery.

Wildlife

The principal big game species within the basin are black-tailed deer, Roosevelt elk, and black bear. Coos and Coquille Subbasins support one of western Oregon's largest elk herds.

Other upland game animals include ring-necked pheasants, quail, grouse, pigeons, doves, and brush rabbits.

Waterfowl populations are primarily composed of migrating ducks and geese, and are found principally in the bays, estuaries, and lakes of the coastal area. There is a large wintering population in the Coos Bay area, and this and the lower Coquille valley are the most important waterfowl areas of the basin.

Beaver, muskrat, river otter, mink, marten, and ring-tailed cat are the principal furbearing animals.

Water is not reserved for wildlife and, with the exception of waterfowl and some furbearers, their use of water is small. Water needs are met from streams, lakes, springs, and marshy areas and the location of these water sources directly affects the distribution of wildlife.

No problems associated with the quantity or quality of water for wildlife use have been reported.

Fish Life

Water rights for fish life in the basin total 37 cfs, all for artificial fish propagation purposes.

The streams and bays of the area provide habitat for a wide variety of both anadromous and resident species of fish. Anadromous species include chinook and silver salmon, steelhead, coastal cutthroat trout, shad, sturgeon, and striped bass. Resident fish include cutthroat and rainbow trout, largemouth bass, yellow perch, bullhead catfish, black and white crappie, bluegill, and pumpkinseed sunfish. The bays also include many shellfish which are subject to problems related to stream and bay pollution. Most important of these are clams, crabs, oysters, and mussels.

The importance of commercial fishing to the area has been discussed in the Economic Factors section of Part I. The contribution of the streams of this basin to coastal fishing cannot be accurately measured but is known to be considerable.

The stream and bay sport fishery of the basin is well known, and its importance can be measured to some degree by reported and estimated angler trips and fish catch.

Coos Bay salmon fishing during the 1955-1961 period produced

from 8,000 to 33,000 fish annually, with the angler trips ranging from 19,000 to 36,000. Table 31 gives the salmon and steelhead catch in the basin for 1959, based on salmon and steelhead punch-card data. Coos River and Bay led in salmon produced, but ranked third behind the Coquille and Chetco systems in steelhead. Thousands of angler trips are also made to the basin's streams and bays each year for the other species of game fish.

TABLE 31

SALMON AND STEELHEAD SPORTS CATCH 1959

SUBBASIN AND AREA	ESTIMATED NUMBER OF FISH		
	Salmon	Steelhead	Total
CHETCO			
Winchuck River	210	210	420
Chetco River and Bay	1,410	2,260	3,670
Pistol River	180	270	450
Hunter Creek	80	110	190
SUBBASIN TOTAL	1,880	2,850	4,730
SIXES			
Elk River	1,010	1,070	2,080
Sixes River	1,620	860	2,480
Floras Creek	210	70	280
SUBBASIN TOTAL	2,840	2,000	4,840
COQUILLE			
Coquille River and Bay	2,490	3,180	5,670
SUBBASIN TOTAL	2,490	3,180	5,670
COOS			
Coos River and Bay	9,350	1,280	10,630
Millicoma River and South Fork Coos River	230	400	630
Tenmile Creek	400	720	1,120
Tenmile Lake	230	230	460
SUBBASIN TOTAL	10,210	2,630	12,840
BASIN TOTAL	17,420	10,660	28,080

Data Source: Oregon State Game Commission

Stream conditions that are acceptable for anadromous fish are also generally adequate for resident salmonid species. For this reason, and because of the high importance of these fish to both the commercial and sport fishery, the discussion of the distribution of, and water requirements for, fish life, will be limited primarily to the anadromous species.

The areal distribution of the principal species of anadromous fish is illustrated on Plates 4 and 4A. In general, chinook salmon utilize the main stems of the larger stream systems, while silver salmon and steelhead and cutthroat trout ascend the smaller tributaries of the large streams and the smaller independent systems. Shad and striped bass, which are not shown on the plate, are found in the tidal reaches of the Coos and Coquille Rivers.

An indication of the monthly distribution of anadromous fish at different stages of their life cycle is given by Figure 22. The patterns differ somewhat for various streams but the distribution shown is typical of the general area. Fall chinook enter the rivers in late September and early October, and spawn from

mid-October through January. Silver salmon also enter in late September but do not spawn until November or December or later. Steelhead start their upstream migration in late October and November, spawning from December through May. Anadromous cutthroat migrations usually start in July and continue through March.

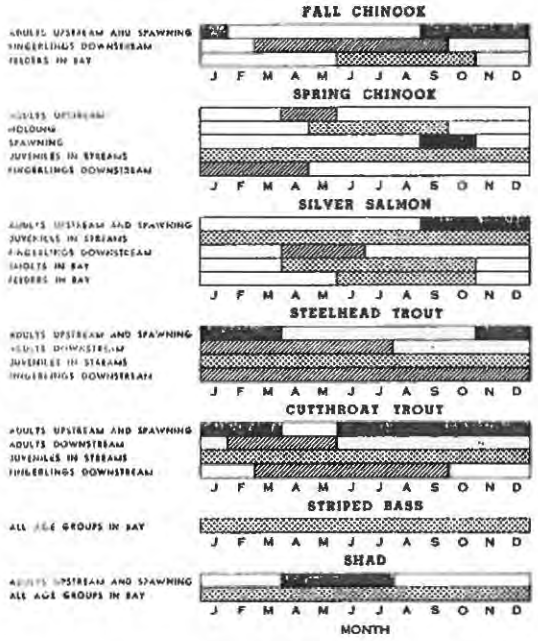


FIGURE 22. Generalized plot of anadromous fish activities in the South Coast Basin.[4]

The major stream systems of the basin, because of differences in fishery problems and also in their production capacity, will be discussed separately.

The Chetco Subbasin streams undoubtedly represent the most nearly natural conditions of any coastal area. The Winchuck, Chetco, and Pistol Rivers and Hunter Creek all have good to excellent runs of fall chinook and steelhead. The Chetco also has a fair run of silver salmon, but represents about the southern limit of these runs.

The Chetco is considered one of the most unspoiled streams in Oregon, and any deterioration by logging or mining activities would, according to the Game Commission, be a severe loss to countless future anglers and recreationalists, as well as to the commercial fishing industry.

The principal problems for fish life in the Chetco area are related to high temperatures and low summer flows.

Streams in the Sixes Subbasin also have large runs of fall chinook and steelhead, and in addition have a small number of silver salmon. Four streams, Elk and Sixes Rivers, and Euchre and Floras Creeks, support over 90 percent of the fish population of the subbasin. These streams are similar to those in the Chetco Subbasin in terms of habitat. Problems include low summer flows and accompanying high water temperatures. On the Elk and Sixes Rivers and Euchre Creek there has been recent damage from high turbidities caused by logging, gravel removal, and road building activities. The problem occurs during the operations and again during later periods of heavy rainfall.

WATER SUPPLY, USE, AND CONTROL

Elk and Sixes Rivers are considered two of the most important fall chinook streams on the Oregon coast.

A few lakes in this area provide fishing for resident trout and several warm-water species. Several thousand legal-sized cutthroat or rainbow trout are planted annually in Floras and Garrison Lakes to provide additional angling.

The Coquille system has important runs of steelhead, fall chinook, silver, and cutthroat. The Coquille, along with the Tenmile and Coos systems, is one of the best silver salmon producing streams in the basin. Limited numbers of striped bass are present in the lower Coquille, and a good shad population supports a commercial fishery.

Much of the Coquille main stem and the lower reach of the North and Middle Forks are primarily bedrock. The smaller tributaries in the headwater areas contain the major portions of spawning gravels. The deep, slow moving waters of the lower Coquille are ideally suited to rearing silver salmon and steelhead trout which have been spawned in the headwater areas. Stranding of young fish due to flooding is a constant threat resulting in heavy losses in the valley lowlands as the floodwaters recede. A remnant run of spring chinook utilize the Coquille South Fork, where stream bottom conditions are more closely associated with those of the Sixes and Chetco Rivers in that they have larger areas of spawning gravels.

Anadromous fish life problems are more acute in the Coquille system than in either the Chetco or Sixes Subbasins, probably due in part to extensive logging of their watersheds, resulting in very low summer flows and high temperatures. Figure 23 shows daily water temperatures in the Coquille South Fork during 1958. Temperatures in excess of 70 degrees occurred during the months of June, July and August. These temperature ranges are well above those desirable for anadromous fish species.

A power development which could beneficially affect fish life is planned for the South Fork Coquille River at Eden Ridge. The location is above the limit of anadromous fish runs, and if good quality water is made available for downstream release at the proper times the project could enhance present fish production, particularly fall chinook.

The Coos River and Tenmile Lake stream systems support important runs of various anadromous species and Coos Bay itself also supports shellfish populations of clams, crabs and oysters. The

lower sections of the streams are similar to those in the Coquille in that they are characterized by large sections of bedrock. Former splash dam operations in the Coos South Fork and Millicoma East Fork have had detrimental effects on sections of the river that had good spawning gravels. Because of this the Millicoma West Fork, which did not have such operations, has the largest present runs of anadromous fish in the Coos system. The South Coos River has the greater potential for enhancement, however. The Fish and Game Commissions started a program of rehabilitation prior to the removal of the dams and has accelerated the program in recent years, with encouraging results.

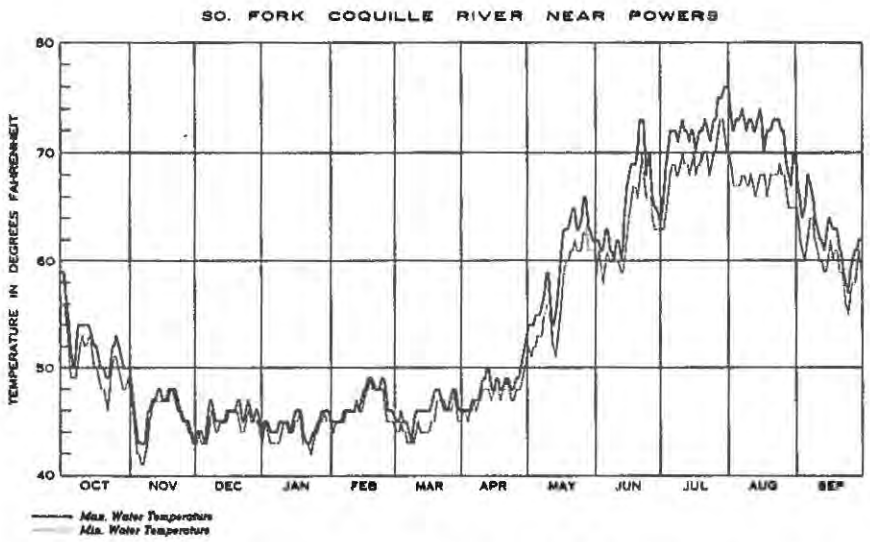


FIGURE 23. Daily water temperatures, South Fork Coquille River near Powers, water year 1958.

A heavier angling pressure is concentrated on the Coos Bay River and system than on any other stream system in the basin. It is also one of the most diversified.

The striped bass population in the lower Coos system is one of the largest north of San Francisco and provides a considerable sport fishery. Shad, which also utilize the same area, provides both a commercial and sport fishery.

The Tenmile Lake system is one of the best known silver salmon areas on the coast. A 1955 population study indicated that 77,500 silver salmon returned to the lakes to spawn. Cutthroat and steelhead trout also are spawned and

reared in the system and they provide for a considerable sport fishery.

Water and watershed problems are similar to those of the Coquille system. Gravels lost due to splash dam operations are returning slowly, but summer flows remain quite low and temperatures high.

The Oregon Game Commission has recently completed a field survey of the South Coast Basin. As one of the results of this study they have compiled a list of recommended minimum flows for certain locations on many of the streams in the area. These figures are included in the Appendix as Table D. For discussion purposes a partial list is given here as Table 32. It lists the flows given for 15 of the major streams and tributaries, either at their mouth or at the farthest downstream location given.

Recommendations are given for monthly or semi-monthly periods, usually for the entire year, and are generally below present average flows. They provide what is considered the basic flows necessary to meet present requirements for anadromous fish passage, spawning, and rearing. These are not considered optimum flows although they may approach optimum in some instances.

These flow recommendations are based primarily upon studies made during fish migration and spawning periods. Data collected included flow volumes, water velocities and depths, gravel characteristics, and spawning counts. Some areas were covered several times in order to evaluate different runs by either the same or different species, varying water conditions, and fluctuations in spawning intensity.

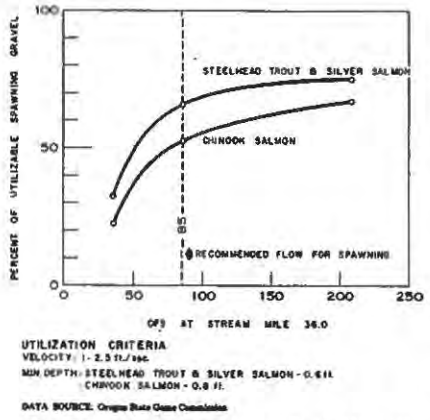


FIGURE 24. Relationship between flow and utilizable spawning gravel.

Figure 24 illustrates the relationship between utilizable spawning gravel and streamflow, and shows the recommended flow for spawning based upon this relationship. This plot is for chinook and silver salmon and steelhead trout spawning in the Coquille North Fork in the vicinity of stream mile 36. Note that as the flow decreases below the recommended value (85 cfs), the percentage of utilizable spawning gravel drops off rapidly. On the other hand, it requires an appreciable increase in flow above the recommended

value to significantly increase the percentage of utilizable spawning gravel. Although time did not permit doing this work on all streams, these results help to substantiate the other flow recommendations until such time as more detailed analyses are available upon which to base modifications of recommended flows.

TABLE 32

RECOMMENDED MINIMUM FLOWS FOR FISH LIFE FOR CERTAIN ANADROMOUS FISH STREAMS

SUBBASIN AND STREAM	JAN. cfs	FEB. cfs	MAR. cfs	APR. cfs	MAY cfs	JUNE cfs	JULY cfs	AUG. cfs	SEPT. cfs	OCT. cfs	NOV. cfs	DEC. cfs
CHETCO												
Chetco River (Above confluence of North Fork)	700	700	700	700	700	160	100	80	80	400	700	700
Pistol River (Mouth)	230	230	230	230	230	40	20	15	15	18	35	255
Winchuck River (Mouth)	145	145	145	145	145	35	20	20	20	20	175	175
Hunter Creek (Mouth)	130	130	130	130	130	10	7	7	7	7	150	150
SIXES												
Elk River (Mouth)	300	300	300	300	300	100	60	45	45	50	300	300
Sixes River (Mouth)	215	190	190	190	190	50	30	30	30	40	215	215
Euchre Creek (Mouth)	105	105	105	105	105	25	10	10	10	10	120	120
Floras Creek (Highway 101)	-	-	-	-	-	6	5	5	5	-	-	-
COQUILLE												
North Fork Coquille River (Confluence of East Fork)	-	-	-	-	-	-	18	14	14	14	-	-
East Fork Coquille River (Mouth)	90	90	90	90	90	60	35	15	15	110	110	110
Middle Fork Coquille River (Mouth)	155	155	155	155	155	60	25	15	15	175	175	175
South Fork Coquille River (Gaylord, River Mile 18.7)	200	200	200	200	200	70	35	30	30	250	250	200
COOS												
South Fork Coos River (River Mile 10.2)	120	120	120	120	120	70	45	30	30	130	120	120
East Fork Millicoma River (Mouth)	-	-	-	-	-	30	20	15	15	-	-	-
West Fork Millicoma River (Mouth)	-	-	-	-	-	15	8	6	6	-	-	-

Note: Complete list of recommendations appears in Appendix as Table D.

Data Source: Oregon State Game Commission

Pollution Abatement

Pollution problems in the basin include heavy turbidity resulting from erosion, intrusion of salt water into tidal stretches of some streams, and the contamination of surface water and groundwater from improper sewage disposal.

Heavy turbidity occurs during periods of high runoff as a result of normal erosion, and is sometimes aggravated by poor road building and logging practices. Placer mining operations also add to the silt load in some areas.

The intrusion of salt water into the tidal reaches of the Coquille River and the estuaries of Coos Bay constitutes a pollution of these waters in that it affects the usefulness of these waters for irrigation, domestic, municipal, and industrial purposes. The exact relationship between the upstream limits of salt intrusion and the flow of water in the streams is not known.

Studies on other rivers have indicated that the upstream movement of the salt front is small in comparison to increased water use up to a critical point, at which time tidal effects cause a rapid upstream movement. This critical point of water use has not been determined for any streams within the basin. A long-term study would be necessary to determine how much water could be diverted from the Coquille and Coos River systems during the low flow period without reaching this critical point.

Contamination of both surface water and groundwater in many areas of the basin results from present methods of sewage disposal by individual, community, and industrial systems. In rural areas the disposal is normally through a septic tank and drain field. Collection systems are used within municipalities, and sewage is then discharged into streams or into the ocean. The treatment of sewage before its discharge varies with the individual system, as shown by Table 33, which lists all public sewerage systems and all individual industrial treatment facilities. Most systems provide only primary treatment. The table also lists needed improvements as recommended by the Oregon State Sanitary Authority.

Pollution problems have occurred throughout the basin in areas having a high water table and where individual systems are improperly constructed or placed too close together. The resulting problems are generally local in nature and affect primarily groundwater or small surface streams. Building loans have been denied in some areas due to the inadequacy of existing sanitary facilities.

TABLE 33

SEWERAGE SYSTEMS

PUBLIC

SUBBASIN AND SYSTEM	DEGREE OF TREATMENT	DESIGN POPULATION	POPULATION SERVED	RECEIVING STREAM	ADDITIONS NEEDED
CHETCO					
Brookings	Primary	5,000	3,000	Chetco Cove	Extension of interceptor, and sewers, pump station
Gold Beach	Primary	5,000	2,000	Riley Creek	
SIXES					
Port Orford	-	-	-	-	Sanitary sewer system and secondary treatment
COQUILLE					
Bandon	None	-	1,200	Coquille River	Sewer extensions, interceptor, intermediate treatment
Coquille	Primary	6,000	4,000	Coquille River	Storm water separation, sewer extensions
Myrtle Point	Intermediate	3,000	3,000	Coquille River	
Powers	None	-	500	South Fork Coquille River	Intermediate treatment (sewer project under construction)
COOS					
Bunker Hill Sanitary District	Primary	1,200	800	Coos Bay	
Charleston	-	-	-	-	Sewers, primary treatment
Coos Bay	Primary	10,000	7,500	Coos Bay	Sewer extensions, pump station
Coos County USAF Station	Secondary	150	150	Coos Bay	
Coos Head Naval Facility	Septic tank			Ocean	
Eastside	Septic tank			Coos Bay	Sanitary sewer system, primary treatment
Empire	None	-	3,500	Coos Bay	Primary treatment
Englewood Area	-	-	-	-	Sewers and connection to Coos Bay system

TABLE 33 (Continued)

SEWERAGE SYSTEMS

INDUSTRIAL

SUBBASIN AND SYSTEM	INDUSTRY TYPE	TREATMENT	RECEIVING STREAM	ADDITIONS NEEDED
COQUILLE				
Bandon	Dairy products	-	-	Adequate pretreatment
Coquille	Meat packing	-	-	Industrial survey required
Myrtle Point	Cheese manufacture (P.E. 1,300)		Myrtle Point sewerage system	Adequate pretreatment
	Cheese manufacture (P.E. 400)	Land disposal by spray irrigation		
COOS				
Coos Bay	Lumber and plywood	Screened hydraulic debarker	Coos Bay	More adequate treatment
	Seafood	-	-	Industrial survey required
	Creamery	-	-	Industrial survey required
Empire	Pulp manufacture (P.E. 150,000)	Some use of waste liquor on roads	Coos Bay	Separation and separate handling of strong waste
	Meat packing	-	-	Industrial survey required
North Bend	Pulp and paper (P.E. 180,000)	Evaporation		

Note: P.E. - Population equivalent

Data Source: Oregon State Sanitary Authority

Major pollution problems have also resulted from inadequate municipal and industrial treatment prior to discharging of effluents into streams and bays. Pollution of Coos Bay has occurred as a result of discharge of untreated municipal sewage and of industrial discharges from a pulp plant. Shellfish populations have reportedly been reduced and the recreational attractiveness has been lessened. Industrial pollution has been reported in the past on the Elk River, as a result of discharge of glue wastes. Fish processing plants at Port Orford and at Brookings discharge untreated wastes into the harbor.

Population increases and industrial expansion are expected throughout the basin. Each addition, even with adequate treatment, will decrease the remaining dilution capacity of the receiving stream.

WATER CONTROL

Flooding

The topographic and climatic conditions existing in the South Coast Basin often result in flood problems for the lowland areas during the winter and spring seasons. The floodwaters are primarily from rapid runoff of precipitation, or inundation of coastal lowlands as a result of tidal action, or both.

Floods may occur as early as September or as late as May, but are most likely to occur between November and March. The lands become primed with the first long-duration storms of the season, and usually remain fairly well saturated throughout much of the winter. Most of the precipitation is in the form of rain, and runoff from the upper watersheds, where stream gradients are relatively steep, is very rapid. Storms of high intensity or long duration therefore result in floods in the lower river valleys, where the gradients are much flatter.

Inundation from ocean tidal waters is common along the lower parts of many of the coastal watersheds. Damages occur during the periods of abnormally high tides and are most severe when these high tides occur simultaneously with high streamflows, restricting the ability of the stream to discharge into the ocean. Another restriction problem occurs in areas where drifting sand has partially blocked the outlets of streams, causing floodwaters to back up and flood the lowlands. This particular problem is considered serious in the Floras Creek and North Slough areas.

Figure 25 shows water control problem areas in the South Coast

PROBLEM AREAS

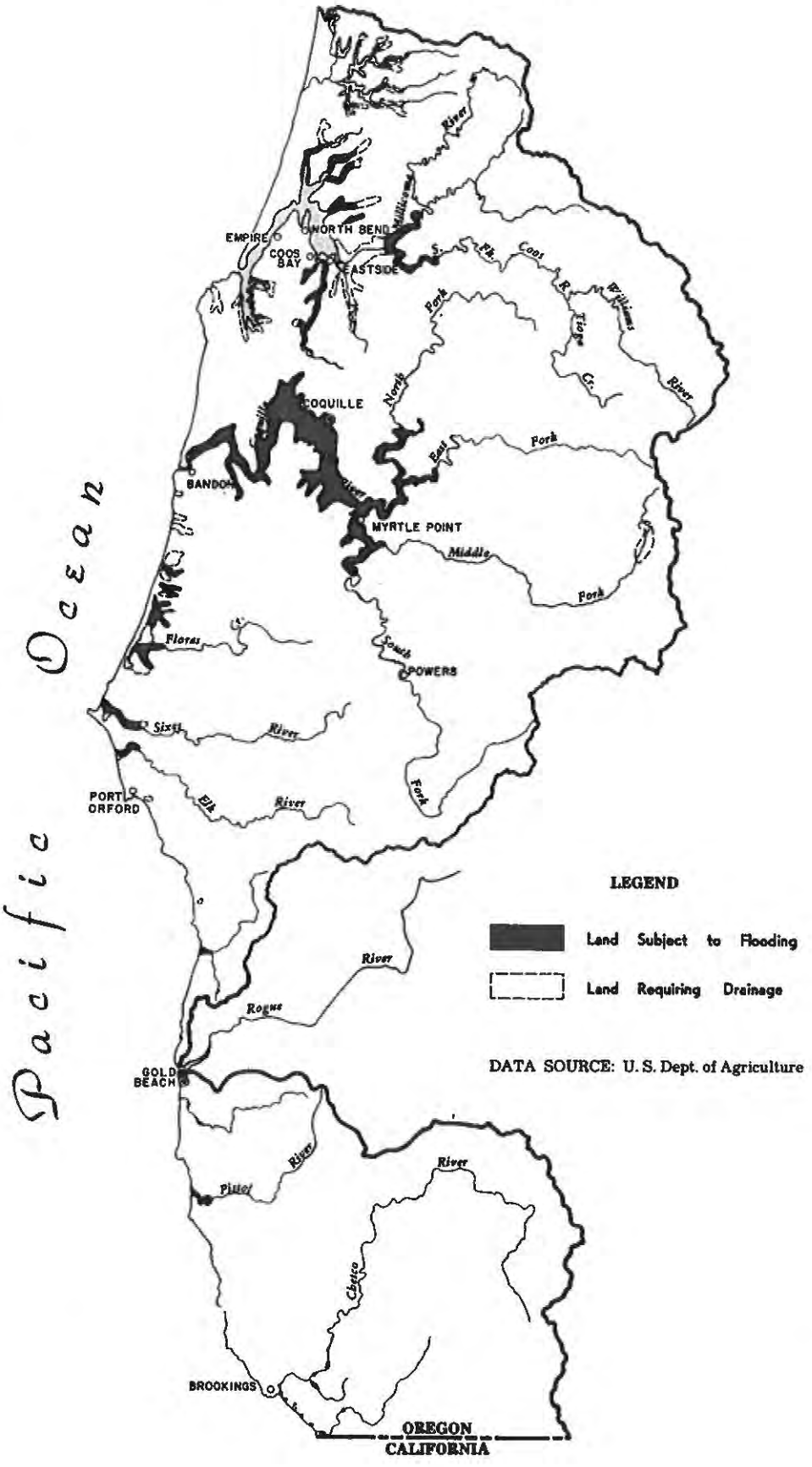


FIGURE 25. Problem Areas.

Basin, and Table B in the Appendix includes reconnaissance data on water problems by watersheds. Flood problem areas are the most extensive in the Coos and Coquille Subbasins, although problem areas of lesser extent occur in the coastal portions of some of the smaller drainage systems.

Damages resulting from floods are dependent upon the land use activities of the flooded areas and upon the developments involved.

Most towns are located above ordinary flood stage but larger floods have occasionally damaged lower lying portions of Coquille and Myrtle Point. Some industrial establishments in the Coquille area have to partially shut down activities during high-water periods.

Floodwaters also cause annual damage by undermining or overflowing highways, railroads, and fences. The railroad through the Coquille valley has been flooded several times, with resulting damage from debris and from softening of the roadbed. Many highways are closed for extended periods during high water, and in addition to damage to the road subgrade or surface, entire sections of roads occasionally wash out.

Damage to agricultural land is widespread on the valley floors of the basin. Most of the land is used for the production of perennial forage crops. Inundation of these farm areas for extended periods of time overloads drainage facilities, shortens grazing time, and destroys pasture seedings. Problems associated with long periods of inundation are especially serious along the Coquille River between Myrtle Point and Rivertown. Sedimentation and deposition of debris carried by floodwaters also causes serious damage to cropland. Silt deposits left on farm lands are damaging to perennial crops, and deposits are occasionally deep enough that they must be removed or the field plowed and reseeded.

Flooding also causes problems to fish life, including silt deposits, channel scouring, changes in streamflow characteristics, and washing out eggs, young fish, and food sources. In the lower Coquille River young fish are often left stranded as waters recede after overflowing the banks.

Damage figures available for the December 1955 flood of the Coquille River system are shown by Table 34. Of the $2,597,000 total damages reported, 40 percent were to agricultural lands and 36 percent to industrial property. There were over 20,000 acres of farm land inundated.

Damages caused by this flood were considerably smaller in other watersheds of the South Coast Basin. The U. S. Corps of Engineers reported damages totaling $127,000 in the Coos River Basin. About 2,100 acres of land were inundated, accounting for about $54,000, and industrial damages amounted to about $70,000.

TABLE 34

COQUILLE FLOOD DAMAGES - DECEMBER 1955

STREAM SECTION	DAMAGES IN DOLLARS					
	Agriculture	Residential	Industrial	Railroads, Roads and Utilities	Other	Total
COQUILLE RIVER						
Main stem:						
Above Coquille	391,580	14,360	151,450	14,350	11,270	583,010
Coquille to mouth	292,550	9,250	606,100	233,300	26,260	1,167,460
Tributaries:						
East Fork	9,700	-	-	10,000	300	20,000
North Fork	34,930	590	-	14,500	-	50,020
South Fork	240,630	11,100	150,460	207,450	19,250	628,890
Middle Fork	24,840	21,390	5,800	84,950	10,470	147,450
TOTAL COQUILLE RIVER	994,230	56,690	913,810	564,550	67,550	2,596,830

Data Source: U. S. Army, Corps of Engineers

The U. S. Corps of Engineers estimated that the 1955 flood varied in magnitude from a 30- to 100-year frequency. The flood crest elevation was 27.5 feet above mean sea level at Coquille, an area where agricultural lands generally lie below 10 feet in elevation and average height of river banks is about 11 feet above sea level.

Freshets overtop the river banks in the lower reaches of the Coquille River on an average of three times a year, and major floods have a recurrence interval of about once in ten years.

Flood control improvements in the South Coast Basin by the federal government have included the reconstruction of the Catching Slough levee on Coos Bay, a bank revetment and levee on the Coquille River immediately downstream from Coquille, and a channel clearing and snagging project for flood control on Larson Inlet. Most improvements, including levees, systems of canals, and outlet works with tide gates, have been constructed by local drainage districts. Many of these improvements, however, do not provide full protection against floods.

WATER SUPPLY, USE, AND CONTROL

The U. S. Corps of Engineers has, in the past, studied both the Coos and Coquille River Basins to determine possible methods of flood control and currently is restudying the Coquille Basin.

It was concluded by the Corps in 1957 that the average annual flood damages in the Coos River Basin are comparatively small although many areas are subject to frequent flooding. A comprehensive flood control program involving multiple-purpose storage reservoirs did not appear to be justified at that time but there are plans to make further studies under the continuing authority of Public Law 685 of the 84th Congress.

Various methods have been considered to control floods in the Coquille River Basin; regulation of flood flows by means of storage on the tributaries or on the main stem below Myrtle Point, diversion of floodwaters to Coos Bay, dredging the river to obtain greater capacity for the present channel, construction of levees along the river banks, rehabilitation of existing drainage works and new construction to facilitate removal of impounded floodwaters, bank protective works at certain vital locations, and the protection of tidal areas against salt water intrusion by means of levees.

A preliminary examination and survey of the Coquille River system was made by the Corps of Engineers in 1942. These studies showed that in order to keep from exceeding the estimated 18,000 cfs bankfull capacity of the Coquille River at Coquille, it would be necessary to have reservoirs on each of the three main tributaries in their lower reaches, or a single dam with a large storage capacity located below the confluence of the main branches. The flood frequency curves of Figure 26 show that any one of the South, Middle or North Forks may discharge 18,000 cfs or more on an average of once every three years and, further, that the combined discharge of any two of the three forks may be expected to exceed this figure nearly every year.

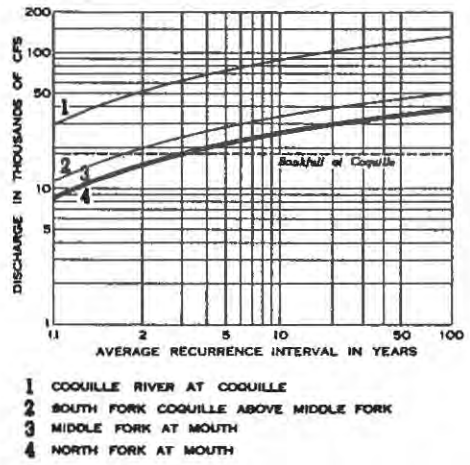


FIGURE 26. Flood frequencies, Coquille River.

The conclusion of the 1942 study was that storage sites adequate to completely control floods at Coquille were not

available on the forks of the Coquille River and that a site below the confluence of the North and South Forks capable of providing such control would flood the City of Myrtle Point, making storage at that site economically infeasible.

Measures for partial flood control were considered feasible at three locations. These measures included bank protection, control of riverbank erosion, and the construction of levees to protect lands from tidal overflow. Construction of these items by the Corps of Engineers was recommended. Part of this work has been completed under special emergency authorization. The remainder lacks necessary local participation. It also appeared in 1942 that rehabilitation of existing drainage facilities for better removal of floodwaters would be economically feasible. This is the responsibility of the local interests although, under current federal legislation, the Corps can consider and recommend drainage improvements.

As mentioned above, the U. S. Corps of Engineers is presently engaged in a restudy of the flood problems in the Coquille River Basin. This study is being made in cooperation with state and other federal agencies, with a view toward establishing a means of comprehensive water development and flood control.

Drainage

Approximately 73,000 acres, or 25 percent of the total arable soils in the South Coast Basin, are subject to excessive wetness. Much of this land, however, is being used for timber production and other purposes for which drainage would not be feasible. It is estimated that 35,000 acres, or about 48 percent of the excessively wet soils, need to be drained. These areas are shown on the generalized water control problem map of Figure 25. Table B in the Appendix lists acreages needing drainage by individual watershed.

TABLE 35

DRAINAGE PROBLEMS

SUBBASIN	EXCESSIVELY WET ARABLE SOILS Acres	AREAS NEEDING DRAINAGE Acres
Chetco	1,200	400
Sixes	7,700	5,000
Coquille	36,800	22,100
Coos	27,300	6,500
BASIN TOTAL	73,000	34,000

Data Source: U. S. Department of Agriculture

An estimate of the soils with excessive wetness and areas needing drainage by subbasin is shown in Table 35.

W A T E R S U P P L Y, U S E, A N D C O N T R O L

The Chetco Subbasin has a relatively small amount of excessively wet soils, due to the steep gradients of its streams. The few drainage problems that exist are predominantly in the tidal areas. More than half of the excessively wet soils in the Sixes Subbasin are Class IV lands, suitable for only occasional cultivation. The majority of these are located on the tidal flats at the mouth of the tributary watersheds and in the Floras and Willow Creek areas. Most of the excessively wet soils in the Coquille Subbasin are along the main Coquille River below Myrtle Point. Those of the Coos Subbasin are predominantly along the sloughs and tidal areas of the streams, in the vicinity of Coos Bay.

Adequate drainage could significantly increase production on the 35,000 acres having drainage problems, and would also increase the variety of crops that could be grown. In some cases, water drained from the land might be used for irrigation. Drainage can be accomplished in many cases by the use of simple interception drains, but most of the area requires extensive pattern or random drainage systems.

Many areas are subject to frequent overflow. Such areas often need to be protected by dikes and outlet drain ditches equipped with floodgate structures. This would prevent high water from causing reverse flows that add to the drainage problem. This also applies to tide lands.

Erosion

Arable land is lost in many areas through streambank erosion. Although such damage is most prevalent where the streams are the steepest, there is also some damage in the main valleys, some of which is caused by tidal and wave action on banks and dikes.

There is a need for more stream channel work, including removal of gravel bars, drift and brush, and dredging in the lower parts of the larger streams. River banks in many places need more protection by the use of rock, trees, brush, and natural growing vegetation. In many cases this type of channel work should be done by groups.

Sheet, gully and rill erosion is not a very serious problem on arable land at present because most of this land is used for production of pasture, hay and silage. The usual crops are perennial grasses and legumes, which give the best protection against erosion.

W A T E R S U P P L Y, U S E, A N D C O N T R O L

Considerable water erosion and land slippage has resulted on steep upland watersheds as a result of clearing for grazing combined with repeated burning to control the encroachment of undesirable vegetation, which leaves the soil unprotected.

Serious soil erosion sometimes occurs as a result of road construction, mining, and logging activities. Excavated material may be sidecast into streams or left where it will be carried away by floodwaters. In some cases, there is little provision for drainage of roads or, upon completion of operations, many roads are abandoned without providing for erosion control.

WATER RESOURCES DEVELOPMENT POTENTIAL

General

The future development of the water resources of a basin is dependent upon a number of interrelated factors. These include the natural surface water and groundwater supply and its seasonal distribution; the present and future needs for water; the need for control of floods, erosion, and excessive wetness; the physical potential for both controlling the supply and making it available for use where and when needed; and the desire and economic ability of the people in and near the basin to develop this potential.

Water supplies may be provided by enlargement or improvement of present facilities, improvement of the method of application and reuse of water, and by development of new supplies. Discussion here will be limited primarily to possible new developments.

New water supplies may be developed by diversion of natural streamflow or springs, storage of surface flows, groundwater pumping, or some combination of these methods, including groundwater storage through recharge.

Control of water to prevent or lessen flood and erosion damage is gained chiefly by storage, channel work, bank revetment, and diking.

It has been found that water use and control problems in the South Coast Basin are, in general, not of a magnitude to either justify or create local support for major project developments, with the exception of flood control. For this reason, few comprehensive studies relative to major projects have been made. Therefore, most of the developments discussed are in the small project category. This section will point out shortages,

damages, and inconveniences caused by poor distribution of the water resources and possible developments that could overcome these problems, without regard to the desire or economic ability to make such developments.

Various agencies have conducted studies in the South Coast Basin, primarily involving possible storage projects for flood control, power development, or irrigation. Plates 5 and 5A show all reservoir sites which, over the years, have been investigated, considered, or proposed. Table C lists available basic data pertaining to these sites.

The U. S. Department of Agriculture conducted a preliminary review of 35 small watersheds to gather basic water and land use facts related to possible projects under Public Law 566. This work was done in cooperation with the State Water Resources Board study and is the basis for much of the data regarding irrigation uses and needs of water used in this report. Plates 5 and 5A show the watersheds studied by the U. S. Department of Agriculture. Table B lists detailed land use data for each watershed.

The U. S. Geological Survey has conducted reconnaissance power studies. Only large reservoir sites were considered and little justification for hydroelectric development was found, with the possible exception of the Coquille South Fork. These were discussed earlier in this report.

Earlier studies by the Corps of Engineers for flood control storage projects were terminated due either to a finding at that time of economic infeasibility or to lack of local interest, or both. Currently the Corps is conducting a comprehensive study of water resources development for the Coquille River Basin.

Detailed studies, such as that being conducted by the Corps, are required in any given area to fully establish what development is necessary to provide needed water supply and control, the desire and ability to make the necessary development, and the best method of obtaining such development.

This section briefly summarizes the physical and economic characteristics, water supply and distribution, and present and potential water-related needs and problems by subbasin. This is followed by a discussion relating water needs to potential developments, based upon present knowledge. This is also by subbasin and, where possible, by stream system.

Chetco Subbasin

The Chetco Subbasin includes the watersheds draining into the Pacific Ocean between the Rogue River drainage and the Oregon-California line. It comprises an area of 719 square miles, of which one-half is drained by the Chetco River. Other major stream systems include the Winchuck River, Pistol River, and Hunter Creek.

Average annual precipitation is estimated to range from about 70 inches along the coast to over 100 inches in the higher interior areas. Elevations range from sea level to 5,100 feet. Stream gradients are quite variable, ranging from an average of 70 feet per mile on the Chetco River main stem to 230 feet per mile on the Winchuck River East Fork. Ninety-five percent of the subbasin is in forests, with only three percent in rangeland and one percent in cropland.

The 1960 population of the Chetco Subbasin was an estimated 8,050. It was concentrated almost entirely along the immediate coast. The two incorporated cities of the subbasin, Brookings (2,637) and Gold Beach (1,765), account for over 50 percent of the subbasin population. The interior is sparsely settled, being comparatively inaccessible.

The economy of this subbasin is centered about forestry and wood products manufacturing. Agriculture, commercial fishing, and recreation are also important. There are a considerable number of mining claims in the upper areas but these do not make a major economic contribution.

The average annual surface water yield of the Chetco Subbasin is estimated at 2,500,000 acre-feet, of which about one-half is runoff from the Chetco River. The Pistol River yields about 360,000 acre-feet and Hunter Creek an estimated 140,000 acre-feet in an average year. Runoff for these streams ranges between 3,100 and 3,400 acre-feet per square mile per year. Streamflows are quite high in the winter, but flows as low as 3 cfs on the Winchuck, 48 cfs on the Chetco, and 1 cfs on the Pistol River have been observed near the mouths of these streams. Hunter Creek has been reported as completely dry at times.

Surface water rights in the Chetco Subbasin total 43 cfs with 29 cfs being for consumptive purposes. This includes 9 cfs for municipal, 8 cfs for industrial, 7 cfs for irrigation, and 4 cfs for domestic purposes. The nonconsumptive rights are almost entirely for mining. If all surface water rights were used to their maximum legal extent, about 27,000 acre-feet would be diverted each year from the streams of the subbasin.

W A T E R S U P P L Y, U S E, A N D C O N T R O L

Groundwater supplies appear to be quite limited and present use is small. Existing rights have a total legal rate of depletion of 3.5 cfs representing a maximum annual depletion of 720 acre-feet.

Subbasin needs include water for domestic supplies and for water-based recreation. Other needs, more localized in nature, include municipal and industrial supplies, irrigation water, and water control, especially flood control.

There is need for a municipal water supply for the community of Hunter Creek, just south of Gold Beach. The water could probably be most economically supplied from the Rogue River through the new Gold Beach system. There is some acreage in the Hunter drainage needing additional irrigation, and there is a potential storage site on Conn Creek, a tributary of Hunter, but small project development seems unlikely at this time.

In the Chetco River drainage area, the major needs for water are in the Brookings and Harbor areas for domestic, municipal, industrial, and irrigation water supply. More reservoir area for recreational purposes would also be a benefit to the area. There are approximately 100 acres of potentially irrigable land in the Chetco drainage and 930 acres of potentially irrigable land in the Harbor area. Storage would be required to meet the needs of all of this land. Two possible sites have been located which could probably supply both the Brookings and Harbor areas. One is on the Chetco North Fork and the other on Jack Creek, a tributary of the Chetco.

There is, at present, local interest in a possible reservoir on the Chetco River although no definite site has as yet been located. Purposes of this storage would include domestic, municipal, and industrial water supply and flood control and recreation. The Chetco is regarded as one of the coast's most unspoiled fishing streams and any storage development in the lower river would probably cause some conflict with the anadromous fish life of the stream.

In the Winchuck system (yield not estimated) there are about 300 acres of potentially irrigated land. Natural flows are sufficient for this potential for most of the year. Three possible storage sites have been located in the upper part of the basin but no needs have been shown to justify either single or multi-purpose projects.

Sixes Subbasin

The Sixes Subbasin includes the watersheds draining into the Pacific Ocean from Fourmile Creek on the north to Euchre Creek on the south. This is an area of approximately 442 square miles. Principal drainages are Fourmile Creek, Floras Creek, Sixes, Elk River, and Euchre Creek.

Precipitation ranges from 55 inches at Cape Blanco to 120 inches in the headwaters of the Elk River. Stream gradients vary considerably. As an example, the headwater stretch of the Elk River has a gradient of 400 feet per mile while on the lower main stem the gradient averages 30 feet per mile. Eighty-seven percent of the basin is covered by forests, three percent by cropland, and eight percent by rangeland.

Subbasin population for 1960 was estimated at 5,500 persons. Port Orford, the only incorporated city, had a 1960 population of 1,170. Most of the remaining population is located along the immediate coast. The economy of the area is based on forestry, agriculture, and tourism.

The average annual yield of the entire subbasin was estimated to be 1,500,000 acre-feet. Similar estimates were made on the Elk River (average yield 330,000 acre-feet), Sixes River (440,000 acre-feet), and Floras Creek (210,000 acre-feet). Runoff per square mile, based on these values, varies from 3,500 acre-feet to 4,300 acre-feet.

Surface water rights total 105 cfs for the subbasin. Nonconsumptive uses total 23 cfs, including domestic, municipal, irrigation, industrial, and recreation. Nonconsumptive uses total 83 cfs, including 75 cfs for mining, and 8 cfs for fish life.

Knowledge of groundwater distribution is very limited. The present use of groundwater, with the exception of domestic use, is small.

The dune and beach sand area north of Cape Blanco may contain groundwater supplies; however, no groundwater studies have been made of this area. It is not expected that groundwater will play a large part in the future water development.

The only presently reported shortages have been for irrigation water on several small acreages in the Sixes and Fourmile drainages and future needs for water will probably be dependent primarily upon the pattern of irrigation development.

The Floras Creek watershed has approximately 2,100 acres of potentially irrigable land, much of which is also subject to flooding and has drainage problems. Such an area may lend itself to project type action. Several possible storage sites have been located which could lessen flooding and also supply irrigation water.

The Fourmile watershed has approximately 1,700 acres of potentially irrigable land, and one site has been located which could supply this water.

Two smaller watersheds, Croft Lake and New Lake, have a total of approximately 1,100 acres of potentially irrigable acres. No storage sites have been located in these watersheds; however, storage on either Floras Creek or Fourmile could also serve this area.

There is a potential for the development of water-using industry on either the Sixes or Elk Rivers. However, due to a lack of stream gaging, it is not known if the low flows in these streams would be adequate for such development or if these flows would need to be supplemented by releases from storage.

Coquille Subbasin

The Coquille Subbasin covers 1,094 square miles. Elevations range from sea level to over 5,100 feet. Precipitation varies from 50 inches at the mouth of the Coquille to 110 inches on the headwaters of the South Fork.

Approximately 88 percent of the area is covered by forests, 5 percent by cropland, and 6 percent by rangeland.

The 1960 subbasin population is estimated at 19,800 persons. Incorporated cities include Coquille (4,730), Myrtle Point (2,886), Bandon (1,653), and Powers (1,366). Population is more widely distributed in this subbasin than in the others due to wider valleys and more extensive transportation systems.

The economy of the area is based on forestry, agriculture, and recreation. Most of the present and potential agricultural lands of the basin lie in this subbasin.

The average annual yield of the Coquille Subbasin is estimated at 2,500,000 acre-feet. Included in this total are yields for the North Fork of 720,000 acre-feet, the Middle Fork of 590,000 acre-feet, and the South Fork of 574,000 acre-feet. Runoff per

square mile for the subbasin is 2,270 acre-feet annually. On the South Fork it averages 3,400 acre-feet.

Present groundwater use is primarily for domestic purposes and with the possible exception of the sand dune area north of Bandon, it appears the potential for groundwater development is very limited.

Surface water rights have a total depletion rate of 805 cfs, with one power right on the Coquille South Fork accounting for 624 cfs. Domestic rights total 95 cfs, municipal 57 cfs, irrigation 74 cfs, and industrial 9 cfs. Groundwater rights total less than 1 cfs.

The present needs for water include municipal water for Bandon and irrigation water for an estimated 1,300 acres.

The direction of future water resource development is difficult to determine. Considering the area as a whole, there will probably be additional domestic, municipal, industrial, and irrigation development.

It appears unlikely that surface water supplies could economically be developed for single purposes and thus storage sites than can serve multiple uses would be most likely of development. Much of the Coquille low areas are subject to flooding and are in need of drainage. It is probable, therefore, that future developments will include flood control benefits as part of storage for irrigation, municipal, industrial, fish and wildlife, and recreation purposes.

There are many storage sites that could serve the above purposes. In general, they fall into two categories, those on the main forks of the Coquille and those on smaller tributaries.

The larger sites were not found economically feasible in past studies; the results of current studies, discussed under Water Control, are not yet known. If any of these sites prove feasible this will probably be based partly on the development of fairly large areas of irrigable land.

Watershed areas on some of the smaller Coquille tributaries may be benefited by multi-purpose storage developments. The U. S. Department of Agriculture has noted some of the areas with better possibilities, based for the most part on a combination of flood and drainage control and irrigation benefits. Some of these areas are already organized as drainage districts. Following is a summary of some of the Department of Agriculture findings in their study.

Beaver Slough Drainage District includes an area of 1,737 acres lying along the Coquille River from Coquille to Beaver Slough. Some floodgates, dikes, and pumps have already been installed. There is a relatively undeveloped area of around 800 acres of potentially arable land lying along Beaver Slough and Beaver Creek that might be included in this development. Five reservoir sites have been studied that have some merit on the small tributaries draining into this area.

The Fat Elk Drainage District contains 2,284 acres lying south and east of Coquille. Many improvements, including pumps, have been installed to help this acreage. Two reservoir sites on small-sized tributary streams draining into this district have been studied.

Fishtrap Drainage District near Arago contains only 251 acres. One reservoir site was studied. There is more area with at least one more reservoir site, that could conceivably be included in the same project.

Bear Creek has good possibilities for channel work, irrigation, and flood control. It flows into the Coquille River at river mile 9 near the upper limit of salt damage from tides. Two reservoir sites were studied.

Coos Subbasin

The Coos Subbasin includes primarily those streams draining into Coos Bay and the Tenmile Lake drainage system. It covers an area of 729 square miles and contains approximately 850 miles of streams. The primary stream system is the Coos River and its major tributary, the Millicoma River.

Average annual precipitation ranges from 50 inches along the coast to 100 inches in the headwaters of the Millicoma. Streams have relatively flat gradients in their lower stretches and tidal effects are evident far inland. Approximately 88 percent of the area is forest land, 2 percent is cropland, and 1 percent is rangeland.

The 1960 population was estimated at 34,500, which is over half the entire South Coast Basin population. The four incorporated cities of North Bend, Coos Bay, Empire, and Eastside have a combined population of 19,800.

The economy of the area is based primarily on forestry, shipping, agriculture, and recreation. Because the Coos Bay area is the

largest population center in the southern coastal region, there is a larger concentration of service-type industry in the area.

The average annual yield of the subbasin has been estimated at 2,500,000 acre-feet. The Coos River yield of 1,590,000 accounts for approximately 60 percent of the total yield. The Tenmile Lake drainage adds another 10 percent and the remaining 750,000 acre-feet come from miscellaneous drainages entering Coos Bay and the ocean.

This subbasin has a substantial groundwater reservoir in the sand dunes north of Coos Bay. The remaining portion of the subbasin appears to have very limited groundwater.

Water rights total 155 cfs; 134 cfs consumptive, 21 cfs non-consumptive. These rights include 11 cfs domestic, 96 cfs municipal, 16 cfs irrigation, 63 cfs industrial, and 18 cfs for fish life. Recreation, power, and mining total less than 2 cfs.

Groundwater rights total 46 cfs, all of which come from the sand dune area mentioned above.

The only existing reported shortage of water is for irrigation of approximately 100 acres in the Catching Slough area. Future water developments will most likely be closely associated with municipal, industrial, and irrigation needs, and drainage and flood control.

Storage is planned on Joe Ney Slough for municipal use and reconnaissance studies are underway on the Millicoma West Fork for possible future municipal and industrial use. In addition, there is an application for industrial storage on the North Slough.

Present development of groundwater in the dune area is for industrial purposes. There remains approximately 30,000 acre-feet of water which is readily available for industrial use.

There is approximately 10,000 acres of potentially irrigable land located in the subbasin. Some of this land may be developed in the future in conjunction with flood control and drainage improvement in order to provide benefits sufficient to justify costs.

Several areas surrounding Coos Bay have been mentioned by the U. S. Department of Agriculture as possibly being adaptable to such development. All of these areas have had some improvements in the form of diking and tide gates. If additional

development takes place it will probably consist of improved diking and tide gate structures and storage of floodwaters for irrigation use. The Department of Agriculture findings from their studies are summarized below.

Coalbank Slough drains an area of just over 4,000 acres, including 536 acres of land that floods from tide and streamflow water. Consideration has been given to requesting permission to close this slough to navigation, so that a dike and tide gate structure can be installed near the bay, eliminating the need for some of the smaller present structures. The slough would then become a storage area for the fresh water from the tributaries using the tide gates during the low rainfall season to store fresh water for irrigation. There is some land with no protection from tidewater. At present there is no irrigation in the watershed but there are 536 acres of arable land suitable for irrigation. No reservoir sites were studied in this drainage.

Haynes Inlet includes 7,120 acres, which are drained by Palouse Creek and Haynes Inlet. The area that floods is organized into the Haynes Drainage District. The problems are much the same as for Coalbank Slough except that there may be a more adequate supply of fresh water for irrigation. One reservoir site was studied in this drainage.

Kentuck Slough is the outlet of Kentuck Creek and Mettman Creek. It contains 10,920 acres, of which 740 acres of the lowland are in the Kentuck Drainage District. Its problems are similar to the others, with benefits to be gained mainly from tide control and irrigation, utilizing the inflow of the two tributaries.

North Slough drains an area of 8,190 acres, including 300 acres of flooded lands within the North Slough Drainage District. Two reservoir sites were studied. There may be some benefits for irrigation from such storage, but most benefits will probably be from flood protection. Water storage on the upper tributaries might replace storage near the tide gates. The present tide gate is at an elevation too high to give good flood and drainage relief. Blowing sands tend to clog the outlet channel. This is presently kept opened by logging interests.

Willanch Slough drains an area of 5,000 acres. The Willanch Drainage District serves 200 of the lowest acres of cropland. The problems and benefits appear to warrant consideration under the P. L. 566 program. There are possibilities of a shortage of irrigation water but no reservoir sites were studied in this drainage.

A P P E N D I X

A U T H O R I T Y

The authority for the preparation and presentation of this report is set forth in ORS 536.300. The Legislative Assembly recognizes and declares in ORS 536.220 (1) that:

"(a) The maintenance of the present level of the economic and general welfare of the people of this state and the future growth and development of this state for the increased economic and general welfare of the people thereof are in large part dependent upon a proper utilization and control of the water resources of this state, and such use and control is therefore a matter of greatest concern and highest priority.

"(b) A proper utilization and control of the water resources of this state can be achieved only through a coordinated, integrated state water resources policy, through plans and programs for the development of such water resources and through other activities designed to encourage, promote and secure the maximum beneficial use and control of such water resources, all carried out by a single state agency.

"(c) The economic and general welfare of the people of this state have been seriously impaired and are in danger of further impairment by the exercise of some single-purpose power or influence over the water resources of this state or portions thereof by each of a large number of public authorities, and by an equally large number of legislative declarations by statute of single-purpose policies with regard to such water resources, resulting in friction and duplication of activity among such public authorities, in confusion as to what is primary and what is secondary beneficial use or control of such water resources and in a consequent failure to utilize and control such water resources for multiple purposes for the maximum beneficial use and control possible and necessary."

The authority for the report, the study on which it is based, and the actions effected are specifically delegated to the State Water Resources Board in ORS 536.300 (1) and (2) which state:

"(1) The board shall proceed as rapidly as possible to study: existing water resources of this state; means and methods of conserving and augmenting such

water resources; existing and contemplated needs and uses of water for domestic, municipal, irrigation, power development, industrial, mining, recreation, wildlife, and fish life uses and for pollution abatement, all of which are declared to be beneficial uses, and all other related subjects, including drainage and reclamation.

"(2) Based upon said studies and after an opportunity to be heard has been given to all other state agencies which may be concerned, the board shall progressively formulate an integrated, coordinated program for the use and control of all the water resources of this state and issue statements thereof."

Within the limits of existing data and knowledge, the study has taken into full consideration the following declarations of policy under ORS 536.310:

"(1) Existing rights, established duties of water, and relative priorities concerning the use of the waters of this state and the laws governing the same are to be protected and preserved subject to the principle that all of the waters within this state belong to the public for use by the people for beneficial purposes without waste;

"(2) It is in the public interest that integration and coordination of uses of water and augmentation of existing supplies for all beneficial purposes be achieved for the maximum economic development thereof for the benefit of the state as a whole;

"(3) That adequate and safe supplies be preserved and protected for human consumption, while conserving maximum supplies for other beneficial uses;

"(4) Multiple-purpose impoundment structures are to be preferred over single-purpose structures; upstream impoundments are to be preferred over downstream impoundments. The fishery resource of this state is an important economic and recreational asset. In the planning and construction of impoundment structures and milldams and other artificial obstructions, due regard shall be given to means and methods for its protection;

"(5) Competitive exploitation of water resources of this

state for single-purpose uses is to be discouraged when other feasible uses are in the general public interest;

"(6) In considering the benefits to be derived from drainage, consideration shall also be given to possible harmful effects upon ground water supplies and protection of wildlife;

"(7) The maintenance of minimum perennial streamflows sufficient to support aquatic life and to minimize pollution shall be fostered and encouraged if existing rights and priorities under existing laws will permit;

"(8) Watershed development policies shall be favored, whenever possible, for the preservation of balanced multiple uses, and project construction and planning with those ends in view shall be encouraged;

"(9) Due regard shall be given in the planning and development of water recreation facilities to safeguard against pollution;

"(10) It is of paramount importance in all cooperative programs that the principle of the sovereignty of this state over all the waters within the state be protected and preserved, and such cooperation by the board shall be designed so as to reinforce and strengthen state control;

"(11) Local development of watershed conservation, when consistent with sound engineering and economic principles, is to be promoted and encouraged; and

"(12) When proposed uses of water are in mutually exclusive conflict or when available supplies of water are insufficient for all who desire to use them, preference shall be given to human consumption purposes over all other uses and for livestock consumption, over any other use, and thereafter other beneficial purposes in such order as may be in the public interest consistent with the principles of this Act under the existing circumstances."

S T A T U T O R Y R E F E R E N C E S

ORS 449.535

"Contamination of, and fishing and camping near, Clear Lake prohibited. No person shall:

"(1) Put any sewage, drainage, refuse or polluting matter, or any dead animal carcass, or part thereof, excrement, putrid, nauseous, decaying, deleterious or offensive substance which, either by itself or in connection with other matter, will corrupt or impair the quality of the water for domestic or municipal purposes, into the water of Clear Lake or the watershed supplying that lake.

"(2) Allow any such substance to escape into, or place it in such position that it or the drainage therefrom escapes or is carried into such waters.

"(3) In any other manner not named in this section befoul, pollute or impair the qualities of such waters for domestic or municipal purposes.

"(4) Catch or attempt to catch any fish in the waters of Clear Lake.

"(5) Camp on any lands adjacent to Clear Lake which belong to the City of Reedsport.

"(6) Establish within the watershed described in ORS 449.540 any public campground or camping place and conduct same in any manner which will pollute, befoul or impair the quality of the water of Clear Lake for domestic or municipal purposes."

ORS 538.120

"Silver Creek, Marion County, and Brushes Creek, Curry County, and tributaries; diversion prohibited. The waters of the north and south forks of Silver Creek and of all tributaries thereof above the confluence of the north and south forks of Silver Creek, all in Marion County, also Brushes Creek and all its tributaries in township 33 south, range 14 west, Willamette Meridian, in Curry County, are withdrawn from appropriation or condemnation, and shall not be diverted or interrupted for any purpose whatsoever, except for use in state parks and except as set forth in ORS 538.130."

S T A T U T O R Y R E F E R E N C E S

ORS 538.130

"Condemnation of lands for park; vested and riparian rights not affected. ORS 538.120 shall not prevent the condemnation for public park purposes of any lands through which any of the streams flow, nor affect vested rights or the rights of riparian proprietors of such lands in or to the water of the creeks or streams."

"CLEAR LAKE AND EDNA LAKE

"In the Matter of the Approval of Application Nos. R 15821 and 15822 of the City of Reedsport to the Exclusion of all Subsequent Appropriations.)))))

O R D E R

"The City of Reedsport has submitted an application which was filed on May 13, 1935 and given No. R-15821, for a permit to store 2800 acre-feet of water in Clear Lake and Edna Lake Reservoir, and an application which was filed on May 13, 1935 and given No. 15822, for a permit to appropriate 10 second-feet of the water to be stored in this reservoir for municipal purposes, manufacturing, domestic and general use.

"The City has requested the approval of these applications to the exclusion of all subsequent appropriations.

"Clear and Edna Lakes have a combined drainage area of less than three square miles. No water was discharging naturally from them when examined August 10, 1940 and statements by residents in the vicinity of the lakes were to the effect that there is normally no natural outflow during the summer months.

"Mr. J. L. Gibbons, the City Recorder of Reedsport states that:

"1. The present water consumption through the City's main pipe line as described in Application No. 15822 is about one million gallons per day.

"2. Extension of the City's water service to include the town of Gardiner requiring an additional 150,000 gallons per day is now under consideration.

"3. New industries, including a pulp mill to utilize the large supply of pulp wood closely adjacent to the city, are expected to be developed in the city in the near future. Such industries would require considerable additional quantities of water.

"4. The present population of Reedsport is 1500, an increase of 20% over that of 1930. A population of 5000 to 6000 is expected by 1960, and the water system is being developed to meet this anticipated growth. The main pipe line alone represents an investment of $60,000.

"Section 47-503, Oregon Code 1930, authorizes the State Engineer to approve applications for municipal water supply to the exclusion of all subsequent appropriations, if the exigencies of the case so demand; and in view of the situation surrounding these proposed appropriations from the standpoint of apparent available water supply and present and probable future demand, the approval of these applications to the exclusion of all subsequent appropriations appears to be essential to the preservation of an adequate water supply for the city.

"IT IS THEREFORE HEREBY ORDERED that applications Nos. R-15821 and 15822 in the name of the City of Reedsport, be and the same are hereby approved to the exclusion of all subsequent appropriations and no subsequent applications for permits to appropriate the waters of Clear Lake and Edna Lake as described in the above applications, shall be approved by the State Engineer.

"Dated at Salem, Oregon, this 4th day of October, 1940.

/s/ CHAS. E. STRICKLIN

Chas. E. Stricklin
State Engineer"

"FERRY CREEK AND GEIGER CREEK

"In the Matter of the)
Withdrawal of Ferry Creek)
and Geiger Creek from) O R D E R
Further Appropriation)

"Findings

"Geiger Creek, which flows into Ferry Creek within the SW¼ SE¼ of Section 29, Township 28 South, Range 14 West, W. M., and its tributaries are located within Sections 29 and 32, Township 28 South, Range 14 West, W. M., and Sections 4, 5 and 9, Township 29 South, Range 14 West, W. M. in Coos County.

"Ferry Creek, which flows into the Coquille River within the SE¼ NW¼ of Section 30, Township 28 South, Range 14 West, W. M., and its tributaries are located within Sections 29, 30, 32 and 33, Township 28 South, Range 14 West, W. M., and Sections 4, 5 and 9, Township 29 South, Range 14 West, W. M., in Coos County.

ORDERS BY STATE ENGINEER

"The City of Bandon, a municipal corporation, has requested that application No. 34672 for a permit to appropriate 3.0 cubic feet per second of water from Geiger Creek at the Oregon State Game Commission dam located within the SW¼ SE¼ of Section 29, Township 28 South, Range 14 West, W. M., for municipal purposes, and that application No. 34673 for a permit to appropriate 3.0 cubic feet per second of water from Ferry Creek at the Oregon State Game Commission dam, also located within the SW¼ SE¼ of said Section 29, for municipal purposes, be approved to the exclusion of all subsequent appropriations.

"Conclusion

"It appears that all the waters of Geiger Creek and its tributaries and all the waters of Ferry Creek and its tributaries above the confluence of Ferry Creek and Geiger Creek, not required to satisfy existing rights, should be preserved as a municipal supply for the City of Bandon.

"Order

"It is ORDERED that no additional applications will be accepted for the appropriation of water from Geiger Creek or its tributaries or from Ferry Creek or its tributaries above the confluence of Ferry Creek and Geiger Creek, said confluence of the streams being within the SW¼ SE¼, Section 29, Township 28 South, Range 14 West, W. M., except for the purpose of municipal use by the City of Bandon.

"Dated at Salem, Oregon, this 13th day of April 1961.

/s/ LEWIS A. STANLEY

Lewis A. Stanley
State Engineer"

S E L E C T E D B I B L I O G R A P H Y

FEDERAL AGENCIES

Agriculture, Department of

Forest Service

Timber Harvest by Ownership in State of Oregon, Annual Reports, 1949-1960
Production of Logs in Oregon and Washington, 1925-1948, Forest Survey Report No. 101, April 1950
Production of Lumber in Oregon and Washington, 1869-1948, Forest Survey Report No. 100, December 1949

Weather Bureau

Climatic Summary of the United States, Climatic Data Herein from the Establishment of Stations to 1930, inclusive, Section 3, Western Oregon, 1936

Commerce, Department of

Census, Bureau of the

Census of Agriculture
Census of Manufactures
Census of Mineral Industries
Census of Population

Weather Bureau

Climatological Data, Oregon, Annual Summaries and Monthly Reports, 1948 to date
Index of Oregon Weather Stations by Counties, State Climatologist, October 1958
Sub-station History, Oregon, Key to Meteorological Records Documentation, No. 1.1, 1956
Climatic Summary of the United States - Supplement for 1931 through 1952, Oregon, Climatography of the United States, No. 11-31, 1956

Defense, Department of

U. S. Army, Corps of Engineers

Waterborne Commerce of the United States, Calendar Year 1960, Part 4, Waterways and Harbors: Pacific Coast, Alaska and Hawaii

S E L E C T E D B I B L I O G R A P H Y

Defense, Department of

U. S. Army, Corps of Engineers

Preliminary Examination Report on Coos Bay, Oregon, July 1957
Western Oregon Streams, Report on Floods of December 1955, October 1956
A Review of Reports on and a Preliminary Examination and Survey of Coos Bay, Oregon, Senate Document No. 253, July 1946
Coquille River and Tributaries, Oregon, House Document No. 620, February 1942

Interior, Department of the

Bonneville Power Administration

The Economic Base for Power Markets in Coos County, Oregon, by Frederick Arpke and Carol Colver, September 1943

Geological Survey

Surface Water Supply of the United States; Part 12-C, North Pacific Slope Basins, 1924-1934 and Part 14, Pacific Slope Basins, 1935-1960
Ground-Water Resources of the Sand-Dune Area North of Coos Bay, by S. G. Brown and R. C. Newcomb, December 1956
Water Power of the Coast Streams of Oregon by R. O. Helland, February 1953
Water Utilization in the Coos River Basin, Oregon, by R. O. Helland, 1947
Water Supply and Utilization, Coquille River Basin, Oregon, W. G. Hoyt, April 1926

National Park Service

Pacific Coast Recreation Area Summary, 1959

STATE AGENCIES

Education, Higher, Department of

Oregon State University

Hydrography of Oregon Estuaries, June 1956 to

September 1958, by Wayne V. Burt and Bruce McAllister
Hydrography of Oregon Estuaries, Prior to June 1956, by Wayne V. Burt
Hydrography of Coos Bay, by John Queen and Wayne V. Burt, May 1955

University of Oregon, Bureau of Municipal Research and Service

Population Trends in North Bend, March 1959
Population Trends in Coquille, 1958
O & C Counties, Population, Economic Development and Finance, January 1957

Engineer, State

Water Resources of the State of Oregon, Bulletins 4 and 7-10, 1878-1941

Fish Commission

Coos Bay Pollution Problems by William D. Clothier and C. Dale Snow, December 1961
Biennial Reports 1936-1938 through 1956-1958

Game Commission

Biennial Reports 1946-1948 to date
Fish Division, Annual Reports 1952 to date
Game Commission, Annual Reports, Fiscal Year 1951 to date

Geology and Mineral Industries, Department of

The Ore.-Bin, Monthly, 1956 to date
Oil and Gas Exploration in Oregon, 1959 and Supplement, 1960
Geology and Coal Resource of the Coos Bay Quadrangle, Oregon, Bulletin No. 27, by John E. Allen and Ewart M. Baldwin, 1944
Progress Report on Coos Bay Coal Field, Bulletin No. 2, by F. W. Libbey, 1943

Highway Department, Parks and Recreation Division

Annual Reports 1954 to date

S E L E C T E D B I B L I O G R A P H Y

Water Resources Board

Hearing Record in the Matter of a Water Resource Program for the Coos-Coquille and Chetco River Basins, November 1961

Water Quality Data Inventory, Bulletin No. 1, June 1956 and Bulletin No. 2, June 1957

COOPERATIVE PROGRAMS

U. S. Department of Agriculture, Economic Research Service, Forest Service, Soil Conservation Service, and Oregon State Water Resources Board

USDA Report on Water and Related Land Resources, South Coast Drainage Basin, Oregon, April 1962

U. S. Department of the Interior, Geological Survey, and Oregon State Department of Geology and Mineral Industries

Geologic Map of Oregon West of the 121st Meridian, Miscellaneous Geologic Investigations Map I-325, 1961

Coal Resources of Oregon, Circular 362 by Ralph Mason and Margaret I. Erwin, 1955

U. S. Department of the Interior, Geologic Survey, and Oregon State Highway Commission

Small Stream Investigations in Oregon, A Compilation of Peak Data through the 1961 water year

MISCELLANEOUS

Survey of the Industrial Potential of Coos County on the Pacific Coast, by Coos County Chamber of Commerce, 1962

Application for License for Eden Ridge Hydroelectric Project, South Fork Coquille River in Coos County, State of Oregon, before the Federal Power Commission, by Pacific Power and Light Company, January 1960

A Summary of Fishery Statistics of the Pacific Coast, prepared for the Northwest Pulp and

S E L E C T E D B I B L I O G R A P H Y

Paper Association, by Roger Tollefson et al, December 1959

Geology of Oregon, by Ewart M. Baldwin, 1959

South Central Coast Pulp and Paper Development Study, prepared for the Oregon Development Commission, by Sandwell and Company, March 1958

A Study of Industrial Development Possibilities for the Coos Bay Port District, prepared for the Port Commission of the Port of Coos Bay, Coos Bay, Oregon, by Stanford Research Institute, April 1956

Report of Agricultural Planning Conference of Coos County, March 1956

Engineering Report on a Water Supply Investigation for the City of Coquille, Oregon, by Cornell, Howland, Hayes and Merryfield, November 1955

Report of Water Resources Committee to 48th Legislative Assembly, January 1955

Prospective Hydroelectric Developments on the Illinois Branch of the Rogue River, Chetco River and Elk River, Oregon, prepared for Coos-Curry Electric Cooperative, Inc., by John S. Cotton, November 1954

Report on the Water Supply for Coos Bay and North Bend, Oregon, prepared for Coos Bay-North Bend Water Board, by C. E. Carter, March 1948

TABLE A

HYDROLOGICAL STATION SUMMARY

MAP INDEX NO.	NAME	USGS STA. NO.	LOCATION Twp.	Rng.	Sec.	ACTIVE	DRAINAGE AREA Sq. Mi.	TYPE	WATER YEARS OF RECORD	COMPLETE WATER YEARS
	STREAM GAGING									
1	DANIELS CREEK NEAR EASTSIDE	3240	26S	12W	2		15	Recorder	1950-54	3
2	MIDDLE FORK COQUILLE RIVER NEAR BRIDGE	3260	29S	11W	36		182	Staff	1929-31	2
3	MIDDLE FORK COQUILLE RIVER NEAR MYRTLE POINT	3270	29S	12W	26		305	Recorder	1931-46	16
4	NORTH FORK COQUILLE RIVER NEAR MYRTLE POINT		28S	12W	36		276	Recorder	1929-46	17
5	ROCK CREEK NEAR ILLAHE	3248	33S	11W	19		13	Recorder	1956-59	3
6	ROCK CREEK NEAR REMOTE	3255	29S	10W	35		23	Staff	1931-33	2
7	SOUTH FORK COQUILLE RIVER ABOVE PANTHER CR. NEAR ILLAHE	3246	32S	11W	28	x	31	Recorder	1957-61	5
8	SOUTH FORK COQUILLE RIVER NEAR ILLAHE	3247	33S	11W	16	x	41	Recorder	1957-61	5
9	SOUTH FORK COQUILLE RIVER NEAR POWERS	3249	32S	11W	18	x	93	Recorder	1957-61	5
10	SOUTH FORK COQUILLE RIVER AT POWERS	3250	31S	12W	12	x	169	Recorder	1916-26, 1929-61	42
11	TENMILE CREEK NEAR LAKESIDE	3232	23S	13W	13	x	87	Recorder	1957-61	4
12	WEST FORK MILLICOMA RIVER NEAR ALLEGANY	3245	24S	11W	19	x	47	Recorder	1954-61	7
	CREST-STAGE GAGING									
13	DRY RUN CREEK NEAR PORT ORFORD	3274	33S	15W	25	x	0.86		1954-61	
14	EEL CREEK AT LAKESIDE	3233	23S	13W	13	x	11.00		1958-61	
15	GEIGER CREEK NEAR BANDON	3271	28S	14W	32	x	1.36		1953-61	
16	GETTYS CREEK NEAR MYRTLE POINT	3266	29S	13W	35	x	1.45		1953-61	
17	HARRIS CREEK NEAR BROOKINGS	3788	40S	14W	36	x	1.05		1953-61	
18	RANSOM CREEK NEAR BROOKINGS	3789	41S	14W	1	x	0.74		1953-61	
	WATER QUALITY									
19	COALBANK SLOUGH AT U. S. 101 BRIDGE		25S	13W	35	x		Spot	1957, 1960	
20	COOS BAY: AT LIGHTHOUSE BEACH		26S	14W	4			Spot	1930-33	
21	AT BATENDORF BEACH		26S	14W	3			Spot	1930-33	
22	AT CHARLESTON		26S	14W	2			Spot	1930-33	
23	WEST OF FOSSIL POINT		25S	14W	35	x		Spot	1957, 1960	
24	NORTH OF PIDGEON POINT		25S	14W	25	x		Spot	1957, 1960	
25	NORTH OF SITKA DOCK		25S	13W	19	x		Spot	1957, 1960	
26	AT EMPIRE		25S	13W	18			Spot	1930-33	
27	NORTH OF EMPIRE DOCK		25S	13W	17	x		Spot	1960	
28	OPPOSITE HENDERSON MARSH		25S	13W	8	x		Spot	1957, 1960	
29	WEST OF RAILROAD BRIDGE		25S	13W	4	x		Spot	1957, 1960	
30	AT MOUTH OF KENTUCK SLOUGH		25S	13W	11	x		Spot	1957, 1960	
31	AT NORTH BEND		25S	13W	11			Spot	1930-33	
32	OPPOSITE MOUTH OF WILLANCH SLOUGH		25S	13W	14	x		Spot	1957, 1960	
33	AT COOS BAY YACHT CLUB		25S	13W	23	x		Spot	1957, 1960	
34	SHIPPING CHANNEL OPPOSITE MOUTH OF MARSHFIELD CHANNEL		25S	13W	26	x		Spot	1957, 1960	
35	AT COOS BAY		25S	13W	26			Spot	1930-33	
36	UP MARSHFIELD CHANNEL		25S	13W	25	x		Spot	1957, 1960	
37	COOS RIVER: AT MOUTH		25S	12W	31			Spot	1930-33	
38	AT BRUNELL DAIRY DOCK		25S	12W	28			Spot	1930-33	
39	AT COOS RIVER HIGH SCHOOL		25S	12W	26			Spot	1930-33	
40	AT DANIELS CREEK DOCK		25S	12W	35			Spot	1930-33	
41	ISTHMUS SLOUGH: OPPOSITE MOUTH OF COALBANK SLOUGH		25S	13W	35	x		Spot	1960	
42	AT EASTSIDE BRIDGE		25S	13W	36	x		Spot	1959, 1960	
43	AT MILLINGTON		26S	13W	1			Spot	1930-33	
44	AT COOS CITY BRIDGE		26S	13W	23	x		Spot	1960	
45	NORTH FORK COQUILLE RIVER NEAR MYRTLE POINT		29S	12W	9	x		Spot	1960-61	
46	SOUTH FORK COQUILLE RIVER NEAR POWERS		31S	12W	11	x		Spot	1960-61	
	WATER TEMPERATURE									
47	FERRY CREEK AT HATCHERY		28S	14W	29			Staff	1943-56	
48	ROCK CREEK NEAR ILLAHE	3248	33S	11W	19			Recorder	1957-59	2
49	SOUTH FORK COQUILLE RIVER AT GAYLORD		30S	12W	22	x		Recorder	1959-61	1
50	SOUTH FORK COQUILLE RIVER NEAR POWERS	3249	32S	11W	18	x		Recorder	1957-61	4
	CLIMATOLOGICAL						ELEV.	TYPE	CALENDAR YEARS OF RECORD	
51	ALLEGANY		25S	11W	8	x	50	Prec.	1940-60	
52	BANDON (Formerly Coquille River L.H., Bandon 2E)		28S	15W	25	x	15	Prec.,Temp.	1887-1960	
53	BANDON						55	Prec.,Temp.	1873-1900	
54	BROOKINGS (Formerly Harbor)		41S	13W	7	x	80	Prec.,Temp.	1912-60	
55	CAPE BLANCO		32S	16W	2	x	186	Prec.,Temp.	1952-60	
56	CHARLESTON		26S	14W	2		10	Prec.	1938-40	
57	COQUILLE		28S	13W	1		80	Prec.,Temp.	1942-54	
58	FIR GLEN		28S	8W	32		2,300	Prec.	1909-17	
59	GOLD BEACH R.S. (Formerly Bilonsberg, Wedderburn)		37S	14W	6	x	50	Prec.,Temp.	1889-91, 1903-13, 1915-18, 1927-60	
60	GOLDEN FALLS		24S	10W	8		650	Prec.	1909-17	
61	HAPPY HOME		32S	11W	23		2,100	Prec.	1909-15	
62	LANGLOIS		30S	15W	35		500	Prec.,Temp.	1891-1904	
63	LANGLOIS 2 (Formerly Denmark, Willow Creek)		31S	15W	2	x	88	Prec.	1922-60	
64	McKINLEY (Formerly Fairview)		27S	11W	32		140	Prec.,Temp.	1897-1923, 1930-44	
65	NORTH BEND FAA AP (Formerly Marshfield)		25S	13W	9	x	11	Prec.,Temp.	1902-60	
66	PORT ORFORD (Formerly The Heads)		33S	15W	8	x	292	Prec.,Temp.	1852-56, 1905-60	
67	POWERS		31S	12W	12	x	300	Prec.,Temp.	1932-60	
68	SITKUM 2 SW		28S	10W	15	x	568	Prec.,Temp.	1944-52, 1955-60	
69	SITKUM 6 W		28S	11W	12		150	Prec.,Temp.	1953-54	

Source: U. S. Geological Survey, U. S. Weather Bureau, Oregon State Game Commission, Oregon State Board of Health

TABLE 8

WATERSHED RECONNAISSANCE DATA SUMMARY

SUBBASIN 17A CHETCO

ITEM	UNIT	1 WINCHUCK RIVER	2 HARBOR AREA	3 CHETCO RIVER	4 CAPE FERRELO	5 PISTOL RIVER	6 HUNTER CREEK	TOTAL OF TRIBUTARIES STUDIED	OTHER AREAS IN SUB-BASIN	TOTAL SUB-BASIN 17A
Number of farms	Farms	8	55	20	18	10	3	114	0	114
LAND USE										
Woodland pastured	Acres	740	1,050	2,075	5,680	1,000	800	11,345	0	11,345
Woodland not pastured	"	35,632	0	225,070	8,700	61,998	27,080	358,480	65,570	424,050
Cropland	"	538	1,050	310	205	392	70	2,565	0	2,565
Other pasture	"	990	1,050	2,765	4,135	4,460	550	13,950	200	14,150
Other	"	300	350	1,600	2,200	600	1,000	6,050	2,000	8,050
Total watershed area	"	38,200	3,500	231,820	20,920	68,450	29,500	392,390	67,770	460,160
Cropland Use										
Dryland										
Pasture	Acres	428	300	240	195	380	50	1,593	0	1,593
Other	"	0	530	0	0	0	0	530	0	530
Total	"	428	830	240	195	380	50	2,123	0	2,123
Irrigated Land										
Pasture	Acres	110	30	50	0	0	0	190	0	190
Cranberries	"	0	0	0	0	0	0	0	0	0
Lily bulbs	"	0	190	20	10	12	20	252	0	252
Other	"	0	0	0	0	0	0	0	0	0
Total	"	110	220	70	10	12	20	442	0	442
Potential cropland	Acres	0	50	0	0	0	0	50	0	50
IRRIGATION										
Water Rights										
Surface water rights	Acres	124	256	47	106	2	17	552	18	570
Ground water rights	"	0	173	0	0	0	3	176	0	176
Total	"	124	429	47	106	2	20	728	18	746
Water Source										
Direct stream diversion	Acres	0	0	0	0	0	0	0	0	0
Pumped from streams	"	110	0	70	0	0	20	200	0	200
Pumped from wells	"	0	143	0	10	12	0	165	0	165
Other	"	0	77	0	0	0	0	77	0	77
Total	"	110	220	70	10	12	20	442	0	442
Water shortage	Acres	0	143	0	0	0	0	143	0	143
Method of Application										
Sprinkling	Acres	110	220	70	10	12	20	442	0	442
Flooding	"	0	0	0	0	0	0	0	0	0
Total	"	110	220	70	10	12	20	442	0	442
Potential irrigated land	Acres	300	930	100	0	300	40	1,670	0	1,670
Water source for potential irrigated land										
Natural flows	Acres	300	0	0	0	300	40	640	0	640
Storage	"	0	930	100	0	0	0	1,030	0	1,030
Total	"	300	930	100	0	300	40	1,670	0	1,670
STORAGE										
Existing										
Ponds	Number	0	2	0	0	0	0	2	0	2
Reservoirs	"	0	0	0	0	0	0	0	0	0
Possible reservoir sites	"	3	0	2	0	0	1	6	0	6
DRAINAGE										
Arable land with wet soil	Acres	10	200	20	20	30	0	280	0	280
Needs										
Tide gate and dike	Acres	0	0	0	0	0	0	0	0	0
Improved surface drainage	"	10	200	0	20	30	0	280	0	280
Subsurface drainage										
Open drains	"	10	100	20	0	30	0	160	0	160
Closed drains	"	0	120	0	0	0	0	120	0	120
Flooded areas	Acres	10	0	125	0	300	30	465	0	465

TABLE 8

WATERSHED RECONNAISSANCE DATA SUMMARY
(Continued)

SUBBASIN 1 SIXES

ITEM	UNIT	7 NESIKA BEACH	8 EUCHRE CREEK	9 MUSSEL CREEK	10 BRUSH CREEK	11 HUBBARD CREEK	12 ELK RIVER	13 SIXES RIVER	14 FLORAS CREEK	15 NEW LAKE	16 CROFT LAKE	17 FOURMILE CREEK	TOTAL OF TRIBUTARIES STUDIED	OTHER AREAS IN SUB-BASIN	TOTAL SUB-BASIN 1
Number of farms	Farms	4	6	3	5	3	20	40	35	15	15	15	161	0	161
LAND USE															
Woodland pastured	Acres	340	262	270	570	0	400	2,796	22,000	2,450	100	5,582	34,770	0	34,770
Woodland not pastured	"	1,700	24,011	6,065	7,940	4,210	58,366	73,969	22,883	600	2,240	5,582	207,566	700	208,266
Cropland	"	50	401	61	0	50	1,814	1,565	1,527	1,422	210	736	7,886	0	7,886
Other pasture	"	970	590	0	780	0	180	3,610	10,120	2,548	600	1,900	21,298	600	21,898
Other	"	400	196	4	2,000	50	350	1,300	1,000	1,400	700	500	7,900	2,160	10,060
Total watershed area	"	3,460	25,460	6,400	11,290	4,310	61,110	83,240	57,580	8,420	3,850	14,300	279,420	3,460	282,880
Cropland Use															
Dryland															
Pasture	Acres	50	351	57	0	50	1,280	1,395	1,194	1,400	150	650	6,577	0	6,577
Other	"	0	0	4	0	0	0	0	0	0	0	0	4	0	4
Total	"	50	351	61	0	50	1,280	1,395	1,194	1,400	150	650	6,581	0	6,581
Irrigated Land															
Pasture	Acres	0	45	0	0	0	534	136	369	0	0	50	1,134	0	1,134
Cranberries	"	0	0	0	0	0	0	34	4	4	55	36	133	0	133
Lily bulbs	"	0	5	0	0	0	0	0	0	14	0	0	19	0	19
Other	"	0	0	0	0	0	0	0	10	4	5	0	19	0	19
Total	"	0	50	0	0	0	534	170	383	22	60	86	1,305	0	1,305
Potential cropland	Acres	0	0	0	0	0	1,000	1,000	1,000	800	500	1,500	5,800	0	5,800
IRRIGATION															
Water Rights															
Surface water rights	Acres	16	7	7	0	0	291	76	320	42	43	127	931	5	934
Ground water rights	"	0	0	0	0	0	0	0	7	0	0	1	8	0	8
Total	"	16	7	7	0	0	291	76	327	42	43	128	939	5	942
Water Source															
Direct stream diversion	Acres	0	0	0	0	0	0	0	40	0	0	0	40	0	40
Pumped from streams	"	0	50	0	0	0	534	170	343	0	0	50	1,147	0	1,147
Pumped from wells	"	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Other	"	0	0	0	0	0	0	0	0	22	60	36	118	0	118
Total	"	0	50	0	0	0	534	170	383	22	60	86	1,305	0	1,305
Water shortage	Acres	0	0	0	0	0	0	34	0	0	0	36	70	0	70
Method of Application															
Sprinkling	Acres	0	50	0	0	0	534	170	343	22	60	86	1,265	0	1,265
Flooding	"	0	0	0	0	0	0	0	40	0	0	0	40	0	40
Total	"	0	50	0	0	0	534	170	383	22	60	86	1,305	0	1,305
Potential irrigated land	Acres	0	176	61	0	30	2,000	1,800	2,500	500	600	1,650	9,317	0	9,317
Water source for potential irrigated land															
Natural flows	Acres	0	50	30	0	30	500	200	800	200	150	650	2,610	0	2,610
Storage	"	0	126	31	0	0	1,500	1,600	1,700	300	450	1,000	6,707	0	6,707
Total	"	0	176	61	0	30	2,000	1,800	2,500	500	600	1,650	9,317	0	9,317
STORAGE															
Existing															
Ponds	Number	0	0	0	0	0	0	1	0	0	0	0	1	0	1
Reservoirs	"	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Possible reservoir sites	"	0	2	0	0	0	2	3	7	0	0	1	15	0	15
DRAINAGE															
Arable land with wet soil	Acres	0	105	16	0	30	112	800	2,000	1,000	600	1,300	5,963	0	5,963
Needs															
Tide gate and dike	Acres	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Improved surface drainage	"	0	0	0	0	0	112	800	1,600	1,000	600	1,000	5,112	0	5,112
Subsurface drainage															
Open drains	"	0	100	16	0	30	112	0	0	1,000	600	800	2,658	0	2,658
Closed drains	"	0	5	11	0	0	0	0	0	0	0	0	16	0	16
Flooded areas	Acres	0	105	0	0	60	1,200	800	1,500	850	100	175	4,790	0	4,790

TABLE 8

WATERSHED RECONNAISSANCE DATA SUMMARY
(Continued)

SUBBASIN 2 COQUILLE

ITEM	UNIT	18 SOUTH FORK COQUILLE RIVER	19 MIDDLE FORK COQUILLE RIVER	20 NORTH & EAST FORKS COQUILLE RIVER	21 CENTRAL COQUILLE RIVER	22 LOWER COQUILLE RIVER	TOTAL SUB-BASIN 2
Number of farms	Farms	189	97	191	122	230	749
LAND USE							
Woodland pastured	Acres	15,000	10,000	8,000	18,000	16,000	67,000
Woodland not pastured	"	123,780	177,600	167,280	31,900	43,150	543,710
Cropland	"	1,150	6,250	3,750	9,100	13,500	33,750
Other pasture	"	15,000	2,500	4,000	6,000	15,000	42,500
Other	"	2,500	2,700	2,500	2,500	3,000	13,200
Total watershed area	"	157,430	199,050	185,530	67,500	90,650	700,160
Cropland Use							
Dryland							
Pasture	Acres	350	5,655	1,250	6,750	12,500	26,505
Other	"	150	225	235	100	150	860
Total	"	500	5,880	1,485	6,850	12,650	27,365
Irrigated Land							
Pasture	Acres	650	350	2,250	2,250	500	6,000
Cranberries	"	0	0	0	0	350	350
Lily bulbs	"	0	0	15	0	0	15
Other	"	0	20	0	0	0	20
Total	"	650	370	2,265	2,250	850	6,385
Potential cropland	Acres	900	2,000	2,000	2,000	9,000	15,900
IRRIGATION							
Water Rights							
Surface water rights	Acres	1,114	693	1,522	1,151	916	5,396
Ground water rights	"	0	0	0	0	31	31
Total	"	1,114	693	1,522	1,151	947	5,427
Water Source							
Direct stream diversion	Acres	0	0	0	0	150	150
Pumped from streams	"	650	370	2,265	2,250	500	6,035
Pumped from wells	"	0	0	0	0	0	0
Other	"	0	0	0	0	200	200
Total	"	650	370	2,265	2,250	850	6,385
Water shortage	Acres	0	180	600	500	0	1,280
Method of Application							
Sprinkling	Acres	650	370	2,265	2,250	730	6,265
Flooding	"	0	0	0	0	120	120
Total	"	650	370	2,265	2,250	850	6,385
Potential irrigated land	Acres	800	4,500	3,235	6,100	16,000	30,635
Water source for potential irrigated land							
Natural flows	Acres	200	2,100	2,000	4,000	1,000	9,300
Storage	"	600	2,400	1,235	2,100	15,000	21,335
Total	"	800	4,500	3,235	6,100	16,000	30,635
STORAGE							
Existing							
Ponds	Number	4	4	2	4	30	44
Reservoirs	"	0	0	1	1	4	6
Possible reservoir sites	"	3	10	6	5	17	41
DRAINAGE							
Arable land with wet soil	Acres	400	1,700	1,000	6,000	13,000	22,100
Needs							
Tide gate and dike	Acres	0	0	0	1,000	2,000	3,000
Improved surface drainage	"	300	1,200	600	6,000	13,000	21,100
Subsurface drainage							
Open drains	"	100	1,100	600	5,000	8,000	14,800
Closed drains	"	200	700	400	1,000	5,000	7,300
Flooded areas	Acres	1,200	600	1,500	7,000	10,000	20,300

TABLE 8

WATERSHED RECONNAISSANCE DATA SUMMARY
(Continued)

SUBBASIN 3 COOS

ITEM	UNIT	23 SOUTH SLOUGH	24 COALBANK SLOUGH	25 ISTHENDS SLOUGH	26 CATCHING SLOUGH	27 SOUTH FORK COOS RIVER	28 MILLICOMA RIVER	29 LOWER COOS RIVER	30 WILLANCH SLOUGH	31 KENTUCK SLOUGH	32 LARSON SLOUGH	33 HAYNES INLET	34 NORTH SLOUGH	35 TENMILE LAKE	TOTAL OF TRIBUTARIES STUDIED	OTHER AREAS IN SUB-BASIN	TOTAL SUB-BASIN 3
Number of farms	Farms	5	12	20	63	26	25	18	12	17	16	19	11	70	314	20	334
LAND USE																	
Woodland pastured	Acres	1,200	200	500	200	150	150	200	100	200	100	100	200	0	3,300	1,000	4,300
Woodland not pastured	"	15,487	3,224	14,950	15,440	159,620	95,530	3,180	4,365	9,180	5,580	6,320	7,495	37,750	378,121	25,350	403,471
Cropland	"	153	536	350	1,500	800	700	1,800	360	740	370	550	420	1,820	10,999	435	10,534
Other pasture	"	600	0	250	300	100	100	0	100	600	40	60	0	400	2,550	600	3,150
Other	"	170	200	650	300	1,600	1,000	150	75	200	60	90	75	4,350	8,920	36,105	45,025
Total watershed area	"	17,610	4,160	16,700	17,740	162,270	97,480	5,330	5,000	10,920	6,150	7,120	8,190	44,320	402,990	63,490	466,480
Cropland Use																	
Dryland																	
Pasture	Acres	150	536	350	1,400	550	450	1,770	225	600	250	450	400	1,650	8,781	410	9,191
Other	"	0	0	0	0	50	0	0	10	40	20	0	0	20	140	0	140
Total	"	150	536	350	1,400	600	450	1,770	235	640	270	450	400	1,670	8,921	410	9,331
Irrigated Land																	
Pasture	Acres	0	0	0	100	200	250	30	125	100	100	100	0	150	1,155	0	1,155
Cranberries	"	3	0	0	0	0	0	0	0	0	0	0	20	0	23	25	48
Lily bulbs	"	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Other	"	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	"	3	0	0	100	200	250	30	125	100	100	100	20	150	1,178	25	1,203
Potential cropland	Acres	200	100	250	600	300	200	250	75	80	50	50	500	300	2,955	0	2,955
IRRIGATION																	
Water Rights																	
Surface water rights	Acres	82	17	209	77	5	201	35	105	105	190	13	83	58	1,180	34	1,214
Ground water rights	"	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	"	82	17	209	77	5	201	35	105	105	190	13	83	58	1,180	34	1,214
Water Source																	
Direct stream diversion	Acres	0	0	0	0	0	0	0	0	0	0	0	20	0	20	0	20
Pumped from streams	"	3	0	0	100	200	250	30	125	100	100	100	0	150	1,158	25	1,183
Pumped from wells	"	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Other	"	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	"	3	0	0	100	200	250	30	125	100	100	100	20	150	1,178	25	1,203
Water shortage	Acres	0	0	0	100	0	0	0	0	0	0	0	0	0	100	0	100
Method of Application																	
Sprinkling	Acres	3	0	0	100	200	250	30	125	100	100	100	0	150	1,158	25	1,183
Flooding	"	0	0	0	0	0	0	0	0	0	0	0	20	0	20	0	20
Total	"	3	0	0	100	200	250	30	125	100	100	100	20	150	1,178	25	1,203
Potential irrigated land	Acres	350	536	600	1,400	900	650	1,770	235	720	250	350	550	1,670	9,981	0	9,981
Water source for potential irrigated land																	
Natural flows	Acres	350	0	200	0	200	200	0	135	620	250	350	550	1,300	4,155	0	4,155
Storage	"	0	536	400	1,400	700	450	1,770	100	100	0	0	0	370	5,826	0	5,826
Total	"	350	536	600	1,400	900	650	1,770	235	720	250	350	550	1,670	9,981	0	9,981
STORAGE																	
Existing																	
Ponds	Number	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	2
Reservoirs	"	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	2
Possible reservoir sites	"	1	0	1	1	6	7	0	0	0	0	1	2	5	24	1	25
DRAINAGE																	
Arable land with wet soil	Acres	350	536	600	1,300	250	250	900	200	275	300	350	450	600	6,361	0	6,361
Needs																	
Tide gate and dike	Acres	150	0	300	1,000	100	100	200	150	100	100	150	150	0	2,500	0	2,500
Improved surface drainage	"	350	536	600	1,300	250	250	900	200	275	300	350	450	600	6,361	0	6,361
Subsurface drainage																	
Open drains	"	350	536	600	1,100	200	100	600	150	200	300	350	450	450	5,386	0	5,386
Closed drains	"	0	0	0	200	50	150	300	50	75	0	0	0	100	925	0	925
Flooded areas	Acres	150	536	300	0	500	100	0	200	200	400	400	400	150	3,336	0	3,336

TABLE C

POTENTIAL WATER DEVELOPMENT PROJECTS
DAM AND RESERVOIR SITES - SOUTH COAST BASIN

MAP INDEX NO.	SITE NAME	STREAM	DR. AREA Sq. Mi.	AVERAGE ANNUAL YIELD Ac.-Ft.	PURPOSE	DAM		RESERVOIR				LOCATION				SOURCE NO.
						Height Feet	Crest Length Feet	Max. Pool Elev. Ft.-MSL	Max. Pool Area Acres	Usable Storage Ac.-Ft.	Total Storage Ac.-Ft.	Twp.	Rng.	Sec.	Str. Mile	
1	ADAMS CREEK	Adams Creek	2	5,200	I-FC-R	20	450	80	75		410	23S	12W	28		1
2	ALDER	Noble Creek	4	9,100	I-FC-R	50	650	80	168		2,980	23	12	11		1
	ASH SWAMP See Eden Ridge															
3	AVERY RANCH	Sixes River	39	117,600	I-FC-R	110	500	400	713		31,490	32	13	10	23	1
4	BANCROFT	Myrtle Creek	18		I-FC							30	11	28		6
5	BATTLE CREEK	Twelvemile Creek	31			165						30	9	13		6
6	BEAR CREEK, LOWER	Bear Creek	22	42,400	I-FC-R	29	900	50	399		3,630	28	14	27		1
7	BEAR CREEK, UPPER	Bear Creek	7		I-FC							29	14	13		6
8	BEAVER CREEK, LOWER	Beaver Creek	4		I-FC							27	13	14		6
9	BEAVER CREEK, UPPER	Beaver Creek	1	2,600	I-FC-R	48	500	100	62		1,040	27	13	24		1
10	BENSON CREEK	Benson Creek	6	15,300	I-FC-R	30	550	80	112		1,430	23	11	19		1
11	BIG CREEK	Big Creek	4	11,200	R	12	400	80	20		50	23	11	5		1
12	BIG CREEK, LOWER	Big Creek	5	10,300	I-FC-R	66	500	320	62		1,500	29	11	12		1, 6
13	BIG CREEK, UPPER	Big Creek	8	14,400	I-FC-R	86	200	800	41		1,310	28	10	32		1
14	BILL CREEK	Bill Creek	6	11,600	I-FC-R	56	300	100	60		1,200	29	14	3		1, 6
15	BOONE CREEK	Boone Creek	2	4,900	I-R	23	300	50	79		540	26	12	32		1
16	BOTTOM CREEK	Bottom Creek	16	47,600	R	26	350	640	39		310	25	9	33		1
17	BOULDER CREEK	Boulder Creek	7	10,700	R	56	500	1,300	75		1,500	30	8	20		1
18	BRADLEY LAKE	China Creek	4	7,600	I-FC-R	31	900	50	199		1,990	29	15	13		1
	BREWSTER VALLEY See Sitkum, Lower															
19	BRIDGE	Middle Fk. Coquille R.	297		I-FC							29	11	19	6	6
20	BUTLER CREEK	Butler Creek	4	11,400	I-R	76	300	800	31		870	33	13	8		1
21	CAMAS CREEK	Camas Creek	8	10,500	I-FC-R	77	600	1,440	72		2,030	28	9	21		1
22	CAMAS VALLEY " " " "	Middle Fk. Coquille R. " " " " " " " "	52 47 42	 100,000 76,200	I-FC-R P P	85 80 85	 1,000 740	1,120	 4,000 2,000 2,000		 110,000 70,000 70,000	29 30 30	9 9 9	36 2 2	30 28 28	2 3 2, 3
23	CATCHING CREEK	Catching Creek	29			45						29	12	30		2
24	CAWFIELD CREEK	Cawfield Creek	2	4,100	I-FC-R	19	350	100	116		120	27	12	32		1, 6
25	CEDAR CREEK	Cedar Creek	29	85,000	R	18	300	720	218		1,050	26	8	7		1
26	CEDAR CREEK	Williams River	98	400,000	P	100						26	9	14	8	3
27	CHETCO RIVER, LOWER	Chetco River	297		P			205		370,000	490,000	40	13	34	4	4
28	CHETCO R., INTERMEDIATE	Chetco River	174		P							38	12	21	24	4
29	CHETCO RIVER, UPPER	Chetco River	92		P	85						38	11	7	31	4
30	CHINA CREEK	China Creek	1		I-FC							27	13	22		6
31	COAL CREEK	South Fk. Coquille R.			P							32	11	17		3
32	COALEDO	Beaver Creek	4	7,800	I-FC-R	31	550	50			1,850	27	13	15		1
33	CONN CREEK	Conn Creek	1	4,200	R	58	300	960	17		350	37	14	9		1
34	CREW CANYON	Euchre Creek	21	61,100	I-FC-R	86	400	160	162		5,190	35	14	3		1
35	CROOKED CREEK	Crooked Creek	2	5,300	R	43	37	50	81		1,200	29	15	12		1
36	CUNNINGHAM CREEK	Cunningham Creek	3		I-FC							27	12	21		6
37	DANIELS CREEK	Daniels Creek	4	12,800	I-FC-R	56	600	100	100		1,990	26	12	14		1
38	DEEP CREEK	Deep Creek	4	5,400	I-R	21	500	1,200	33		200	29	9	12		1
39	DEMENT CREEK	Dement Creek	6	22,800	I-FC-R	53	250	240	67		1,170	30	13	25		1
40	DEVILS ELBOW	West Fk. Millicoma R.	53		FC							24	11	31	3	2
41	DEW VALLEY	South Twomile Creek	4	12,000	I-FC-R	22	650	50	93		600	29	15	24		1
42	DICE CREEK	Dice Creek	4	5,500	R	42	200	1,250	20		390	30	8	31		1
43	DRY CREEK	Dry Creek	16	47,400	I-R	26	250	80	56		450	32	14	7		1
44	EAST FK. FLORAS CR.	East Fk. Floras Creek	7	21,800	I-FC-R	86	700	800	142		4,530	30	13	33		1
45	EAST FK. MILLICOMA R.	East Fk. Millicoma R.	47		FC							25	11	1	10	2
46	EAST FK. MILLICOMA R.	East Fk. Millicoma R.	8	21,500	FC-R	86	450	1,120	131		4,180	25	10	1	20	1
47	EDEN RIDGE ASH SWAMP " "	South Fk. Coquille R. " " " " " " " "	29 29 28	 28,000 76,200	P P P	210 160 170	740 460 600	2,340 2,290	1,680 1,100	110,000	115,000 62,000 62,000	32 32 32	11 11 11	27 23 23	53 54 54	5 3 4, 3
48	ELK CREEK	Elk Creek	4	12,000	FC-R	77	180	1,120	100		2,820	23	11	25		1
49	ELK CREEK, LOWER	Elk Creek	14		I-FC							28	11	28		6
50	ELK CREEK, UPPER	Elk Creek	13	25,100	I-FC-R	46	350	100	118		1,780	28	11	27		1
51	ELK RIVER, LOWER	Elk River	79		P							32	15	35	8	4
52	ELK R., INTERMEDIATE	Elk River	54		P	100						33	14	16	17	4
53	ELK RIVER, UPPER	Elk River	25		P							33	13	18	23	4
54	ELLIOTT FOREST	Johnson Creek	6	16,900	R	18	250	80	36		160	23	11	31		1
55	EUCHRE CREEK	Euchre Creek	14	41,100	R	59	250	240	35		750	34	14	36		1
56	FAIRVIEW VALLEY FAIRVIEW "	North Fk. Coquille R. " " " " " " " "	143 143 143	300,000 350,000 350,000	P P P	180 200 250	1,000 1,000 1,100	200	12,700 10,000 13,000		884,000 800,000 1,300,000	28 28 28	12 12 12	23 23 23	12 12 12	2, 3 3 3
57	FALL CREEK	Fall Creek	15	41,200	FC-R	85	520	480	157		4,960	25	10	25		1
	FALL CREEK See Tioga															

TABLE C

POTENTIAL WATER DEVELOPMENT PROJECTS
DAM AND RESERVOIR SITES - SOUTH COAST BASIN
(Continued)

MAP INDEX NO.	SITE NAME	STREAM	DR. AREA Sq. Mi.	AVERAGE ANNUAL YIELD Ac.-Ft.	PURPOSE	DAM		RESERVOIR				LOCATION				SOURCE NO.
						Height Feet	Crest Length Feet	Max. Pool Elev. Ft.-MSL	Max. Pool Area Acres	Usable Storage Ac.-Ft.	Total Storage Ac.-Ft.	Twp.	Rng.	Sec.	Str. Mile	
58	FALLS	Hetson Creek	12	35,000	FC-R	86	420	960	275		8,790	24S	10W	29		1
59	FAT ELK CREEK	Fat Elk Creek	2	4,200	I-FC-R	21	500	50	72		440	28	13	10		1
60	FISH TRAP CREEK	Fish Trap Creek	5	9,000	I-FC-R	15	450	50	47		180	28	13	34		1
61	FLORAS CREEK	Floras Creek	50	148,000	I-FC-R	69	300	320	65		1,650	30	14	33		1
62	FOURMILE CREEK	Fourmile Creek	15	43,500	I-FC-R	75	300	160	249		6,900	30	14	6		1
63	FOURTH OF JULY CREEK	Fourth of July Creek	8	22,500	R	86	200	320	27		860	40	12	36		1
64	FRUIN CREEK	L. North Fk. Coquille R.	3	8,600	R	59	400	720	31		660	26	11	24		1
65	GAYLORD	South Fk. Coquille R.	214		I-FC							30	12	22	19	6
66	GLENN CREEK	East Fk. Millicoma R.	67	120,000	P-FC	200						24	11	26	7	3
67	GOLDEN FALLS	Glenn Creek	11	32,800	FC-R	86	650	720	256		8,190	24	10	18		1
68	GUERIN CREEK	North Fk. Floras Creek	25	73,600	I-FC-R	58	380	480	135		2,770	30	14	26		1
69	HALL CREEK	Hall Creek	7	12,500	I-FC-R	56	650	100	75		1,500	29	13	10		1, 6
70	HATCHET SLOUGH	Hatchet Slough	2	3,500	I-FC-R	15	600	50	33		120	28	13	6		1
71	HIGHWAY 101	Unnamed	1	1,100	I-R	24	500	50			500	27	13	33		1
72	HUDSON CREEK	Hudson Creek	6		I-FC							27	11	7		6
73	INDIAN CREEK	Indian Creek	4		I-FC							29	12	35		6
74	JACK CREEK	Jack Creek	9	25,400	I-R	58	480	80	193		3,980	41	13	2		1
75	JACKSON PARK	Brummit Creek	24			76						28	10	11		2
76	JERUSALEM CREEK	Middle Creek	47		I-FC	92						28	11	5		2, 6
77	JOE MEY SLOUGH	Joe Mey Slough	5		M-In							26	14	1		6
78	JOES CREEK	West Fk. Millicoma R.	27		FC							23	11	13	25	2
79	JOHNSON CREEK	Johnson Creek	4	7,700	I-FC-R	31	300	50	44		440	29	14	6		1
80	LAMPA CREEK	Lampa Creek	5	9,100	I-FC-R	20	550	50	58		310	28	13	32		1, 6
81	LANG CREEK	Lang Creek	2	2,800	I-R	38	450	1,200	47		600	29	8	6		1
82	LAVERNE, LOWER	North Fk. Coquille R.	40			125						27	11	5	32	2
83	LAVERNE, UPPER	North Fk. Coquille R.	23			160						26	11	16	39	2
84	LAWHORNE CREEK	Middle Creek	23			111						27	11	15		2
85	LENEVE	Unnamed	1		I-FC							27	13	30		6
86	LOCKHART	South Fk. Coquille R.	42		P	125	560	2,155	205	2,600	7,500	33	11	9	50	5
87	LOWER FLASH DAM	South Fk. Coos River	207		P	100		350				25	10	32	20	3
88	MARCH	Unnamed	3	4,900	I-FC-R	33	650	50	98		1,570	27	13	17		1
89	MARLOW CREEK	Marlow Creek	7	20,500	R	20	500	50	50		280	25	11	5		1
90	McCRIBBLE	Bald Mountain Creek	10	29,100	R	43	150	400	17		250	33	14	19		1
91	MIDDLE FK. COQUILLE R.	Middle Fk. Coquille R.	6	9,700	I-FC-R	110	800	1,280	396		17,380	29	8	6	38	1
92	MYRTLE CREEK MYRTLE CREEK, LOWER	Myrtle Creek " "	70 70	134,000	I-R	30 50	450	160	53		500	30 30	11 11	3 3		1 2
93	MYRTLE CREEK, UPPER	Rock Creek	33			115						30	11	13		2, 6
94	MYRTLE POINT	Coquille River	887		FC	50		65			130,000	29	12	5	36	2
95	NOBLE CREEK	Noble Creek	2	3,600	I-FC-R	31	300	100	19		190	27	13	12		1, 6
96	NORTH FK. CHETCO RIVER	North Fk. Chetco River	2	7,100	R	71	300	800	29		770	39	13	30		1
97	N. FK. FLORAS CR., LOWER	North Fk. Floras Creek	42	124,000	I-FC-R	55	300	400	60		1,160	31	14	2		1
98	N. FK. FLORAS CR., MIDDLE	North Fk. Floras Creek	6	18,900	I-FC-R	59	200	560	44		930	30	14	23		1
99	N. FK. FLORAS CR., UPPER	North Fk. Floras Creek	3	6,600	I-FC-R	74	270	800	35		940	30	14	12		1
100	NORTH FK. NORTH SLOUGH	North Fk. North Slough	2	3,700	FC-R	26	500	80	83		660	24	13	1		1
101	NORTH FK. SIXES RIVER	North Fk. Sixes River	7	20,700	I-FC-R	72	420	560	152		4,000	31	13	23		1
102	NORTH SLOUGH	North Slough	14		In						1,850	24	13	27		5
103	OLDLAND RANCH	Joe Mey Slough	2	3,100	FC-R	31	400	50	69		680	26	13	7		1
104	PALOUSE CREEK	Palouse Creek	5	14,000	FC-R	31	450	80	62		620	24	12	9		1
105	PULASKI CREEK	Pulaski Creek	2	2,800	I-FC-R	20	350	50	31		180	28	13	14		1
106	RAZELLE RANCH	Big Creek	3	5,500	I-R	56	500	100	203		4,060	26	14	21		1
107	REED CREEK	Reed Creek	1	1,200	I-R	36	400	1,200	27		320	29	9	13		1
108	REMOTE	Middle Fk. Coquille R.	165		I-FC							29	10	33	15	6
109	REMOTE	Sandy Creek	19			76						29	10	27		2
110	ROCK CREEK	Rock Creek	21		I-FC							29	10	25		6
111	ROCK CREEK	Rock Creek	37	105,500	I-FC-R	82	500	320	265		8,050	30	11	14		1
112	ROCK CREEK	Rock Creek	9		I-FC							33	11	19		6
113	SALMON CREEK SALMON CREEK	Salmon Creek " "	16 17	44,100	I-FC-R	77 83	500	560	122		3,440	31 31	12 12	34 34		1, 6 2
114	SANDY CREEK	Sandy Creek	14		I-FC							29	10	22		6
115	SECTION 30	East Fk. Floras Creek	12	35,700	I-FC-R	63	300	640	44		990	30	13	30		1
116	SEVENMILE CREEK, LOWER	Sevenmile Creek	4		I-FC							27	14	34		6
117	SEVENMILE CREEK, UPPER	Sevenmile Creek	2	4,100	I-FC-R	48	200	100	47		790	27	14	27		1
118	SHINGLEHOUSE SLOUGH	Shinglehouse Slough	2		In							26	13	11		6
119	SITKUM, LOWER BREWSTER VALLEY " "	East Fk. Coquille R. " " " " " " " " " " " "	79 79 79 85	200,000 200,000 202,000	FC-P P P P	100 125 130	680 900 800	720	1,400		60,000 100,000	28 28 28 28	10 10 10 10	9 9 9 9	19 19 19 19	2, 6 3 3 2, 3
120	SITKUM, UPPER	East Fk. Coquille R.	52			182						28	10	11	22	2

TABLE C

POTENTIAL WATER DEVELOPMENT PROJECTS
DAM AND RESERVOIR SITES - SOUTH COAST BASIN
(Continued)

MAP INDEX NO.	SITE NAME	STREAM	DR. AREA Sq. Mi.	AVERAGE ANNUAL YIELD Ac.-Ft.	PURPOSE	DAM		RESERVOIR				LOCATION				SOURCE NO.
						Height Feet	Crest Length Feet	Max. Pool Elev. Ft.-MSL	Max. Pool Area, Acres	Usable Storage Ac.-Ft.	Total Storage Ac.-Ft.	Twp.	Rng.	Sec.	Str. Mile	
120	SITKUM, UPPER	East Fk. Coquille R.	52			182						28S	10W	11	22	2
121	SOUTH FK. COQUILLE R.	South Fk. Coquille R.	22	63,400	I-FC-R	31	320	2,240	205		2,050	32	11	12	57	1
122	SOUTH FK. NORTH SLOUGH	North Slough	2	5,400	FC-R	21	450	80	44		260	24	12	7		1
123	SOUTH SLOUGH	South Slough	23		In							26	14	11		6
124	STEEL CREEK	Steel Creek	4		I-FC							28	11	12		6
125	STEELE CREEK	Steele Creek	1	3,100	I-FC-R	34	550	250	46		500	27	12	22		1
126	STEINNON CREEK	Steinnon Creek	4		I-FC							27	12	14		6
127	TENMILE LAKE	Tenmile Creek	67		In	10						23	12	18		6
128	TIDEWATER	South Fk. Coos River	212		P	50		250				25	11	25	17	3
129	TIOGA FALL CREEK " "	South Fk. Coos River " " " " " " " "	191 191 191	 700,000 700,000	FC P P	 70 300		 420 650	 2,070	 250,000	 330,000	25 25 25	10 10 10	36 36 36	27 27 27	2 3 3
130	TIOGA CREEK	Tioga Creek	14	38,200	R	73	300	800	47		1,260	27	10	1	9	1
131	TIOGA FORK	South Fk. Coos River	165	600,000	P	300		720			200,000	26	9	7	31	3
132	TIOGA GUARD STATION	Unnamed	2	6,400	R	73	500	800	91		2,430	26	10	35		1
133	TWIN SITE	Unnamed	1	900	I-FC-R	18	400	50	25		120	27	13	19		1
134	TWOMILE CREEK	Twomile Creek	8	22,700	I-R	20	500	50	65		370	29	14	19		1
135	UNNAMED	Unnamed	1	1,500	I-FC-R	62	350	250	32		700	27	11	6		1
136	UPPER TWIN	Unnamed	1	1,300	I-FC-R	26	450	50	39		310	27	13	20		1
137	VAUGHN	West Fk. Millicoma R.	38		M-In							24	11	4	15	7
138	WARD CREEK	Ward Creek	4	7,600	I-FC-R	72	450	150	65		1,730	29	13	26		1
139	WEEKLY CREEK	East Fk. Coquille R.	140			120						28	11	29	2	2
140	WEEKLY CREEK	Weekly Creek	5		I-FC							28	11	31		6
141	WEST FORK MILLICOMA RIVER, LOWER	West Fk. Millicoma R.	48		M-In							24	11	19	6	7
142	WEST FORK MILLICOMA RIVER, LOWER GOULD	West Fk. Millicoma R. " " " "	18 18	52,800	FC-R M-In	86	400	720	177		5,650	23 23	11 11	26 26	22 22	1 7
143	WEST FORK MILLICOMA RIVER, UPPER	West Fk. Millicoma R.	8	23,200	FC-R	53	200	960	103		1,930	23	10	7	31	1
144	WHEELER CREEK	Wheeler Creek	8	25,100	R	70	290	400	31		800	40	12	20		1
145	WHITLEY CREEK	North Fk. Coquille R.	28		I-FC							26	11	28	36	6
146	WINCHUCK RIVER	Winchuck River	21	62,400	R	84	400	240	219		6,580	41	12	3	12	1
147	WOLF CREEK	Catching Creek	2		I-FC							30	13	2		6
148	WOODWARD CR., LOWER	Woodward Creek	4		I-FC							27	12	12		6
149	WOODWARD CR., UPPER	Woodward Creek	3	6,400	R	33	500	400	35		370	26	11	31		1
150	YANKEE RUN	Yankee Run	4		I-FC							28	11	20		6

Note 1: This table includes damsites with conflicting reservoir areas.

Purposes: D - Domestic and Livestock
M - Municipal
I - Irrigation
In - Industrial
P - Power
R - Recreation, Fish and Wildlife
FC - Flood Control

Sources: 1 - U. S. Department of Agriculture
2 - U. S. Corps of Engineers
3 - U. S. Geological Survey
4 - Coos-Curry Electric Cooperative, Inc.
5 - Pacific Power and Light Co.
6 - Coos County Soil and Water Resources Committee
7 - Coos Bay-North Bend Water Board

TABLE D (Continued)

RECOMMENDED MINIMUM FLOWS FOR FISH LIFE

STREAM	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	LOCATION
Little Matson Creek	16	16	16	16	16	4 3	3	2	2	2	3 16	16	Mouth
West Fork Millicoma River						25 15	12 8	6	6				Mouth
Coquille River													
Bear Creek	10	10	10	10	10	3 1	1	1	1	1	2 10	10	River mile 5.0
Catching Creek	30	30	30	30	30	4 2	2	2	2	2	5 30	30	Confluence of Ward Creek
Middle Fork Catching Creek	16	16	16	16	16	2 1	1	1	1	1	2 16	16	Mouth
South Fork Catching Creek	16	16	16	16	16	2 1	1	1	1	1	2 16	16	Mouth
Ward Creek	15	15	15	15	15	2 1	1	1	1	1	2 15	15	Mouth
Cunningham Creek	16	16	16	16	16	2 1	1	1	1	1	2 16	16	Just below confluence of Cawfield Creek
Fat Elk Creek	5	5	5	5	5	1	1	1	1	1	2 5	5	Mouth
Ferry Creek	11	11	11	11	11	4 3	3	3	3	3	5 11	11	Mouth
Fishtrap Creek	10	10	10	10	10	3 1	1	1	1	1	3 10	10	Mouth
Hall Creek	12	12	12	12	12	4 2	2	2	2	2	5 12	12	Mouth
Lampa Creek	9	9	9	9	9	3 1	1	1	1	1	2 9	9	Mouth
Sevenmile Creek	7	7	7	7	7	4 3	2	2	2	2	3 7	7	U. S. Highway 101
North Fork Coquille River							18	14	14	14			Confluence of East Fork Coquille River
North Fork Coquille River	85 75	75	75	75	75		10	8	8	85	85	85	River mile 35
East Fork Coquille River	110 90	90	90	90	90	70 60	40 35	25 15	15	110	110	110	Mouth
East Fork Coquille River	95 75	75	75	75	75	60 50	30 25	20 10	10	95	95	95	River mile 17
China Creek	12	12	12	12	12	3 1	1	1	1	1	2 12	12	Mouth
Elk Creek	40	40	40	40	40	5 2	2	2	2	2 50	50	40	Mouth
Hantz Creek	10	10	10	10	10	2 1	1	1	1	1	2 10	10	Mouth
Steel Creek	20	20	20	20	20	3 2	1	1	1	1	2 20	20	Mouth
Weekly Creek	8	8	8	8	8	2 1	1	1	1	1	1 8	8	Mouth
Yankee Run Creek	11	11	11	11	11	2 1	1	1	1	1	2 11	11	Mouth
Evans Creek	35	35	35	35	35	8 5	3	2	2	40	40	40 35	Mouth
Hudson Creek	20	20	20	20	20	5 3	2 1	1	1	1	2 20	20	Mouth
Johns Creek	8	8	8	8	8	2 1	1	1	1	1	1 8	8	Mouth
Lost Creek	5	5	5	5	5	2 1	1	1	1	1	1 5	5	Mouth
Middle Creek							8 6	4	4	4			Mouth
Cherry Creek	45	45	45	45	45	9 6	4 2	2	2	2	4 45	45	Mouth
Moon Creek	20	20	20	20	20	5 3	2	2	2	2	20	20	Mouth
Steele Creek	7	7	7	7	7	2 1	1	1	1	1	2 7	7	Mouth
South Fork Coquille River	200	200	200	200	200	100 70	45 35	30	30	250	250	200	River mile 18.7 (Gaylord)
South Fork Coquille River	45	45	45	45	45	25 12	8 6	4	3	50	50	50	River mile 47
Banner Creek	12	12	12	12	12	2 1	1	1	1	1	2 12	12	Mouth
Beaver Creek	9	9	9	9	9	1	1	1	1	1	1 9	9	Mouth
Coal Creek	40	40	40	40	40	10 6	4 3	3	3	3	5 40	40	Mouth

TABLE D (Continued)

RECOMMENDED MINIMUM FLOWS FOR FISH LIFE

STREAM	JAN.		FEB.		MAR.	APR.	MAY	JUNE		JULY		AUG.		SEPT.	OCT.		NOV.		DEC.	LOCATION
Middle Fork Coquille River	175	155		155	155	155	155	80	60	40	25	20	15	15		175		175	175	Mouth
Middle Fork Coquille River	75	65		65	65	65	65	35	30	25	20	15	10	10		75		75	75	River mile 16 (Remote)
Middle Fork Coquille River		35		35	35	35	35	15	12	10	8	6	4	4		35		35	35	River mile 26
Big Creek		40		40	40	40	40	10	6	4	3		2	2		2	5	40	40	Mouth
Myrtle Creek									15		12	10	8	8		8				Mouth
Myrtle Creek								7	5		4		4	4		4				Confluence of Rock Creek
Cole Creek		12		12	12	12	12	4	3		2		1	1		1	2	12	12	Mouth
Rock Creek								10	6	5	4		4	4		4				Mouth
Rock Creek								10	8	7	6	4	3	3		3				Mouth
Salmon Creek		15		15	15	15	15	2	1		1		1	1		1	2	15	15	Mouth
Sandy Creek		45		45	45	45	45	8	6	4	3		2	2		2	5	45	45	Mouth
Slater Creek		20		20	20	20	20	6	2	2	1		1	1		1	3	20	20	Mouth
Dement Creek		35		35	35	35	35	5	3		3		3	2		2	4	35	35	Mouth
Hayes Creek		12		12	12	12	12	4	2		1		1	1		1	2	12	12	Mouth
Rhoda Creek		8		8	8	8	8	3	1		1		1	1		1	2	8	8	Mouth
Rock Creek		50		50	50	50	50	15	10	8	5		3	3		60	60	50	50	Mouth
Salmon Creek		45		45	45	45	45	10	6		4		4	4		55	55	45	45	Mouth
Salmon Creek		40		40	40	40	40	6	4		3		3	3		45	45	40	40	River mile 3.5
Woodward Creek		15		15	15	15	15	2	1		1		1	1		1	3	15	15	Mouth
Eel Lake System																				
Eel Creek		20		20	20	20	20	10	6		2		2	2		2	4	20	20	Mouth (Confluence of Tenmile Creek)
Winter Arm Creek		25		25	25	25	25	5	3		1		1	1		1	2	25	25	Mouth
Elk River		300		300	300	300	300	130	100	65	60		45	45	50	300		300	300	Mouth
Elk River		190		190	190	190	190									190		190	190	Confluence of Bald Mountain Creek
Elk River		100		100	100	100	100	50	40	25	20	15	10	10	10	100		100	100	Confluence of Butler Creek
Anvil Creek		30	30	15	15	15	15	4	3	2	1		1	1	1	30		30	30	Mouth
Bald Mountain Creek		45		45	45	45	45	25	20	15	10		6	6	6	45		45	45	Mouth
Blackberry Creek		8		8	8	8	8	4	2		1		1	1		1	2	4	8	Mouth
Butler Creek		14	14	10	10	10	10	5	4	3	2		2	2	2	14		14	14	Mouth
North Fork Elk River		65		65	65	65	65												65	Mouth
South Fork Elk River		25		25	25	25	25												25	Mouth
Panther Creek		40	40	35	35	35	35	15	10	8	6		4	4	4	40		40	40	Mouth
Red Cedar Creek		15		15	15	15	15	4	2		1		1	1		1		25	25	Mouth
Pistol River	255	230		230	230	230	230	60	40	25	20		15	15	18	25	35	255	255	Mouth
Crook Creek		9		9	9	9	9	4	2		1		1	1		1	1	3	9	Mouth
Deep Creek	20	16		16	16	16	16	6	3	3	2		1	1		1	3	20	20	Mouth

TABLE D (Continued)

RECOMMENDED MINIMUM FLOWS FOR FISH LIFE

STREAM	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	LOCATION
Sixes River	215	215 190	190	190	190	60 50	40 30	30	30	40 215	215	215	Mouth
Sixes River	70	70 60	60	60	60	20 15	12 8	8	8	8 70	70	70	Confluence of South Fork
Sixes River	40	40 35	35	35	35	15 10	8 5	5	5	5 40	40	40	Confluence of Middle For
Sixes River	15	15 12	12	12	12	4 3	2	1	1	1 15	15	15	Confluence of North Fork
Dry Creek	40	40 30	30	30	30	8 4	4	4	4	4 40	40	40	Mouth
Edson Creek	35	35 25	25	25	25	8 6	4 3	3	3	3 35	35	35	Mouth
Elephant Rock Creek	15	15 12	12	12	12	6 4	2	2	2	2 15	15	15	Mouth
Otter Creek	12	12 8	8	8	8	4 2	1	1	1	1 12	12	12	Mouth
Middle Fork Sixes River	30	30 25	25	25	25	10 7	5 3	3	3	3 30	30	30	Mouth
North Fork Sixes River	20	20 17	17	17	17	6 4	3 2	2	2	2 20	20	20	Mouth
South Fork Sixes River	40	40 35	35	35	35	20 15	10 8	6	6	6 40	40	40	Mouth
Sugar Creek	7	7	7	7	7	3 2	1	1	1	1	3	7	Mouth
Other Pacific Ocean Tributaries													
Big Creek	12	12	12	12	12	4 2	1	1	1	1	1 12	12	Mouth
Brush Creek	45 40	40	40	40	40	30 20	12 10	8	8	8 45	45	45	Mouth
Euchre Creek	120 105	105	105	105	105	40 25	12 10	10	10	10 120	120	120	Mouth
Euchre Creek	55 50	50	50	50	50	25 15	10 8	8	8	8 55	55	55	Confluence of Crooked Bridge Creek
Boulder Creek	12	12	12	12	12	6 4	2 1	1	1	1	1 3	12	Mouth
Cedar Creek	30 20	20	20	20	20	8 6	4 3	2	2	2 30	30	30	Mouth
Crooked Bridge Creek	9	9	9	9	9	3 2	1	1	1	1	1 2	9	Mouth
Floras Creek						8 6	5	5	5				Highway 101
North Fork Floras Creek						4 3	3	3	3				Confluence of South Fork
South Fork Floras Creek						3 2	2	2	2				Confluence of North Fork
Willow Creek	30 25	25	25	25	25	4 3	3	2	2	2 30	30	30	Mouth
Fourmile Creek	30	30	30	30	30	4 3	3	3	3	3 35	35	35	Mouth
South Fork Fourmile Creek	19	19	19	19	19	3 2	2	2	2	2	2 19	19	Mouth
Hunter Creek	130	130	130	130	130	15 10	7	7	7	7 150	150	150	Mouth
Hunter Creek	-	-	-	-	-	-	5	5	5	5	-	-	Confluence of Big South Fork
Big South Fork Hunter Creek	20	20	20	20	20	5 2	2	2	2	2	5 10	20	Mouth
Little South Fork Hunter Creek	12	12	12	12	12	2 1	1	1	1	1	2 12	12	Mouth
Johnson Creek	5	5	5	5	5	3 2	1	1	1	1	2 5	5	Mouth
Mussel Creek	25	25	25	25	25	6 3	2	2	2	2	4 25	25	Confluence of Myrtle Creek (Highway 101 crossing)
Myrtle Creek	13	13	13	13	13	4 2	1	1	1	1	3 4	13	Mouth
Myers Creek	20	20	20	20	20	4 2	2	2	2	2	2 5	20	Mouth
Twomile Creek (North of Bandon)	6	6	6	6	6	2 1	1	1	1	1	1 2	6	Mouth
Twomile Creek (South of Bandon)	11	11	11	11	11	5 3	2	2	2	2	3 11	11	Mouth

TABLE D (Continued)

RECOMMENDED MINIMUM FLOWS FOR FISH LIFE

STREAM	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	LOCATION
Tenmile Lakes System													
Adams Creek	18	18	18	18	18	3 1	1	1	1	1	2 18	18	Mouth
Benson Creek	50	50	50	50	50	8 2	1	1	1	1	4 50	50	Mouth
Benson Creek	25	25	25	25	25	5 2	1	1	1	1	2 25	25	Section line between sections 17 and 18
Big Creek	35	35	35	35	35	5 2	1	1	1	1	3 35	35	Section line between sections 5 and 6
Noble Creek	14	14	14	14	14	3 1	1	1	1	1	2 14	14	Confluence of Alder Gulch Creek
Alder Gulch Creek	10	10	10	10	10	2 1	1	1	1	1	2 10	10	Mouth
Black Creek	13	13	13	13	13	3 1	1	1	1	1	2 13	13	Mouth
Murphy Creek	10	10	10	10	10	3 1	1	1	1	1	2 10	10	Mouth
Roberts Creek	25	25	25	25	25	5 2	1	1	1	1	3 25	25	Confluence of Johnson Creek
Johnson Creek	50	50	50	50	50	8 2	1	1	1	1	4 50	50	Confluence of Roberts Creek
North Fork Johnson Creek	25	25	25	25	25	5 1	1	1	1	1	3 25	25	Mouth
South Fork Johnson Creek	18	18	18	18	18	4 1	1	1	1	1	2 18	18	Mouth
Robertson Creek	8	8	8	8	8	2 1	1	1	1	1	2 8	8	Mouth
Shutter Creek	18	18	18	18	18	4 1	1	1	1	1	2 18	18	Mouth
Wilkens Creek													
North Arm	6	6	6	6	6	2 1	1	1	1	1	1 6	6	Mouth
South Arm	6	6	6	6	6	2 1	1	1	1	1	1 6	6	Mouth
Winchuck River	145	145	145	145	145	50 35	25 20	20	20	20 175	175	175	Mouth
Winchuck River	90	90	90	90	90	40 25	20 15	15	15	15 110	110	110	Confluence of Bear Creek
Bear Creek	35	35	35	35	35	10 6	4	3	3	3 40	40	40	Mouth
Wheeler Creek	35	35	35	35	35	15 10	7	7	7	7 45	45	45	Mouth
East Fork Winchuck River	35	35	35	35	35	15 10	7	7	7	7 45	45	45	Mouth (Confluence of Wheeler Creek)
Fourth of July Creek	15	15	15	15	15	4 2	1	1	1	1 20	20	20	Mouth

Note: Two figures are given where substantial flow changes occur during the month.
The recommended summer flows for many streams will not be adequate to correct the existing temperature problem.
Where flow figures are omitted sufficient information is not available.

Source: Oregon State Game Commission

ABBREVIATIONS AND SYMBOLS

ac.ft.	acre-feet
Applic.	application
Bd.Ft.	board feet
BLM	Bureau of Land Management
Br.	branch
Can.	canyon
Cert.	certificate
CFS,cfs	cubic feet per second
Co.	Company, County
Cr.	Creek
D.,Dom.	domestic and livestock
d.b.h.	diameter base height
Dr.	drainage
E.	East
elev.	elevation
F.	fish, fork
° F.	degrees Fahrenheit
Fig.	figure
Fk.	Fork
ft.	foot, feet
ft./sec.	feet per second
G.	gulch
gpd	gallons per day
I.,Irrig.	irrigation
In.,Ind.	industrial, industries
Is.	Island
kw	kilowatts
kwh	kilowatt hours
L.	Lake, Little
L.H.	light house
M.	mining
Max.	maximum
Mdw.	meadow
mgd	million gallons per day
mi.	mile
Mid.	middle
Min.	minimum, mining
Misc.	miscellaneous
MSL	mean sea level
Mtn.	mountain
Mu.,Mun.	municipal
N.	North
No.	number
P.	power
P.E.	population equivalent
Pers.	persons
Prec.	precipitation
Pt.	Point
R.,Re.,Rec.	recreation
R.,Riv.	River
R.,Rng.	Range
R.R.A.	Roadside Rest Area
R.S.	Ranger Station
Ref.	reference
Res.	Reservoir
Rk.	Rock
S.	South
S.P.	State Park
Sec.	Section
Sl.	slough
Spr.	Spring
Sq.	square
Sq.Mi.	square mile
Sta.	Station
Str.	Stream
T,Twp.	Township
temp.	temperature
Trib.	tributary
W.	Wayside, West
Σ	sigma (a summation)

A P P R O X I M A T E
H Y D R A U L I C E Q U I V A L E N T S

1 acre foot
= a volume 1 acre in area and 1 foot in depth
= 326,000 gallons
= 43,560 cubic feet
= 0.5 cubic feet per second for 1 day

1 cubic foot per second
= 7.5 gallons per second
= 450 gallons per minute
= 2.0 acre-feet per day
= 650,000 gallons per day

1 inch per day
= 0.04 cubic feet per second per acre
= 27 cubic feet per second per square mile
= 19 gallons per minute per acre

1 inch per hour
= 1.0 cubic feet per second per acre
= 640 cubic feet per second per square mile
= 450 gallons per minute per acre

1 million gallons per day
= 690 gallons per minute
= 1.5 cubic feet per second
= 3.0 acre-feet per day

A C K N O W L E D G M E N T

The following County Water Resource Advisory Committee members are listed in recognition of their work as general committee chairmen, secretaries, and subcommittee chairmen or co-chairmen. Some served in more than one capacity.

COOS COUNTY

General Chairman - Frank Rood

Committee Secretary - George Jenkins

Subcommittee Chairmen:

George Burr
Harry Christensen
Robert Detlefsen
John Huffman
Ivan Laird
Jack LaFlamme
James Larson
A. J. Moore
C. V. Signor
Jerry Ulett

CURRY COUNTY

General Chairman - Robert Van Leer

Committee Secretary - Louis Oester

Subcommittee Chairmen:

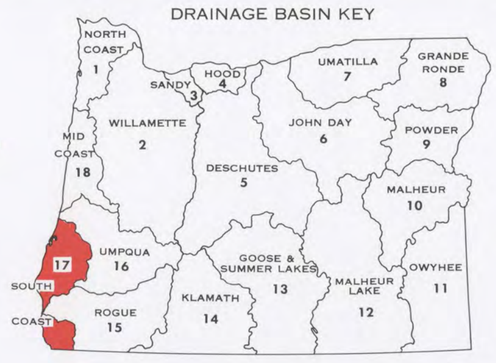
Robert Anderson
Norman Baker
Ed Carpenter
Robert Knox
Ted McKenzie
Jack Wright

SOUTH COAST DRAINAGE BASIN OREGON

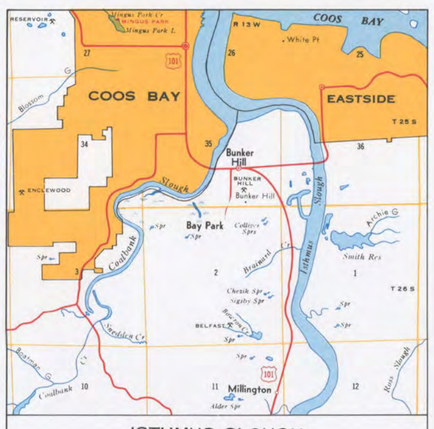
STATE WATER RESOURCES BOARD
SALEM, OREGON
1971

MAP NO. 17.6

DRAINAGE BASIN KEY

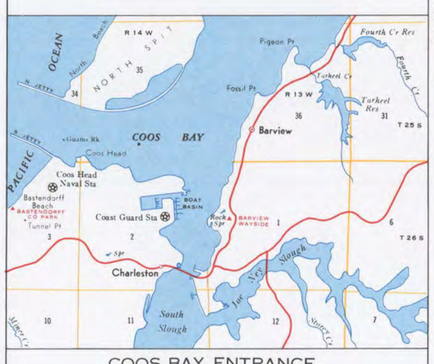


ISTHMUS SLOUGH



MILES 0 1 2

COOS BAY ENTRANCE



MILES 0 1 2

CHETCO RIVER MOUTH



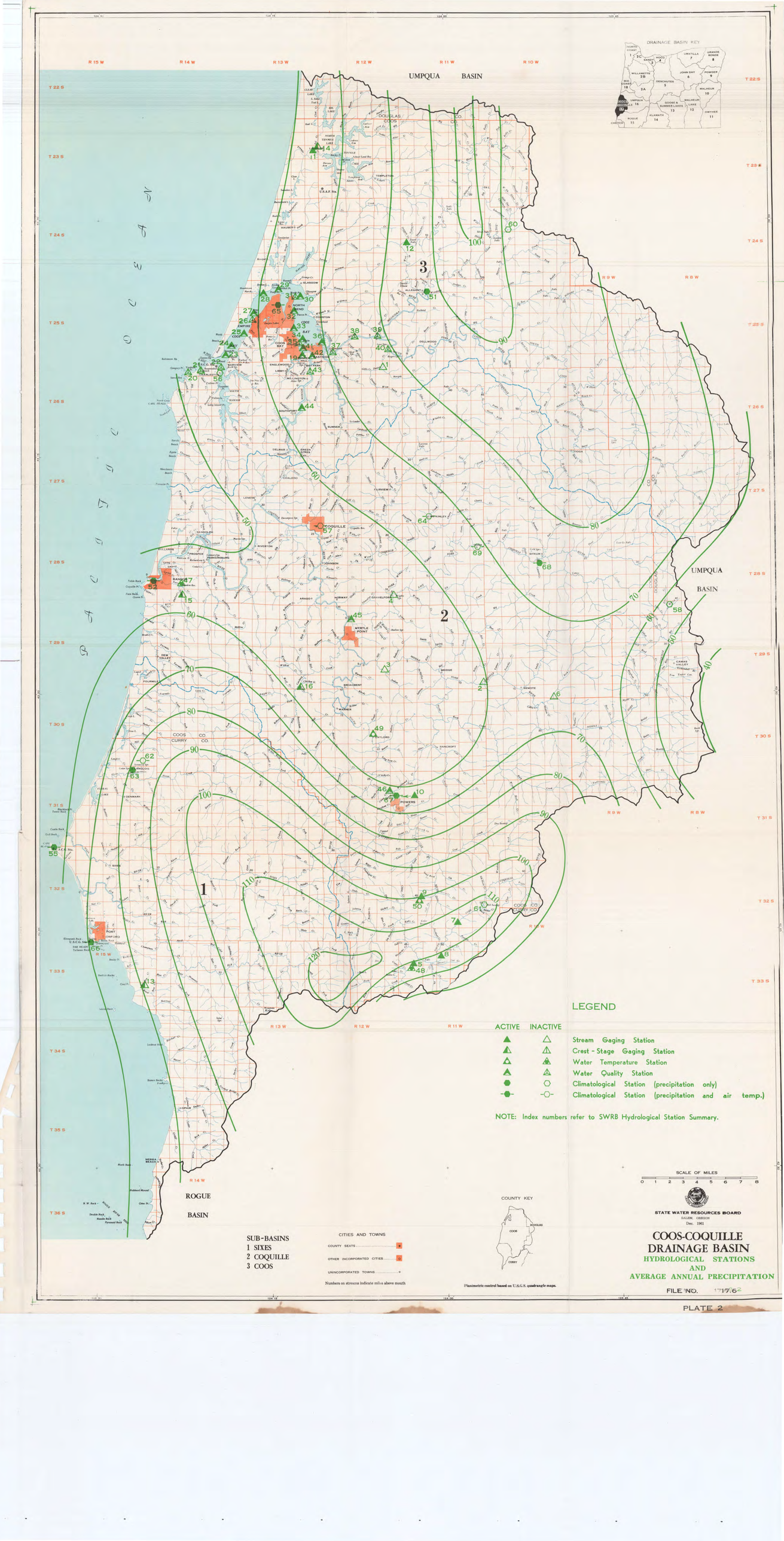
LEGEND

INCORPORATED CITY
OVER 10,000 — COOS BAY
1,000 - 10,000 — BANDON
UNDER 1,000 — POWERS
UNINCORPORATED COMMUNITY — Sitkum
FORMER COMMUNITY, PLACE NAME — (Corbin)* * Callahan
Includes place names of historical significance.
ROADS: PAVED, GRAVEL, DIRT
BOAT LANDING — LDG
PARK OR CAMPGROUND — LONG RIDGE CG
Includes State parks and waysides, Forest Service camps, BLM camps, County and Municipal parks, Organizational camps, Hunter camps and Resorts.
RANGER STA., GUARD STA., LOOKOUT — RS GS LO
ELEVATION IN FEET: LAND, WATER, ROAD — 3642 711 3330
Elevations shown on Reservoirs are at maximum pool.
PERENNIAL STREAM, LAKE
INTERMITTENT STREAM, LAKE
STREAM MILES (MILES ABOVE MOUTH) — 45
CANAL OR DITCH — Cook Ditch
STREAM OR CANAL GAGE — 3250
USGS and Oregon State Engineer gages active in 1970.
FALLS, RAPIDS — Falls, Rapids
SPRING — Salt Spr
MARSH, MEADOW — McCoy Swamp, Bear Mdw
DAM, DIKE, JETTY
HYDRO POWER PLANT — POWER PLANT
WATER PIPELINE, SIPHON, FLUME OR TUNNEL — Siphon
MINE, QUARRY, GRAVEL PIT, ETC. — LAMPA Q GP
Name of mine included where space permits

MILES 1 0 1 2 3 4 5
POLYCONIC PROJECTION

STATE OF OREGON WATER RESOURCES BOARD

Transcribed by Google Cloud Vision

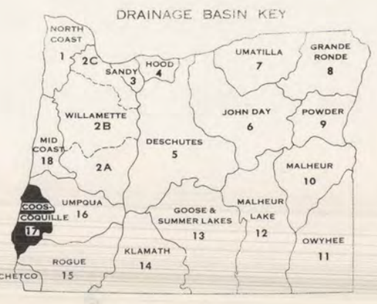

DRAINAGE BASIN KEY
UMPQUA BASIN
SUBDUCTION ZONE
SUB-BASINS
1 SIXES
2 COQUILLE
3 COOS
ROGUE BASIN
UMPQUA BASIN
COUNTY KEY
CITIES AND TOWNS
COUNTY SEATS
OTHER INCORPORATED CITIES
UNINCORPORATED TOWNS
Numbers on streams indicate miles above mouth
Planimetric control based on U.S.G.S. quadrangle maps.
LEGEND
ACTIVE INACTIVE
Stream Gaging Station
Crest - Stage Gaging Station
Water Temperature Station
Water Quality Station
Climatological Station (precipitation only)
Climatological Station (precipitation and air temp.)
NOTE: Index numbers refer to SWRB Hydrological Station Summary.
SCALE OF MILES
0 1 2 3 4 5 6 7 8
STATE WATER RESOURCES BOARD
SALEM, OREGON
Dec. 1961
COOS-COQUILLE
DRAINAGE BASIN
HYDROLOGICAL STATIONS
AND
AVERAGE ANNUAL PRECIPITATION
FILE NO. 17176.2
PLATE 2


DRAINAGE BASIN KEY
NORTH COAST 1
2C
HOOD 3
SANDY 4
UMATILLA 7
GRANDE RONDE 8
WILLAMETTE 2B
JOHN DAY 6
POWDER 9
MID COAST 18
DESCHUTES 5
3A
MALHEUR 10
UMPQUA 16
GOOSE & SUMMER LAKES 13
LAKE 12
DWYHEE 11
ROGUE 15
KLAMATH 14
CHETCO
UMPQUA BASIN
ROGUE BASIN
SOUTH COAST BASIN
DOUGLAS CO.
COOS CO.
CURRY CO.
1
2
3
COOS BAY
COQUILLE
MYRTLE POINT
BANDON
NORTH BEND
EMPIRE
COOS BAY
PORT ORFORD
GOLD BEACH
GRANTS PASS
R 15 W
R 14 W
R 13 W
R 12 W
R 11 W
R 10 W
R 9 W
R 8 W
T 22 S
T 23 S
T 24 S
T 25 S
T 26 S
T 27 S
T 28 S
T 29 S
T 30 S
T 31 S
T 32 S
T 33 S
T 34 S
T 35 S
T 36 S
SUB-BASINS
1 SIXES
2 COQUILLE
3 COOS
CITIES AND TOWNS
COUNTY SEATS
OTHER INCORPORATED CITIES
UNINCORPORATED TOWNS
Numbers on streams indicate miles above mouth
WATER RIGHTS
JANUARY 1, 1962
SURFACE WATER
999 Application
R 999 Reservoir storage application
HE 999 Hydroelectric power application
GROUND WATER
G 999 Application
GR 999 Registration
NOTE: Individual rights are described in SWRB Water Rights Summary
COUNTY KEY
COOS
DOUGLAS
CURRY
Planimetric control based on U.S.G.S. quadrangle maps.
SCALE OF MILES
0 1 2 3 4 5 6 7 8
STATE WATER RESOURCES BOARD
SALEM, OREGON
Dec. 1961
COOS-COQUILLE DRAINAGE BASIN
WATER RIGHTS
FILE NO. 17.63

DRAINAGE BASIN KEY
UMPQUA BASIN
ROGUE BASIN
SIXES
COQUILLE
COOS
DOUGLAS CO
COOS CO
CURRY CO
LEGEND
Damsite
(Index numbers refer to SWRB Potential Damsite Summary.)
Watershed Studied By USDA
(Numbers refer to Watershed Reconnaissance Data Summary.)
Area Not Studied
DATA SOURCE: U. S. Dept. of Agriculture
U. S. Geological Survey
Corps of Engineers
Pacific Power & Light Co.
Coos - Curry Electric Co-op
SUB-BASINS
1 SIXES
2 COQUILLE
3 COOS
CITIES AND TOWNS
COUNTY SEATS
OTHER INCORPORATED CITIES
UNINCORPORATED TOWNS
Numbers on streams indicate miles above mouth
COUNTY KEY
Planimetric control based on U.S.G.S. quadrangle maps.
SCALE OF MILES
0 1 2 3 4 5 6 7 8
STATE WATER RESOURCES BOARD
SALEM, OREGON
Dec. 1961
COOS-COQUILLE DRAINAGE BASIN
DAMSITES
FILE NO. 17 17.66
PLATE 5

UMPQUA BASIN

DRAINAGE BASIN KEY



R 15 W R 14 W R 13 W R 12 W R 11 W R 10 W R 9 W R 8 W

T 22 S T 23 S T 24 S T 25 S T 26 S T 27 S T 28 S T 29 S T 30 S T 31 S T 32 S T 33 S T 34 S T 35 S

124° 30' 124° 15' 124° 00' 123° 45'

43° 30' 43° 15' 43° 00'

PACIFIC OCEAN

COOS BAY · COOS RIVER · COQUILLE RIVER · UMPQUA RIVER · SIXES RIVER · ELK RIVER · SOUTH FORK COQUILLE RIVER · MIDDLE FORK COQUILLE RIVER · NORTH FORK COQUILLE RIVER · EAST FORK COQUILLE RIVER · WEST FORK COQUILLE RIVER · MILLICOMA RIVER · DOUGLAS CO. · COOS CO. · CURRY CO.

CLEAR LAKE · L. Edna · Teal L. · EEL LAKE · Hall L. · NORTH TENMILE LAKE · LAKESIDE · TENMILE LAKE · School Land Bay · Devore Arm · Shutter Arm · Templeton Arm · TEMPLETON · U.S.A.F. Sta. · Clear L. · Saunders L. · Butterfield L. · Beale L. · Lagoon Res. · HAUSER · Sandpoint L. · Horsfall L. · Henderson Marsh · Jordan L. · Jordan Cove · Jordan Pt. · GLASGOW · Glasgow Pt. · Porter Pt. · North Pt. · NORTH BEND · Pierce Pt. · COOSTON · Crawford Pt. · Empire Lakes · EMPIRE · Pony Cr. Res. · COOS BAY · Mingus Park · Graveyard Pt. · EASTSIDE · BUNKER HILL · Cutler Spr. · BAY PARK · ENGLEWOOD · LIBBY · MILLINGTON · Alder Spr. · Baltimore Rk. · Gregory Pt. · Yoakum Pt. · U.S.C.G. Sta. · Bastendorf Beach · CHARLESTON · Sunset Bay · Coalbed Pt. · Yoakum · BARVIEW · Rock Spr. · Tarheel Cr.-A-Ree · Pigeon Pt. · Fossil Pt. · Coos Head · Gunder Rk. · N. Jetty · North Spit · North Beach · Empire Lakes · Chicken Pt. · Pony Cr. Res. · Mingus Park · Graveyard Pt. · Yellow Jacket Cr. · Ideal Spr. · Archer Cr. · Bastendorf Beach · Sacchi Beach · Agate Beach · Merchants Beach · Fivemile Pt. · North Cove · CAPE ARAGO · South Cove · Big Creek · Cape Cr. · Sevenmile · Watson Cr. · Lindy Cr. · Whiskey Run Cr. · Elliott Cr. · Walline Ln. · Long Island · Yoakum · Coalbed Pt. · Sunset Bay · Tenmile · Tenmile Cr. · Rocky Pt. · Willow Pt. · Clear L. · Saunders L. · Butterfield L. · Beale L. · Lagoon Res. · Sandpoint L. · Horsfall L. · Henderson Marsh · Jordan L. · Jordan Cove · Jordan Pt. · Pony Pt. · North Pt. · Pierce Pt. · Crawford Pt. · Graveyard Pt. · Yellow Jacket Cr. · Ideal Spr. · Archer Cr. · Bastendorf Beach · Pigeon Pt. · Fossil Pt. · Coos Head · Gunder Rk. · N. Jetty · North Spit · Baltimore Rk. · Gregory Pt. · Yoakum Pt. · Sunset Bay · Coalbed Pt. · Yoakum · Tenmile · Tenmile Cr. · Rocky Pt. · Willow Pt. · Devore Arm · Shutter Arm · Templeton Arm